

EXAMINATION OF THE EFFECTS OF INTERPROFESSIONAL
COLLABORATION ON HEALTH CARE PROVIDER AND TEAM PRODUCTIVITY
IN PRIMARY HEALTH CARE: AN IMPORTANT CONSIDERATION IN HEALTH
HUMAN RESOURCES PLANNING

by

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DEDICATION PAGE

This dissertation is dedicated to health care providers in general, and more specifically, to the health care providers that chose to participate in my research study. This work would not be possible without the generosity of your time and wisdom and your willingness to share your experiences with me. I have learned so much from you all.

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ABSTRACT

Health human resources (HHR) crises have been forecasted based on predicted shortages in all health care provider (HCP) groups. How HCPs use their individual and complementary competencies to work together impacts these crises. Interprofessional collaboration (IPC) is promoted as a means to create HHR efficiencies and enhance quality of care. Thus it is reasonable to establish not only if IPC occurs in teams but also the extent to which it occurs and how it affects productivity.

An embedded mixed-methods approach was used to discover HCPs' definitions of IPC, their ability to collaborate, and their perceived level of productivity. Fifteen HCPs participated in two semi-structured interviews and self-assessment for demonstration of IPC competencies using the Interprofessional Collaborator Assessment Rubric (ICAR). Applied thematic analysis was used to analyze the interview data. Bivariate analysis of ICAR data was performed. Comparative analysis of participant's interviews in conjunction with their ICAR scores was completed.

IPC definition themes included: understanding/valuing/using team expertise, communication, team member availability, and belongingness. IPC competency relevance, deeper understanding/heightened awareness, and differences between knowing and doing emerged as post-ICAR IPC definition themes. Contributing to/achieving patient outcomes were the hallmark of personal productivity, alongside the ability to complete the 'to-do' list and manage changing priorities. Post-ICAR personal productivity themes included: status quo work environments do not support collaboration/productivity and productivity could be defined differently. Team productivity was depicted as the right person with the right skills and team productivity enhanced collaboration. Post-ICAR team productivity themes included: the importance of role modeling IPC and leaving the team if unable to collaborate. Participants acknowledged similar barriers to productivity and IPC: medical model, hierarchy, turf protection, inconsistent funding/remuneration, and scope of practice restrictions. Quantitative analysis indicated that participants believed themselves to be demonstrating the IPC competencies at '*above expected*' levels. The amount of variance of the competencies was quite low. Correlation analyses shed light on the content validity of this limited data set, particularly when they were considered alongside the qualitative analyses. The trueness of the conclusions drawn from the quantitative observations is demonstrated by the consistency of the qualitative observations and supported by relevant literature.

LIST OF ABBREVIATIONS AND SYMBOLS USED

AHP	Allied Health Professional
AIPHE	Accreditation of Interprofessional Health Education
ANA	American Nurses Association
ANCOVA	Analysis of Covariance
ANOVA	Analysis of Variance
ATA	Applied Thematic Analysis
BI	Behavioural Indicator
CACHC	Canadian Association of Community Health Centres
CACHCA	Canadian Alliance of Community Health Centre Associations
CAIPE	Centre for the Advancement of Interprofessional Education
CAM	Complementary and Alternative Medicine
CBA	Competency-based Approach
CB-HHRP	Competency-based Health Human Resources Planning
CEO	Chief Executive Officer
CHC	Community Health Centre
CI	Confidence Interval
CIHC	Canadian Interprofessional Health Collaborative
CIHI	Canadian Institute for Health Information
CNA	Canadian Nurses Association
CV	Coefficient of Variation
DEA	Data Envelopment Analysis
DHA	District Health Authorities

DRG	Diagnostic-related Groups
EMR	Electronic Medical Record
ES	Effect Size
FCA	Friction Cost Approach
FHT	Family Health Team
FPC	Finite Population Correction
GIM	General Internal Medicine
GP	General Practitioner
HCA	Human Capital Approach
HCP	Health Care Provider
HHR	Health Human Resources
HHRP	Health Human Resources Planning
$H_{i,j,t}$	the proportion of the population by level of health need for age group i and gender j at time t
HPPD	Hours per Patient Day
HPPV	Hours per Patient Visit
HRA	Health Risk Appraisal
ICAR	Interprofessional Collaborator Assessment Rubric
ICU	Intensive Care/Intensive Care Unit
ICUMAQ	Intensive Care Unit Management Attitudes Questionnaire
IECPCP	Interprofessional Education for Collaborative Patient-centered Practice
IEM	Internationally Educated Medical
IHI	Institute for Healthcare Improvement
IP	Interprofessional

IPC	Interprofessional Collaboration
IPE	Interprofessional Education
IPEC	Interprofessional Education Collaborative
KR 20	Kuder-Richardson 20
LPN	Licensed Practical Nurse
Mdn	Median
MDS	Minimum Data Set
MOCINS	Model of Care Initiative in Nova Scotia
N/O	Not Observed
$N_{i,j,t}$	number of HCPs required to perform each service to patients of age group i and gender j at time t (i.e., the inverse of productivity)
NM	Nurse Manager
NSACPHCR	Nova Scotia Advisory Committee on Primary Health Care Renewal
OECD	Organization for Economic Co-operation and Development
OLS	Ordinary Least Squares
PCH	Patient Care Hours
PD	Patient Day
PHC	Primary Health Care
$P_{i,j,t}$	the size of the population in age group i and gender j at time t
PP	Pay Period
PT	Physical Therapy
$Q_{i,j,t}$	number (or quantity) of services required by level of need per person of age group i and gender j at time t
QWL	Quality of Work Life
RAI	Resident Assessment Instrument

RCT	Randomized Controlled Trial
REB	Research Ethics Board
RN	Registered Nurse
ROI	Return on Investment
RQ	Research Question
R_t	the number of HCPs required to meet the service needs of a population at time t
RUG	Resource Utilization Groups
SB-HHRP	Service-based Health Human Resources Planning
SCRIPT	Structuring Communication Relationships for Interprofessional Teamwork
SD	Standard Deviation
SoD	Social Desirability
SoP	Scope of Practice
UOS	Unit of Service
US	United States
WHO	World Health Organization
WLQ	Work Limitations Questionnaire
WPAI-GH	Work Productivity and Activity Impairment Questionnaire: General Health
Σ	Sum of all values
+	Concurrent
→	Sequential
()	Embedded
→←	Recursive process

[]	Mixed-methods used in a single study that is within a series of studies
=	Purpose of mixing methods
α	Alpha
β	Beta
n	Sample size
N	Population size
η^2	Eta squared
\bar{x}	Mean

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IPE/C is above that of an expert, for he is a craftsman in this field and I am honored to have him on my ‘team’.

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CHAPTER 1 INTRODUCTION

Background and Rationale

For many years, a global health human resources (HHR) crisis has been forecasted based, to some extent, on predicted shortages in all health care provider (HCP) groups. The health workforce, fundamental to the delivery of high-quality, safe and accessible care, is being taxed due in part to these shortages, and as a result, health systems performance is expected to suffer. HHR planning (HHRP) is a viable method to better understand the composition and distribution of the workforce and health worker behaviour so that effective interventions can be created to improve workforce performance (World Health Organization, 2008a).

It is widely understood that many stakeholders – policy-makers, professional bodies, research funding agencies – are calling for innovative and accurate ways to effectively plan for the health workforce (Tomblin Murphy, Birch, O’Brien-Pallas, Kephart, & MacKenzie, 2011; Tomblin Murphy, MacKenzie, et al., 2009; World Health Organization, 2008a). And, as is also becoming increasingly apparent, a number of methods typically employed to forecast the health workforce (i.e.; population to provider or population to utilization ratios) are not adequately doing so as a result of faulty assumptions. These assumptions include that future health care demand is solely influenced by the current supply of HCPs, that the age and/or gender of the population determines service need, that context (i.e.; time, place) does not influence health care needs, and that the production of HCPs does not change (Birch et al., 2007; Birch et al., 2009; Birch, Mason, Sutton, & Whittaker, 2013; Birch, O’Brien-Pallas, Alksnis, Tomblin Murphy, & Thomson, 2003; Bloom, Duckett, & Robertson, 2012; Bloor & Maynard,

2013; O'Brien-Pallas et al., 2007; Tomblin Murphy, Birch, MacKenzie, et al., 2011; Tomblin Murphy, Kephart, Lethbridge, O'Brien-Pallas, & Birch, 2009; Tomblin Murphy & MacKenzie, 2013; Tomblin Murphy, MacKenzie, et al., 2009). These assumptions must be corrected for any HHRP model to be useful.

HHRP must be about having the right number and skill mix of HCPs in the right place at the right time (Birch et al., 2007) and it must be based on more than forecasted size or demographic mix of the population as there are other equally important factors that impact planning. Consideration must be given to population health care needs, the range of available health care services, the methods of and resource commitment to health care program delivery, the production and characteristics of HCPs, and technological advances in health care (Tomblin Murphy & O'Brien-Pallas, 2002). The Health System and Health Human Resources Planning Conceptual Framework (Tomblin Murphy & O'Brien-Pallas, 2006) is a methodology designed to address these considerations as it captures the importance of planning for HHR requirements within the context of needs. It is used as the theoretical foundation for this study and is described at length in Chapter Three.

When undertaking a needs-based HHRP approach it is equally important to consider *how* HCPs work together and the impact team delivered care has on workforce productivity. Interprofessional collaboration (IPC) has been promoted as a means to create HHR efficiencies and enhance the quality of care and is defined as occurring “when two or more individuals from different backgrounds with complementary skills interact to create a shared understanding that none had previously possessed or could have come to on their own” (World Health Organization, 2010, p. 36). Given the

potential impact that IPC may have on HHRP, it is reasonable to not only establish *if* IPC occurs in health teams but also the extent to which it occurs and how it might affect productivity, as these factors may greatly influence health systems performance. Yet productivity, typically defined and measured in terms of the relationship or ratio of outputs to inputs, is a difficult concept to define and measurement variables differ depending on the purpose of analysis (Curtin, 1995; Evans, Schneider, & Barer, 2010; Holcomb, Hoffart, & Fox, 2002; Smith, 2010; Suter & Deutschlander, 2010).

Oftentimes productivity measures are purely economic and pay little attention to the impact of knowledge, skills, judgment, and patient/provider experiences on productivity as these unquantifiable variables do not easily fit into economic productivity equations (Holcomb et al., 2002). But the accumulated economic value of experience, creativity, enthusiasm, and knowledge and skills (read: human capital), that are owned by workers and made available to an organization, should be considered useful assets as they can be translated into practical activities that create a competitive advantage over other organizations (Agor, 1997; AL-Ma'ani & Jaradat, 2010; McGillis Hall, 2003). Essentially, productivity from this viewpoint is understood to be directly proportional to the supply of human capital (Tranmer, Guerriere, Ungar, & Coyte, 2005) and human capital is directly related to the competencies that workers' possess.

In keeping with these arguments, when examining whether IPC affects productivity, it is imperative that one considers the human capital (i.e.; the knowledge, skills, and attitudes) associated with IPC. It is anticipated that when interprofessional (IP) human capital is developed, HCPs will begin to reflect upon how they work within their team and perhaps adopt more efficient and productive work practices. Moreover, when

HCPs are able to work to their optimal scope of practice while adopting the competencies necessary for IPC, the numbers required to meet population health needs should change to a more efficient mix where the right numbers are in the right place at the right time doing the right thing. As such, the level to which IPC occurs and the impact it has on productivity is of great importance to HHRP as the ability of HCPs to work in a more productive manner may significantly influence health systems performance. Yet, no research could be found that linked the knowledge, skills, and attitudes associated with IPC to productivity measurement. Specifically, there were no studies found that examined whether the adoption of IPC competencies would impact HCP productivity as assessed by HCPs themselves.

Purpose and Statement of Research Questions

This doctoral study focused on HCPs' capacity to collaborate and the subsequent effects this may have had on their perceived productivity. The purpose of this study was to discover HCPs' understandings about IPC and their perceived level of efficiency and effectiveness when working with their team; to determine the extent to which HCPs demonstrate the competencies that are related to IPC; and, to explore whether self- and peer-assessment for the IPC competencies changed HCPs' sense of being efficient and effective. In essence, did it change their perceptions of being productive? In an effort to advance knowledge in the field of primary health care (PHC), the study was situated within this setting.

An embedded mixed-methods research design guided the study as this methodology provided the means to answer each of the research questions while allowing

for quantitative and qualitative understanding regarding how IPC affects perceived HCP productivity in the PHC setting. The research questions (RQ) that guided the study are:

RQ 1: How do HCPs define IPC? What are HCPs' perceived level of personal and team productivity (efficiency, effectiveness) when working in a team environment?

RQ 2: To what extent do HCPs demonstrate performance of IPC competencies, as assessed using the Interprofessional Collaborator Assessment Rubric (ICAR)?

RQ 3: How did the self- and peer-IPC competency assessments change HCPs' definitions of IPC? What are HCPs' perceptions of personal and team productivity after completing the assessments?

Invitation for Reflection

I believe that it is important to situate myself for you, the reader; for as I write from my “voice”, so too will you read from yours. The following elements have made me who I am today and influence the lens with which I view the world. I write from the perspective of a white, middle class, female registered nurse. I have been a registered nurse for over 30 years. For the first part of my nursing career, I practiced as a staff nurse in intensive care; in the latter, as an educator, researcher and practice setting consultant with a particular focus on interprofessional education (IPE) and IPC. I have had the privilege and pleasure of helping health care teams learn about, from, and with one another on their journey to becoming interprofessional and collaborative. Along the way, I have heard many stories about inefficiencies in the care they provide.

Underscoring my work in the field of IPE is my worldview of what knowledge is and how knowledge is generated. I believe that knowledge is not always objective; that it

is subjectively created through lived experiences that, when shared, can lead to in-depth understanding of a phenomenon. Yet, I also recognize the importance of being able to reduce phenomena into its basic parts (in this case, the IPC competencies) so that one can determine whether or not something is occurring. Thus, I believe that a qualitative and a quantitative exploration of HCP experiences in relation to IPC and productivity are warranted.

As you read I encourage you to use your own lens. This may not come easy, for differences such as power, knowledge, beliefs, values, experience, and attitudes will position each one of us within our own perspective and may make it difficult to appreciate that others have valuable perspectives too. Nevertheless, I urge you to read on with an open mind and emulate the philosophical underpinnings of IPE - to learn about, from, and with one another.

CHAPTER 2 LITERATURE REVIEW

There are various standpoints regarding the *modus operandi* for the critical appraisal of literature within the research process. Depending upon whether the study takes a qualitative or quantitative approach, the technique and rationale for the critical appraisal will vary. Prior to a qualitative investigation, an extensive literature review is not generally performed so that the researcher can remain a stranger to the topic thereby guarding against the development of preconceived notions that would threaten to lead participants in directions that the researcher has uncovered in the literature (Streubert & Carpenter, 1999). And even within the qualitative paradigm there are divergent beliefs depending on the type of study being conducted. Purists would suggest that no literature review be done prior to inquiry (as in phenomenology), another faction would propose that one read everything available on the topic (as in ethnography), while others advocate for a critical examination of only relevant literature so that the investigator may remain open yet informed (such as in grounded theory) (Burns & Grove, 2009; Morse & Field, 1995; Streubert & Carpenter, 1999). Whatever stance is taken, the importance of the qualitative research literature review becomes evident during the analysis phase, at which point the research findings can be placed in context with what is uncovered in the literature (Streubert & Carpenter, 1999).

In contrast, from a quantitative perspective, regardless of the type of study being performed, an extensive critical appraisal of the literature is necessary at the beginning of the research process as it uncovers the gaps, consistencies, and inconsistencies in the area of inquiry and thus guides the creation of a robust research study (Burns & Grove, 2009; Krainovich-Miller & Cameron, 2009). Through this broad review, the researcher

becomes aware of unanswered questions within the topic area. Quantitative literature appraisals highlight the strengths and weaknesses of prior studies thereby assisting in the establishment of appropriate research designs, methodologies, and analysis for addressing the current research question(s) or hypothesis(es) (Krainovich-Miller & Cameron, 2009). During the discussion phase of the research report, a second limited literature review is conducted to compare and integrate new knowledge garnered from the study with previously cited findings.

Because I conducted a mixed methodological research investigation, I executed a review of empirical, theoretical, and grey literature that moved beyond a cursory, to a more comprehensive examination. Four main subject areas, which emerged during the conceptualization of the study, were searched: IPC, specifically as it related to the required knowledge, skills, and attitudes; competency movement/competency-based approach (CBA); IPC competencies; and, productivity. These fields emerged as I reflected upon IPC in the practice setting, as follows: in order to collaborate fully and successfully in an IP team, I believe that HCPs must adopt IPC competencies. I speculate that said competencies will enhance one's knowledge, skills, and attitudes and as a result will positively impact performance within the team. Subsequently, the enhancement in HCP performance should also positively impact their productivity and as such becomes an important consideration of needs-based HHRP.

The literature review begins with a brief presentation of the critical appraisal frameworks and search strategies used. Each of the abovementioned content areas are then defined and relevant literature is critically analyzed and synthesized. I conclude with

a discussion of the gaps found and present rationale that will support my proposed research study.

Critical Appraisal Frameworks

Originally, it was anticipated that the PICO Framework for Critical Appraisal of Quantitative Research (Richardson, Wilson, Nishikawa, & Hayward, 1995) would be utilized to evaluate the quantitative studies. However, upon examination of the studies collected it quickly became evident that this approach would not be appropriate as the papers were neither randomized controlled trials (RCTs), causation/harm studies, nor treatment/prevention studies. Instead, the critiquing guidelines for quantitative research as suggested by Heermann, Craft, and Singh (2009) were applied. The Qualitative Research Critical Review Framework by Letts et al. (2007) was used to critique the qualitative studies. Theoretical and grey literature was also examined to develop a deeper and more meaningful understanding of IPC, the requisite IPC competencies, CBA, and productivity.

Search Strategies

A search for empirical, theoretical, and grey literature that specifically investigated or provided deeper understanding related to the abovementioned content areas was conducted within the following parameters: English language papers only, from years 1990 to 2012, in peer-reviewed journals and/or online sources. Electronic databases and online sources searched included: Business Source Complete, Canadian Interprofessional Health Collaborative online library, CINAHL, EconoLit, EMBASE, Health and Psychosocial Instruments, online Journal of Research in Interprofessional Practice and Education, Medline, PsychArticles, PsychInfo, PubMed, SocIndex, The

Cochrane Collaboration, and Web of Science. In addition, reference lists of relevant and included studies were hand-searched. All articles identified by the databases were considered for inclusion by first reviewing the title, and if deemed suitable, the abstract was reviewed. If at this stage the abstract contained content germane to the study, the full text was reviewed. Papers were excluded if they did not meet the search criteria. During the analysis phase, a secondary search was conducted from years 2012-2015, using the same parameters and databases as outlined above.

While searching for articles related to IPC and IPC competencies, it was important to consider that although the phrases ‘interprofessional’, ‘interdisciplinary’ and ‘multidisciplinary’ have evolved with different meanings, studies continue to use the words interchangeably depending on the context in which they are used. For example, in Sweden, the prefixes ‘inter’ and ‘multi’ are unfamiliar, and thus are used reciprocally (Kvarnstrom & Cederlund, 2006). Hence, the search for literature related to IPC and IPC competencies included the words interprofessional, interdisciplinary, and multidisciplinary in combination with: collaboration, indicators, measurement, measures, teamwork, pre-licensure, post-licensure, post-graduate, organizational culture, and practice setting.

Papers specific to the competency movement or CBA were searched using the terms competency or competency-based together with: education, collaboration, HHRP, development, practice, health care, measurement, team, and teamwork. Productivity articles were discovered using the following terms, either in isolation or in combination with one another: productivity, HHRP, measurement, calculation, efficiency, impact, indicators, measures, health services, health worker, and workforce.

Interprofessional Collaboration

Way, Jones, and Busing (2000) describe IPC as an “inter-professional process for communication and decision making that enables the separate and shared knowledge and skills of care providers to synergistically influence the client/patient care provided” (p. 3). In an effort to make this definition measureable, Gilbert offered that the process of communication and decision-making, measured as a function of the knowledge, skills, and attitudes learned, occurs through changing HCPs’ attitudes and behaviours (personal communication, April 24, 2012). I would agree and suggest that the change in attitudes and behaviours occurs as a result of HCPs having opportunities to learn from, with, and about one another, which will be discussed in more depth later. Deepening the understanding of IPC, Health Canada (2003, as cited in Oandasan et al., 2004) describes collaborative patient-centered practice as the active contribution of each discipline in patient care where patient and family-centered goals/values are enhanced, communication among HCPs is improved, and participation in and respect for clinical decision-making both among and between professions is fostered.

Although each definition has its merits in describing IPC and highlights some essential competencies, the use of the term ‘professional’, or even ‘discipline’ for that matter, may connote a more hierarchical and exclusionary stance than intended and has been the source of angst by those who are not in a regulated health profession. For this reason, I find the World Health Organization’s (2010) definition of IPC more inclusive as it speaks to those HCPs who may not be regulated or even come into direct contact with the patient/family but are an integral part of any health care team. IPC is described as occurring “when two or more individuals from different backgrounds with

complementary skills interact to create a shared understanding that none had previously possessed or could have come to on their own. When health workers collaborate together, something is there that was not there before” (WHO, 2010, p. 36). It is also important to note that while coordination and cooperation form the basis for collaboration, by themselves they are not enough to ensure or sustain IPC (WHO, 2010). IPC unfolds when these above-mentioned qualities are blended with mutual respect, trust, autonomy, responsibility, communication, and assertiveness (Bronstein, 2003; Oandasan & Reeves, 2005). The IPC team shares leadership, fosters *interdependence* between members, and endeavors to improve team performance (Bronstein, 2003; Oandasan & Reeves, 2005). Team members appreciate that no single HCP can meet all of the complex needs of any individual and therefore become engaged in the patient’s care journey based upon their competencies and scope of practice, rather than on a professional title. IPC team members understand their own roles, responsibilities, and scopes of practice as well as those of their teammates, they respect each other’s perspectives, and share in open and honest communication (Hall & Weaver, 2001; Yeager, 2005).

Qualitative IP Literature Review

Applying the search processes and inclusion criteria as described above, 12 qualitative research articles were included in the critique as they either directly described and/or intimated the knowledge, skills, and attitudes required for IPC or they allowed for a more comprehensive understanding of the concept. Although there were areas of overlap between the papers chosen, five broad themes emerged from the appraisal and include: criteria for success; roles and relationships; practice-based IPE as the foundation for IPC; organizational culture; and, communication.

Criteria for success. Coordination of limited human and financial resources has become a necessity as a result of escalating health care costs, rising technological complexities, and increasing HCP specialization (Mickan & Rodger, 2005). Not surprisingly then, it is imperative that focus be placed on the criteria/structures necessary to create and support successful IP teams so as to function effectively within these limited resources. Unfortunately, there were few validated predictors of successful teams that were found in the literature.

Mickan and Rodgers (2005) adopted a two-stage mixed methodological approach to understand what constituted effective teamwork. In Stage I, physicians, nurses, administrators, and allied health professionals (AHP) (n=39) participated in repertory grid interviews and clarification questionnaires to identify the bipolar constructs of personal teamwork experiences. In Stage II, the Teamwork in Health Care Inventory questionnaire (Mickan, 2002 as cited in Mickan & Rodgers, 2005) was distributed to 202 HCPs from the same group of hospitals that were involved in Stage 1. Findings suggested that effective teams had a distinct, forward-thinking purpose which was relevant to both patients and the organization. Goals were measurable, descriptive, and established collaboratively. Team leaders were facilitative; situating and maintaining decision-making structures, managing conflict, sharing ideas and information, coordinating tasks, and providing feedback while at the same time listening to, supporting, and trusting team members (Mickan & Rodgers, 2005). Team communication was described as flexible, regular, and easy so that all members were able to share ideas and information. When the team worked together over long periods of time, they were depicted as being trustful and cohesive with a strong sense of obligation and camaraderie; consequently, they wanted to

continue to work together. Mutual respect was also present in effective teams, where members were open to diversity and to integrating the contributions of all (Mickan & Rodgers, 2005). Several key attributes related to IPC can be identified from this study (i.e.; clear purpose and goals, facilitative leadership, meaningful communication, and respect), which speak to the some of the competencies required for IPC to thrive.

In a study spanning 10 hospitals of varying size from a range of geographic regions in the Unites States, Orr (2010), using a grounded theory approach, investigated the characteristics that shaped positive working relationships between nurses and support service workers. The study was conducted from the perspective of the support service worker; 298 participated in 65 focus groups, and included HCPs from environmental (housekeeping), food and nutrition, patient transportation, biomedical (clinical) engineering, facilities management, security, and laundry/linen services. A model of collaborative working relationships emerged, where mind-set and modeling behaviour were thought to strongly drive collaboration. Mind-set was defined as the internalized attitudes toward others that effected how collaboration was (or was not) demonstrated or modeled. Because it was understood that attitudes affected actions, how one thought and acted became a “self-reinforcing process” (Orr, 2010, p. 131). Secondary elements of the model included learning, communication, and relationships. Learning was dependent upon time and familiarity, where the concept of familiarity was related to positive reinforcement, the manner of how criticisms were given, and opportunities for support service workers to learn better ways to meet future nursing expectations (Orr, 2010). Communication was influenced by two-way interactions, listening, specificity, common nomenclature, acknowledgement, and respect. Relationships were affected by altruistic

behaviours, reciprocity of favors, and the ability of support service workers to work within scope and to have nurses know what that scope was (Orr, 2010).

Although these appraised studies utilized different methodologies, participant characteristics, size, and location, similarities in relation to teamwork criteria existed. Each study highlighted the necessity of respect as an underpinning of successful collaborative teamwork, as well as including flexibility in communication. Mickan and Rodgers (2005) presented the notion of having a common goal or vision as important to the collaborative process; while Orr (2010) highlighted the significance of positive attitudes on the establishment of collaborative relationships.

Roles and relationships. In an attempt to address disparities in health care, various models of care have emerged globally that have led to the unique mix of HCPs required to meet the needs of the population. Many of these new models have IPC as their underpinning and as such share similar issues in relation to roles and relationships.

A study by Goldman, Meuser, Rogers, Lawrie, and Reeves (2010) underscores the significance of investigating the perspectives of HCPs engaged in team-based primary care. An exploratory case study approach was used with a sample of representatives from 12 Family Health Teams (FHTs) and two primary care practices in urban and rural Ontario, Canada. Thirty-two interviews were conducted with 12 family physicians; six nurses (including nurse practitioners); five pharmacists; and nine “other” FHT members (described as managers, social workers, and dietitians). Findings were grouped into five themes: rethinking traditional roles and scopes of practice; management and leadership; time and space; IP initiatives; and, early perceptions of collaborative care (Goldman et al., 2010, p. 370). In an effort to ensure that comprehensive and organized care was

available to meet patient needs, new roles were created and populated by various HCPs. As expected, challenges lay in defining and shaping these roles in addition to recruiting HCPs who could actually work collaboratively. When traditional roles and scopes of practice were altered, team members experienced uncertainty in defining their role and in educating the rest of the FHT regarding their contributions to patient care. Manager or executive director positions were considered crucial to the progress and overall administration of the FHT. When this position was not in place or inefficient, a lack of team development was reported. Another important consideration raised was the concept of time and space. When FHTs had members who were geographically separate from the team, team development and the ability to work interprofessionally was hindered. IP initiatives were developed with the objective of creating systems which support having the most effective HCP providing care. Finally, most participants perceived that the collaborative approach was making positive strides in patient care (Goldman et al., 2010). This study draws attention to the importance of role understanding, effective leadership, and ways to deal with proximity issues when establishing IPC practice.

Grace and Higgs (2010) centered their study on the roles and relationships among general practitioners (GPs) and complementary and alternative medicine (CAM) providers in New South Wales, Australia. This hermeneutic phenomenological study found that relationships and collaboration fall within a range - from equal partnerships to unequal partnerships, with limited or no IPC. High levels of CAM training and self-confidence among CAM practitioners fostered equal power-sharing relationships; however, there were a limited number of such cases found. The most common relationship was that of GP as 'gate-keeper' of their patients' health care. Of interest was

the fact that this ‘gate-keeper’ function resulted in relief on the part of the CAM practitioners, as they were no longer responsible to be the primary contact for patients (Grace & Higgs, 2010). In this case, trust and understanding of HCP roles and responsibilities seem to be lacking; qualities that are key for successful IPC.

McGrail, Morse, Glessner, and Gardner (2008) explored the collaborative relationship between internationally educated medical (IEM) residents and hospital-based nurses in a community teaching hospital. Combining narrative inquiry with phenomenology, participants (25 IEM residents, 32 staff nurses, and 10 nurse/physician faculty) were asked to write a narrative recounting a time when they experienced nurse-physician collaboration “at its best” (McGrail et al., 2008, p. 199). Physicians were seen as facilitating IPC when they demonstrated trust and respect, responded quickly, were physically and intellectually available, and were perceptive, flexible, supportive and kind. Nurses were considered facilitative to IPC when they coordinated care and advocated for and supported patients, families, and physician colleagues. Facilitative nurses were believed to be knowledgeable, experienced, responsive, and gentle. Collaboration positively impacted all involved professions; physicians described feelings of gratitude or respect, while nurses expressed job satisfaction. Both groups shared that they felt respected, valued, and understood. Collaborative competence was unrelated to age, gender, profession, or years in practice; however, it was associated with clinical expertise, IP relationships, and mentoring (McGrail et al., 2008).

Despite the differences in participants’ professional designations, each study highlights the importance of role understanding both in relation to individuals knowing their own role and in being able to articulate it to others. As well, factors that facilitate

collaborative relationships such as managerial support, geographical proximity of HCPs, self-confidence, clinical expertise, availability, and flexibility were deemed essential to establishing and/or maintaining IPC practice.

Practice-based IPE as the foundation for IPC. Because HCPs have typically been taught in the traditional uni-professional siloed education system, they may have had little chance to share ideas and knowledge with those from other backgrounds. As a result, they may not understand the practices, expertise, responsibilities, skills, and/or theoretical perspectives of other disciplines (San Martin-Rodriguez, Beaulieu, D'Amour, & Ferrada-Videla, 2005) thus limiting their ability to naturally collaborate. As Romanow (2002) rationalizes, “if healthcare providers are expected to work together and share expertise in a team environment, it makes sense that their education and training should prepare them for this type of working arrangement” (p. 109). In effect, the only way HCPs will become collaborative practice ready, and therefore appreciate how IPC relates to healthcare, is to take part in IPE opportunities (WHO, 2010).

IPE is defined as occurring “when two or more professions learn with, from and about each other to improve collaboration and the quality of care” (Centre for the Advancement of Interprofessional Education (CAIPE), 2002) and was conceived as a means to overcome ignorance and prejudice amongst health and social care professionals (Barr, 2005). IPE is an effective way in which to ensure that HCPs have the knowledge, training, and tools necessary to collaborate in patient care (Accreditation of Interprofessional Health Education (AIPHE) Steering Committee, 2009; Barr, 2005, Steinert, 2005). Within an IPE endeavour there is, “active engagement of students from different professions in interactive learning – something must be exchanged among and

between learners from different professions that changes how they perceive themselves and others” (AIPHE Steering Committee, 2009, p.6). Although I agree with the overall sentiment expressed by AIPHE (2009) regarding the necessity for interactive IP learning, I take issue on a couple of points. First, it is important to note that the use of the word ‘student’ may imply that IPE only takes place during the pre-licensure preparation of HCPs when in fact, post-licensure or practice-based IP learning opportunities are crucial to the advancement IPC in the practice setting. Because many currently practicing HCPs were educated in the traditional uni-focal (read: siloed) education system, they may not possess the competencies necessary for IPC. For this reason, IPE opportunities must be made available at the practice level. In defense of the AIPHE (2009) description, the focus of the report was on the accreditation of pre-licensure education and as such their use of the word ‘student’ makes perfect sense; however, as a caution, by including a caveat explaining that IPE is not restricted to the pre-licensure setting would have greatly strengthened their discussion. My second concern with both the AIPHE (2009) and the CAIPE (2002) definitions of IPE lie in the use of the word profession(s). As discussed earlier, not all HCPs consider themselves ‘professionals’ per se and as a result may not engage fully with the IPE opportunity when this language is used. In fact, this very scenario was presented to me during a recent IPE session in long-term care when an administrative assistant expressed that she did not belong in the session as she was not considered a professional as were others on the team. Because the word ‘professional’ is so pervasive within the IP literature, it is important to communicate a new meaning of the word ‘professional’ during IPE sessions that is inclusive of all team members.

Utilizing a multiple case study approach, Hollenberg et al. (2009) emphasize the importance of IPE initiatives in enhancing awareness about and attraction to practice-based IPC among hospital staff and leaders. Within a large hospital network in Ontario, Canada, IPE programs were provided to staff for the express purpose of preparing them to apply and role model IPC for health professional students. Of the 1000 HCPs who had attended the IPE sessions, 105 were recruited to the study from a variety of professions (nursing, medicine, physiotherapy, social work, and occupational therapy) and project roles (learner, facilitator, and leader). Findings suggested that four major outcomes resulted from the IPE programs: 1) HCPs learned about the importance of collaborating during the design, implementation, and delivery of IPE programs; 2) HCPs' awareness, perceptions, attitudes, and knowledge were enhanced; 3) the factors that needed to be in place so that IPE and IPC would be entrenched within the organization were illuminated; and, 4) there evolved an understanding that organizations wanted to persevere in the establishment of IPE to support IPC (Hollenberg et al., 2009). A critical factor that could potentially negatively impact sustainability was the limited involvement of physicians and for this reason participants believed that any future IPE initiatives should target this group. Furthermore, participants also stressed that IPC should be mandated as a professional obligation within the organization (Hollenberg et al., 2009).

In another study that highlighted the importance of IPE, Chan et al. (2010) describe changes in IPC, communication, and patient empowerment following an intervention designed to improve teamwork among GPs, practice staff, and AHPs (including podiatrists, optometrists, diabetes educators, dieticians, cardiac rehabilitation workers, exercise physiologists, and psychologists). Thirty-five GPs and 39 AHPs from

26 general practices participated in a one-evening IPE workshop that included teamwork principles and a role-play case study. Prior to the intervention, GPs usually informed patients about the need for referrals and then made the referrals to an AHP who then provided clinical advice to patients and reported back to GPs. GPs had limited understanding regarding the role and competence of AHPs, which affected trust and ultimately IPC. Following the intervention, there was evidence of an enhanced communication process between patients and practice staff. Patients informed GPs and practice staff about their condition and any AHP consultations; practice staff provided self-management support to patients; and, three-way communication occurred between patients, GPs, and AHPs so that patient progress could be tracked and care plan goals negotiated. Personal relationship building strategies, such as face-to-face or telephone meetings, among team members appeared to improve IPC. It was reported that “getting to know each other on a personal level was seen as helping with better communications” (Chan et al., 2010, p.521). Overall, IPC improved between patients, GPs, and AHPs, with an enhanced role for patients.

As is evident in these studies, IPE is foundational to establishing and/or enhancing IPC in the practice setting but it must be thoughtfully and repeatedly facilitated for it to flourish in a traditional hierarchical health care environment. It was found that IPC was a skill that needed to be learned and that physician involvement in IPE is crucial to the success of IPC.

Organizational culture. Organizational culture encompasses the assumptions, values, norms, and customs that are rooted in the traditions of its members (Seren & Baykal, 2007). Collaborative cultures value teamwork and team management in

achieving goals; there is an extreme commitment to the organization. Bosch, Dijkstra, Wensing, van der Weijden, and Grol (2008) offer that organizational cultures that are collaborative and support teamwork may contribute to high quality care. “Although no type of culture that best fits healthcare settings has been defined, an innovative, creative, problem-solving structure that is open to changes, where staff employees have as much right to make decisions as do the managers, has been suggested as the most advantageous type” (Seren & Baykal, 2007, p. 192). These descriptors appear very similar to those associated with IPC.

Sinclair, Lingard, and Mohabeer (2009) described the structures, relationships, and elements of organizational culture that contributed to IPC on a rehabilitation team in results from their ethnographic study. Conducted in an urban university-affiliated rehabilitation hospital, the study involved a core team of more than 40 different HCPs. Two key themes of IPC emerged from their analysis, that of team culture and of communication structures. Team culture was related to collaborative leadership, care philosophy, relationships, and context of practice and was directly influenced by the physical layout of the unit. For example, because patient’s beds were located on the unit, while the therapy rooms and offices were not, distinctions between clinicians and nurses as well as physical and psychosocial therapy were polarized. Collaborative decision-making was viewed as difficult because it occurred away from the unit and as such nurses were often not involved. The willingness of various HCPs to share experiential knowledge was deemed essential to effective team meetings and a heightened sense of team culture of collaboration (Sinclair et al., 2009).

Goldman et al. (2010) also discuss the value of organizational activities such as IP committees/working groups, team retreats, and journal clubs to facilitate dialogue within newly developed teams. Their study (described on p. 17 of this manuscript) highlighted the need for organizational structures that create: systems where the most appropriate HCP provides the required care; processes to support referrals and scheduling (i.e.; case conferences, case management rounds, electronic medical records); and, patient education regarding the changes to the model of care from physician-focused to IP-focused.

As is evident from these studies, the importance of organizational culture to set the stage for IPC to thrive is crucial and must be considered when planning for and embarking on a change in care delivery.

Communication. IP communication is believed to be a cornerstone of IPC and clinical decision-making as it encourages HCPs to respect and value the contributions of others in the provision of safe, quality patient care (Aston, Shi, Bullôt, Galway, & Crisp, 2005; Gotlib Conn et al., 2009). Yet research has shown that communication within teams is strained; impacted by power differentials and affected by inefficiencies in hospital structures (Gotlib Conn et al., 2009).

To gain greater understanding of how interactions unfold within an IP team, Gotlib Conn et al. (2009) studied the communication patterns of HCPs working in two adult general internal medicine (GIM) units of two academic teaching hospitals in Canada. With an overall goal of developing an intervention for the improvement of IP communication, the researchers first had to understand the factors that hindered and/or supported communication within a team. Researchers returned to raw data that were

collected during previous ethnographic observations and interviews conducted during the Structuring Communication Relationships for Interprofessional Teamwork (SCRIPT) research program; a multi-year, multi-method Canadian study that explored factors that facilitated or impeded IPC in GIM, primary care, and rehabilitation settings (Miller et al., 2008). Findings showed that communication occurred either synchronously (i.e.; telephone consults, impromptu conversations, rounds) or asynchronously (i.e.; white board, patient chart) and that the choice depended upon which type met the needs of the HCPs involved. However, there was resistance to some forms of communication if the HCPs felt that their contributions were not valued or if it was seen as increasing workload. For example, the use of the white board was not endorsed by nurses as it was not perceived as contributing to nursing's IP work. Nurses' unwillingness to use the white board may have been silent defiance of medical dominance, as the white board limited the kind of nursing information that was deemed important enough to be conveyed in patient care discussions (Gotlib Conn et al., 2009). Moreover, individual nurses did not contribute during IP rounds as they maintained that they did not have the time to do so (Gotlib Conn et al., 2009), which may also be interpreted as silent resistance. As is evident in this study, consideration is necessary regarding how profession-specific communication is navigated, as well as which genres are valued by each profession. It is also imperative to consider the relationships between HCPs when determining which types of communication strategies are most useful within an IP team (Gotlib Conn et al., 2009).

Rice et al. (2010) reported their findings from a qualitative intervention study in relation to the implementation of an IPE initiative designed to improve IP communication

and collaboration. Previous research in the same setting indicated that HCPs did not know their colleague's name or profession, their skill sets or competencies, or that other HCPs might require information they had in relation to the patients they cared for (Reeves, Rice, et al., 2009). Set in the same GIM units mentioned above, the intervention (piloted over an 8-week period) included a semi-scripted four-step process intended to be used for all patient-related HCP interactions. The intervention was initially taught to the most senior HCPs within each profession represented on the GIM units, who were then to role-model and promote the communication intervention for their respective professional colleagues. Findings pointed to restricted uptake as many front-line HCPs were unaware of the intervention despite the initial enthusiasm of senior stakeholders to trial it. In fact, the steps of the intervention were never used in the GIM units (Rice et al., 2010). When comparing IP communication on the study units with a unit that had no intervention, researchers found no differences; interactions were detached and nameless, and the opinions of nurses and AHP staff were rarely sought. Reasons given for the poor performance included the fast-paced nature of the setting as well as the presence of medical hierarchy. Some of the physicians expressed that the intervention encroached on their authority and related that "they were accustomed to having their orders carried out with little or no discussion or negotiation, a point which was supported by nursing, therapy, and other health professionals' discussion of medical hierarchies" (Rice et al., 2010, p. 358). This observation draws attention to the nature of health professional education, especially within the physician group, where communication and collaboration are granted minimal importance (Rice et al., 2010). As a result of limited IP communication curriculum within many health professional education programs, when

HCPs engage with members of the team, the significance of communication and collaboration are lost.

In a research paper by Chilcutt (2009), the concept of leadership style and its effects on team communication was examined using a “broad qualitative approach” in ten dental offices in Georgia (n=4), Alabama (n=5), and Mississippi (n=1) (p. 1258). In each dental practice the researcher recruited one dentist, a senior staff member, and a new staff member to determine how dentists perceived their organizational role, what leadership behaviours were used, and how these leadership behaviours affected team communication, team identity, interdependence, social distance, and conflict management. Two leadership styles – pro-active/hierarchical and laissez-faire/team-oriented – emerged and were directly linked to communication practices. Results indicated that there were no demographical differentiations between dentists who were hierarchical and those who were team-oriented; neither age nor gender influenced the type of leadership style exhibited. Four dentists were identified as proactive hierarchical leaders, describing themselves as separate from the rest of the team and preferring formal team communication practices. Two of the four hierarchical leaders were autocratic decision-makers who made unilateral decisions, and if they did inform the rest of the team, it was done after the decisions were made. Laissez-faire leaders favored a free-form, open-access, “trickle-down” approach to communication; they were team-oriented, preferring participative decision-making and described themselves as team members who managed team “talents and resources” (Chilcutt, 2009, p. 1254). Autocratic decision-making was linked to increased organizational ambiguity and high degrees of functional identity, whereas participative decision-making resulted in higher team identity. When

team members were able to deal with disagreements through confrontation and collaboration conflict management styles, they considered themselves interdependent with a high degree of social closeness, which ultimately increased job satisfaction and IPC. When force, accommodation, or avoidance conflict management styles were used, independence and social distancing occurred, resulting in frustration and high staff turnover rates. Findings of the Chilcutt (2009) study suggest that a participative decision-making process, with open communication, and effective methods of conflict management positively affect a team's culture. A positive team culture is central to patient care, as "teams with greater cohesiveness are associated with better clinical outcome measures and higher patient satisfaction" (Chilcutt, 2009, p. 1258). The research studies appraised highlight the importance of addressing and improving IP communication in relation to IPC. However, much work is needed in preparing the team to effectively communicate with one another.

The qualitative studies reviewed reveal some essential attributes for IPC to thrive. Respect, flexibility, a common vision and goals along with positive attitudes were considered crucial for success. The importance of understanding one's role and being able to articulate it to others, building relationships, managing conflict, and effectively communicating helped to build relationships within the IP team. The importance of evaluating organizational culture for the supports necessary for IPC was emphasized and the need for practice-based IPE was evident as a necessary foundation for IPC. Building on the findings of the qualitative literature, a review of quantitative literature yielded similar results.

Quantitative IP Literature Review

Applying an identical search strategy as undertaken in the qualitative review, only four quantitative research papers were discovered that provided a richer understanding of IPC in relation to the focus of my study. Three overall themes were identified and included: educational impact, perceptions of IPC, and the role of leadership.

Educational impact. Miller (2004) carried out a descriptive comparative study to examine whether levels of education impacted registered nurses' (RNs) perceptions of collaboration with other HCPs and if there was a relationship between their perceptions and their role identity. The American Nurses Association (ANA) conceptual definition of collaboration was used in the study (1980, as cited in Miller 2004). Since there were more recent definitions of collaboration available at the time of the study, I question why one that is more than 30 years old was used; however, it does encompass the concepts inherent in the more recent definitions described earlier in this chapter (i.e.; Health Canada, 2003 and Way et al., 2000). A stratified random sample of two groups of nurses from one Canadian province was chosen; nurses whose highest educational level was either diploma/baccalaureate or masters/doctorate. A survey, which assessed professional identity and the four dimensions of collaboration as outlined by the ANA (patient-care goals, mutual safeguarding of concerns, practice sphere clarity, and sense of power/control), was mailed to 800 nurses with a 49% return rate (n=395). Both groups of nurses were found to collaborate with other HCPs under three of the four dimensions examined. They were concerned about meeting own and others' needs (mutual safeguarding); recognized, accepted, and respected individual and overlapping spheres (practice sphere clarity); while neither group thought of themselves as powerless and

brought an impression of this into IP relationships (power/control). However, the patient-care goals dimension was less conclusive as both groups believed that certain tasks were shared by other HCPs rather than solely by nurses, despite being developed by nurses for nurses. Professional identity was found to be significantly stronger ($p < .001$) for those with higher levels of education. In addition, levels of educational preparation had a positive impact on mutual safeguarding and power/control, less of an effect on patient-care goals, and little effect on practice spheres (Miller, 2004).

Miller (2004) offers that the study findings may have significant implications for nurses in practice, education, and administration because educational level may positively influence collaboration. Based on the study's results, the author suggests that those wishing to work in areas known for their high level of IP "cooperation" (Miller, 2004, p. 142), such as intensive care (ICU), may want to consider graduate level education. Further, the author advises that administrators consider graduate level nurses in their staffing model. My first concern with the author's proposals is the use of the term cooperation as opposed to collaboration. As discussed earlier in this chapter, cooperation forms a component of the foundation for collaboration but in and of itself, it is not the same as collaboration. I am unsure as to the author's reason for introducing the concept of cooperation or of her understanding of the difference between these two terms; hence, I am also suspect as to the suggestions made regarding graduate level education as an underpinning of cooperation and/or collaboration. As well, although the statistical findings may support the rationale of higher levels of education to support collaborative practice, the reality of advancing IPC is much different. Higher levels of siloed education will not advance IPC for it is only through episodes of learning with, from, and about

other HCPs that IPC will flourish. Suggesting that graduate level education is required to work either cooperatively or collaboratively seems shortsighted and unrealistic. A more pragmatic suggestion would be to assess the amount of IP learning that takes place in pre- or post-graduate level education and then propose how to situate and enhance IPE in these settings.

Perceptions of and attitudes regarding IPC. As noted by Ødegård and Strype (2009), IPC is a complicated concept to explicitly define and may mean different things to different people. As such, the researchers used a descriptive exploratory design to examine: 1) professional's perceptions of the prominent aspects of IPC in the child mental health sector, and 2) the characteristics that influence perceptions of IPC. The PINCOM-Q questionnaire, a self-report instrument used in the study, was designed to discover the complexities of IPC and measures the subjective perceptions of 12 constructs across individual, group, and organizational levels. One hundred fifty-seven (n=157) questionnaires were distributed to a geographical convenience sample of professionals in public schools, primary care, and/or specialist services who worked with children with mental health problems in one county in western Norway. With an 86% response rate, 134 professionals participated in the study, within the following categories: teachers (n=43, 32.1%), special educators (n=17, 12.7%), psychologists (n=16, 11.9%), social workers (n=14, 10.4%), primary nurses (n=13, 9.7%), child welfare workers (n=9, 6.7%), medical doctors (n=7, 5.2%), and others (n =14, 10.4%) (Ødegård & Strype, 2009). Findings suggest that IPC groups are important to professionals not only because they allow for a better working strategy but also because they provide much needed sharing and support to the professionals themselves. Group leadership was found to affect

the efficiency of IPC teams therefore it may be prudent for IPC teams to explore how leadership is determined, how it will unfold, and what tasks are associated with the position. Ødegård and Strype (2009) also speculated that organizational culture may influence the degree to which professionals collaborate depending on how valued IPC is perceived to be within the organization. If the organizational culture does not openly support IPC, professionals may not be motivated to participate or lead IPC initiatives. When exploring the differences of the perceptions to IPC between different professional groups, findings indicated that there were differences between men and women regarding what they perceived as most important to IPC; for example, woman considered coping, communication, and organizational domain as more important to IPC than men. It must be noted that only 26 men participated in the study as compared with 108 women, which may intimate that there is a possibility of over-sampling of women. However, the World Health Organization (2008b) notes that “within the health sector women comprise over 75% of the workforce...” (p. 1) and according to Statistics Norway (2010), “women more often work in health services, teaching and care services...” (p. 13). Since this study was situated in Norway and the sample was comprised of workers from both the education and health sectors the dissimilarity in the number of women and men in the sample is not unexpected.

There were also differences noted in relation to where professionals worked and their perceptions of IPC; those who worked in schools perceived organizational culture as significantly less important than those who worked in primary care and specialist services. Results illustrated that no significant differences were found related to professional education, workplace, working experience, and age (Ødegård & Strype, 2009). Because

the PINCOM-Q provided the constructs related to IPC it may have restricted the range of perceptions experienced by the participants themselves (Ødegård & Strype, 2009). Since perceptions are invariably subjective, a qualitative or mixed methodological approach may have garnered richer data concerning the experiences of the participants.

Thomas, Sexton, and Helmreich (2003) also compared attitudes regarding teamwork/collaboration in a cross-sectional survey of nurses and physicians working in eight ICUs in two teaching and four non-teaching hospitals in Houston, Texas. The research team developed a seven-item teamwork scale, the Intensive Care Unit Management Attitudes Questionnaire (ICUMAQ) (Thomas et al., 2003), which was adapted from two attitude surveys that were shown to predict performance in the aviation industry. Content validity for the newly developed questionnaire was improved through review of current literature regarding teamwork and error in critical care, soliciting feedback from ICU physicians and nurses, and focus group responses. A total of 550 subjects (226 physicians and 324 nurses) were eligible to participate; 320 subjects responded for a 58% response rate. Of the 320 responses, 90 were from physicians (40% response rate) and 230 from nurses (71% response rate). Multivariate ANOVA indicated that physicians and nurses have quite different views of teamwork climate. Seventy-one percent of nurses rated intraprofessional collaboration (i.e.; between nurses) and communication as high or very high. Likewise, 70% of physicians rated intraprofessional collaboration (i.e.; between physicians) and communication as high or very high. However, quite the opposite was found regarding IPC and communication interprofessionally (between nurses and physicians), with only 33% of nurses rating them as high/very high with physicians, while interestingly, 73% of physicians believed that

IPC and communication was high/very high with nurses (Thomas et al., 2003). Thomas et al. (2003) offer that these discrepancies may be related to differences in status, authority, responsibilities, gender, educational preparation, and professional cultures. Given the specialization of the study area, results may not be generalizable to other settings (i.e.; less acute areas, different states, or other countries).

Servant leadership. Settings that promote IPC require a robust leadership mandate and as such HCPs are searching for leadership styles and structures to support them in their journey. Servant leadership may be the ideal approach in response to this need as it is described as “putting others first and creating a work environment that promotes a community experience and shared decision making” (Scruggs Garber, Madigan, Click, & Fitzpatrick, 2009, p. 332).

In an effort to better understand the essence within organizations that transition from a traditional model of care to a patient-centered model, Scruggs Garber et al. (2009) investigated nurses', physicians', and residents' attitudes about collaboration and servant leadership. The researchers applied the relationship-centered conceptual framework used in the Pew-Fetzer Task Force on Advancing Psychosocial Health Education (Tresolini, 1994, as cited in Scruggs Garber et al., 2009) as its central tenets, such as teamwork, common values, learning from others, and integration of services, are applicable in the pursuit of understanding the attributes of and relationship between IPC and servant leadership. A descriptive comparative design, appropriate for the query, was used to examine the attitudes of nurses and physicians toward collaboration and servant leadership, how their attitudes differed, and whether there was a relationship between collaboration and servant leadership within each group and, if so, what type of

relationship existed. The Jefferson Scale of Attitudes toward Physician-Nurse Collaboration (Hojat et al., 2003 as cited in Scruggs Garber et al., 2009) and the Barbuto-Wheeler Servant Leadership Questionnaire (Barbuto & Wheeler, 2006, as cited in Scruggs Garber et al., 2009) were used to explore these questions. Additional items, related to self-awareness and organizational performance of collaboration and servant leadership, were added by the researchers but were excluded in the statistical analysis and therefore did not affect reliability or validity of the tools. All RNs (n=2660), physicians (n=447), and residents (n=171) with email access employed by a healthcare system in the mid-Atlantic region of southeastern United States were invited to participate. The sample was comprised of 419 nurses (16% response rate), 61 physicians (14% response rate), and 17 residents (10% response rate); adequate to support statistical analysis but not necessarily adequate for generalizability of the findings (Scruggs Garber et al., 2009). Statistically significant differences ($p < 0.001$) were found between RNs and physicians/residents in relation to their attitudes towards collaboration and servant leadership (nurses had higher scores), even when the resident group was removed from the analysis. Regarding the items added by the researchers, nurses scored higher than both physicians and residents in relation to perceptions of self as role-models for collaboration and organizational servant leadership. It should be noted that since the surveys were self-rating there may have been response bias as participant's may not have wanted to rate themselves as non-collaborative; therefore, ethnographic observations of IPC and servant leadership competencies may have provided more substantial data. Nevertheless, these findings may have a significant impact when attempting to transform organizational culture in relation to establishing IPC and servant leadership as the

preferred model of care. Identification of HCPs that are committed to act as IP champions (in this case nurses) is one of the first steps in the journey of establishing this philosophy in an organization. Therefore, since nurses are typically the largest group of HCPs it would be wise for healthcare administrators and educators to target this group as they could make a significant positive impact when attempting to establish IPC and servant leadership. As well, understanding the reasons why physicians do not endorse IPC and servant leadership (for example, because they do not see IPC as central to their professional mandate and view their role as the authority/leader in care) is imperative so that initiatives can focus on addressing these rationale. It would also be prudent to examine the perceptions of the AHPs and patients since they are also integral members of the health team.

Despite using different designs and being limited in numbers, the quantitative research papers appraised revealed similar results regarding the outcomes of IPC, such as increased quality of care, team effectiveness, and job satisfaction among both nurses and physicians. However, there were obvious differences in nurse-physician perceptions of IPC and leadership. Physicians did not collaborate as readily, nor did they see the advantage of doing so, whereas nurses had more positive attitudes towards IPC and servant leadership and were therefore more likely to engage both intra- and interprofessionally. For these reasons, when trying to establish and/or advance IPC as a model of care, education that focuses on the advantages and provider, patient, and system outcomes of IPC would be foundational.

Theoretical and Grey IP Literature

There is a plethora of theoretical and grey literature pertaining to IPE and IPC for both the pre- and post-licensure sectors; however, a decision was made to include only those that I believed would enrich my (and the readers) understanding of the philosophical underpinnings of IPE/IPC and any related IPC competencies. Articles that offered rich and vivid descriptions of IPE and IPC, described their historical perspectives and theoretical frameworks, and/or illustrated to the reader the essential knowledge, skills, and attitudes for IPC were included.

The literature revealed that when trying to implement or improve teamwork, HCPs should attend to the individual values and norms of team members, the core competencies germane to IPC, and the structures that support IPC (Oandasan et al., 2006). Successful IP teams were described as having clear structures that delineated team objectives, the roles and responsibilities of each team member, methods for information sharing, and ways of coordinating team activities and staffing (Oandasan et al., 2006). Elements identified as being essential to IPC included the ability to be both a team leader and a team member while still being able to act autonomously as necessary, possessing the skills for conflict resolution, having confidence in oneself and others, showing mutual respect, and sharing responsibility (Oandasan et al., 2006; WHO, 2010).

Dutcher et al. (2005) recommend that strategies be put in place to enhance communication processes among HCPs in an effort to support collaborative practice. Oandasan et al. (2006) concur, suggesting that communication protocols may improve team communication processes. In an IP team, members must be capable to express their opinions as well as possess the ability to listen to others. IPC is successful when team

members are able to effectively communicate so that individual and team goals are balanced, communal resources can be negotiated, and decision-making shared (WHO, 2010).

As was discussed previously in this chapter, a complex educational approach such as IPE is an effective way in which to ensure that HCPs have the necessary knowledge, preparation, and tools to enable them to implement strategies designed to promote the active participation of each profession in patient care (AIPHE Steering Committee, 2009; Steinert, 2005). The WHO (2010) maintains that IPE is fundamental to the development of collaborative practice-ready HCPs as it ensures that they will be prepared to work together to provide comprehensive services in a wide range of practice settings. And it appears that the Canadian government has been committed to move forward in its effort to ensure that healthcare improves for its citizens via IPC. In 2003, \$90 million was dedicated to Health Canada's Pan-Canadian Health Human Resources Strategy, which was to be followed by \$20 million annually thereafter. The Pan-Canadian Strategy had three foci: HHRP, IPE for collaborative patient-centered practice (IECPCP), and strategies related to recruitment and retention. Specific to health professional education, an IP approach was endorsed as it was believed to stimulate culture change within the health professions (Conference Board of Canada, 2007). In fact, the Conference Board of Canada (2007) went so far as to suggest that regulatory standards that require IPE for collaborative practice be established. From pre-licensure education to post-licensure continuing professional development opportunities, curricula and training models that embrace the concepts and philosophy of IPC have been endorsed. Furthermore, in order to establish and sustain IPE, educators at all levels of instruction have been urged to

attain the competencies required to develop, facilitate, and evaluate IP programs as well as to assess the learning outcomes associated with IP groups of learners (WHO, 2010).

For IPC to thrive, the organizational culture and practice setting must be assessed in relation to the context in which HCPs practice, the abilities of leaders to facilitate IPC, as well as the availability of resources to support collaboration. Each health care setting is unique and therefore strategies used to establish IPC must consider local requirements and challenges (WHO, 2010). The context for and settings of teams will have significant implications for IPC as there may be distinct differences in team functioning based on where they are situated (i.e.; in community, rehabilitation, or tertiary care settings). Described as “boundedness”, tertiary (or institutional) teams are often co-located in the same building and thus experience the same organizational structures that support or hinder the team approach and because of this they see themselves as an intact social entity. Whereas teams located in community or primary care settings are not bounded in the traditional sense; they are more fluid and virtual and therefore may not consider themselves as part of a team (Oandasan et al., 2006).

Organizational factors not only have an influence on the development of IPC practices but on team performance as well. Teams thrive in organizations that support and promote teamwork, therefore it is imperative that each organization considers its infrastructure (management, administrative, governance, physical space) as there is considerable work involved in creating team-based organizations (Oandasan et al., 2006; WHO, 2010). To illustrate, it is important for organizations to consider physical space and examine it for evidence of hierarchy of position (i.e.; a physician’s lounge and no

lounge for the rest of the team; the ‘nurses’ station) and make efforts to involve the team in determining how to make their physical space less hierarchical.

Leadership is also required at all levels of the Canadian healthcare system and leaders need to be invested in and provided with leadership training opportunities which enable them to create a culture that not only supports, but expects, IPC to flourish and build capacity for HCPs to practice collaboratively (Oandasan et al., 2006). Leaders have the responsibility to develop team processes, set clear goals, ensure the right mix of HCPs exists based on client needs, and create favorable performance conditions for the team (Oandasan et al., 2006). An unequivocal organizational philosophy that supports IPC, encourages HCPs to consider innovative ways of working together, promotes the development of common goals, and that rises above resistance is essential (Oandasan et al., 2006). Human, financial, technological, and educational resources and tools are required to support teamwork. Additionally, national standards, accreditation guidelines, protocols, and core competencies for IPC need to be developed and implemented at the government and decision-maker level.

In this appraisal, similar themes emerged and crossed the distinct boundary lines between qualitative, quantitative, and grey literature. The importance of collaborative goals, enhanced collaborative communication skills, shared decision-making abilities, conflict management skills, role understanding, relationship building, and putting in place and supporting an organizational culture that can sustain IPC were highlighted by these important contributions. A similar vein in most of these papers was the notion that HCPs need to learn how to work together; that collaboration does not magically appear nor is it necessarily common practice simply because HCPs work with others. IPC must be

learned and it must be nurtured. Like most things in health care, there are distinct knowledge, skills, attitudes, and behaviours that are linked to IPC and which must be passed on to the students and practicing HCPs so that this new way of working together can be realized.

Competency Frameworks

The competency movement is not new. It was conceived in 1911 when F.W. Taylor claimed that efficiency and productivity could be heightened through the use of a “one best way” approach that described the ideal combination of knowledge, skills, and attitudes necessary to perform a specific task (Garavan & McGuire, 2001, p. 145). Over the past century, governments around the world have attached importance to the development and adoption of competency standards in industry, education, HR management, and health care in an effort to attain a competitive edge in the global economy (Garavan & McGuire, 2001; Grif Alspach, 1996; Leung, 2002). In an era of heightened risk management, consumer rights, and HHR development there are a number of professions, regulatory bodies, and government organizations specific to health care that are advocating for the use of competencies as they not only describe outcomes related to performance but also provide provisional predictors of performance and delineate standards of practice (Lane & Ross, 1998; Reeves, Fox, & Hodges, 2009). For example, the Canadian Nurses Association (CNA) Specialty Certification Program (2011), the CanMeds 2005 Physician Competency Framework (2005), and the Canadian Patient Safety Institute Safety Competencies Framework (2008) are just some examples of the specialty, professional, and government health care competency frameworks in existence in Canada. Moreover, the competency-based approach (CBA) recognizes the

relationship between knowledge and skill and therefore is often used as a means for professional development. For instance, HCPs may be required to not only attain entry-level competencies but, depending on where their careers take them or what their role demands, they may also need to become proficient in specialty or employer-specific competencies.

Even though the competency movement is long-standing, it is not without confusion. Contradictions exist in how the terminology is used, in its philosophical underpinnings, and within the various perspectives regarding its utility. The words ‘competency’ and ‘competence’ are often used interchangeably, but in actual fact, they do not have the same meaning. Based on definitions from the field of education, competence signifies the potential capability of an individual to function in a given situation; thus to determine an individual’s potential competence, one would need to assess their knowledge (cognitive), attitude (affective) and/or skill (psychomotor/technical/procedural) capabilities (Grif Alspach, 1996). It is important to note that defining competence in this way raises two conceptual consequences. First, there is the misinterpretation that one’s *potential* capability is the same as their *actual* capability. Yet, we must keep in mind that mastery of a set of competencies does not ensure that one is competent, for competencies are merely the building blocks of competence and only the first step to ensure that HCPs are capable of delivering safe, quality care (Canadian Interprofessional Health Collaborative (CIHC), 2010; Whitcomb, 2007; Wood, Flavell, Vanstolk, Bainbridge, & Nasmith, 2009). Competence can only be guaranteed when there is evidence that the knowledge, skills, and attitudes required to deliver care are consistently demonstrated in real-life situations (Grif Alspach, 1996). As

a former critical care program faculty, I can attest to the fact that competency assessment within a simulated learning experience does not equate to competence in the real world setting.

Also proving problematic in the definition of competence is the assumption that competence can be neatly defined and assessed by dividing it into discrete ‘packages’ of knowledge, skills, and attitudes (Grif Alspach, 1996). Competence, rather, is the interplay between the cognitive, affective, and psychomotor domains that any given situation demands. Therefore, the assessment of competence requires learners to show that they can integrate what they know with what they do, how they will actually do it, and what they think about what they do when they do it. In essence, when there is a need to determine if HCPs can carry out their roles and responsibilities in practice, the focus must shift from that of competence to the concept of competency (Grif Alspach, 1996).

Unlike competence, competency is a dynamic concept that puts emphasis on an individual’s *actual* performance in real-life settings and is relative to the specific standards of performance and/or practice in that particular setting (Grif Alspach, 1996). A competency is an explicit set of attributes that employees use in order to perform a task or function required by their work (Garavan & McGuire, 2001; Lane & Ross, 1998) and “reflect the practice of a professional within their own profession” (Bainbridge, Nasmith, Orchard, & Wood, 2010, p. 7). Competency has also been defined as observable performance, the outcome of performance, or as knowledge, skills, and abilities (Wood et al., 2009). Lasnier (2000, as cited in Goudreau, 2009), Tardif (2006 as cited in Goudreau, 2009), and Goudreau et al. (2009) use the term *know-how* to describe a competency, where that *know-how* is based upon the cognitive, affective, psychomotor, and/or social

capabilities and skills that are required to address particular situations. In effect, attainment of a competency allows an individual to draw upon previous knowledge, concepts, and abilities to manage any relevant situation and implies an ability to transfer the competency to new situations (Lane & Ross, 1998).

The competency movement has evolved from various philosophical underpinnings such as positivism, cognitivism, phenomenology, and constructivism (Garavan & McGuire, 2001; Goudreau et al., 2009). In a positivistic approach, work and worker are considered independent from each other, where the work is envisioned as objective, can be described in exact ways, and is unconnected to the worker who performs it. From this viewpoint, competencies are externally framed (Garavan & McGuire, 2001). A cognitive approach also places importance on objective measurement but in doing so also considers how workers obtain and apply knowledge (Garavan & McGuire, 2001; Goudreau et al., 2009). Cognitivism characterizes knowledge as declarative (what is known), procedural (how it is used) and conditional (when and why it is used) (Goudreau et al., 2009).

In contrast to positivism and cognitivism, a phenomenological approach to competence and competencies argues that organizational context and the role and experiences of workers cannot be disregarded; that, in fact, “it is not the competencies themselves that are significant but instead it is the way that individuals experience work which is fundamental to their competence” (Garavan & McGuire, 2001, p. 147). Likewise, the constructivist approach emphasizes the personal and incentive-driven aspects of competency and is based on the belief that absolute reality does not exist and therefore is constructed from perception (Garavan & McGuire, 2001). As a result,

competencies may need to be modified to suit contextual factors. As is seen in these multiple viewpoints, the concept of competence and competency changes depending on the perspective adopted and ultimately will affect expectations when assessed.

Another important consideration in this discussion is the notion that there are different types of competencies. Goudreau et al. (2009) identify specific versus transversal competencies, where those particular to a defined profession/occupation are considered specific and those that are less exclusive and more common across professional/occupational groups, transversal. Barr (1998) too depicts competencies as common, complementary, or collaborative. While Barr (1998) describes common competencies as those shared by all HCPs, the Interprofessional Education Collaborative (IPEC) Expert Panel (2011) counters that a more helpful definition would be that common competencies are shared by more than one HCP group, rather than all. Regardless of whether common competencies are shared by some or all, they are often the source of tension between HCPs because they overlap professional/occupational boundaries and as such one group may suspect that another is encroaching on their territory. Complementary competencies are those which are unique and individualized to a particular profession or HCP group, thereby distinguishing one profession/group from another (Bainbridge et al., 2010; CIHC, 2010). When HCPs work in partnerships to blend their distinct competencies with those of others, the recipient of care reaps the benefits of a magnitude of different yet complementary knowledge, skills, and attitudes. Finally, collaborative competencies “describe the complex integration of knowledge, skills, attitudes, values, and judgments” (Bainbridge et al., 2010, p. 7) that when executed give HCPs the necessary tools to work together with others in an interdependent manner. So

what makes collaborative competencies any different than common or complementary competencies? Perhaps the collaborative competencies are not necessarily different per se, perhaps what makes them unique is the way in which they are taught, learned, and shared. Perhaps it is how collaborative competencies build upon the common and complementary competencies and how they are combined that sets them apart into this other category. To illustrate, it is common for many HCP groups to learn about how to provide patient-centered care in their uniprofessional education programs. But when HCPs have an opportunity to learn with, from, and about each other in relation to patient-centered care, there may be a shift in that dynamic. It is no longer about what *I* perceive to be patient-centered care; it is now about how *we* define and enact a patient-centered care approach. When HCPs are taught interactively, when there are opportunities to learn with, from, and about one another, and when there are environments in which HCPs can consistently practice in this manner, that is when the competencies truly become collaborative in nature.

As in any ‘movement’ per se, there are supporters and detractors and the competency movement is no different. Critics argue that because there is an inherent level of control when using competency frameworks, workers or learners must conform in their performance so as to meet a prescribed competency (Garavan & McGuire, 2001). Leung (2002) offers that this may lead to HCPs/learners to merely do the ‘right’ thing to pass rather than to use their critical thinking skills. To counter this criticism, I would offer that what is perceived as prescribed is really a recommendation for performance that is based on best practice evidence. Therefore, using a competency framework to assess whether HCPs can perform safely is not any different than any other method which

evaluates best practice standards. With respect to the concern that competencies negate critical thinking, the argument offered suggests that there is an ‘all-or-nothing’ style when using competencies; that is, that one either uses competencies or they critically think. However, there is nothing in the competency literature to suggest that this is the case. Moreover, the CBA is only one method of teaching and evaluating performance and can be used in conjunction with other modalities that do promote critical thinking, such as problem-based learning, case-based learning, or concept mapping.

Reeves, Fox, et al. (2009) share similar arguments to those presented earlier, identifying that the use of competencies disregards the intricate processes that professional practice requires and cannot possibly represent the complexities of the real world. Talbot (2004) goes so far as to assert that this type of educational model “limits the reflection, intuition, experience and higher order competence necessary for expert, holistic or well developed practice” (p. 587). Similar counter-arguments as presented above hold true here; there is nothing to suggest that the CBA has to be used in isolation and as such, the use of reflection and higher-order thinking should be encouraged.

Garavan and McGuire (2001) and Leung (2002) maintain that jobs cannot be condensed into discrete competencies because it is not likely that every element of efficient performance can be isolated. True, but the purpose of delineating the knowledge, skills, and attitudes inherent in any given competency is not to prescribe every nuance associated with the competency but rather to highlight the critical attributes associated with it. Competencies identify broad performance requirements. Their associated performance criteria or descriptors are the behaviours necessary to achieve the competency and the related behavioural indicators are critical examples of specific,

observable, and measurable behaviours which are often used for judging attainment of the competency (Banfield & Lackie, 2009; Curran et al., 2011; Goudreau et al., 2009; Lane & Ross, 1998). They also contend that breaking performance into tasks ignores the connections between the tasks and their underlying meaning (Garavan & McGuire, 2001; Leung, 2002). There is a component of this argument for which I would agree; that breaking competency into discrete tasks loses something in translation if the process of learning stops at that point. However, by integrating other educational approaches to augment clinical judgment one can meld the knowledge, skills, and attitudes back together into observable (and assessable) performance.

The line of reasoning presented by Garavan and McGuire (2001) and Leung (2002) intimates that learning is static; however, in reality, learning is a dynamic process where proficiency advances along a continuum. Benner's (1982) theoretical framework, *From Novice to Expert*, describes just such a continuum that may prove helpful in understanding the CBA as it offers increments to performance that are based upon experience as well as education. According to Benner's theory (1982), when one acquires and develops a skill, a person passes through five levels of proficiency: novice, advanced beginner, competent, proficient, and expert. A change in proficiency level indicates that there has been a shift from reliance on abstract principles to that of using concrete past experiences. As well, there is transformation in perception from concentrating on a compilation of relevant bits (read: competencies) to a more holistic view. "Experience, in addition to formal education preparation, is required to develop this competency since it is impossible to learn ways of being and coping with an illness solely by concept or theorem. A deep understanding of the situation is required before one acquires a

repertoire of ways of being and coping with a particular illness experience” (Benner, 1982, p. 406).

Competency development has also come under fire. A frequently used approach in competency framework development is the Delphi method, where experts in the field identify and/or rate the clarity, relevance, and representativeness of relevant knowledge, skills, and attitudes related to the particular competency. Because of this, the competency movement is seen as replicating the views of the professional elite and reinforcing traditional discourse about norms, behaviours, and attitudes (Reeves, Fox, et al., 2009). This is a compelling argument and perhaps could be mitigated by including students and practitioners during competency development. This was accomplished in a study by Curran et al. (2011) in the development and evaluation of an interprofessional collaborator assessment rubric when students and faculty were invited to validate the competencies that were created via the Delphi method (Curran et al., 2011). Finally, Reeves, Fox, et al. (2009) share that the CBA perpetuates professional turf protection as HCPs view certain activities as ‘belonging’ exclusively to them. This is another valid critique and all the more reason for the establishment of IP learning opportunities where the relevance of working collaboratively is instilled and a move away from owning anything in health care is encouraged.

Despite the many criticisms of the competency movement, there are those who support their use. Proponents assert that competencies assist with identification of learning needs (Garavan & McGuire, 2001) and facilitate the creation of individualized flexible training (Leung, 2002; Talbot, 2004). Reeves, Fox, et al. (2009) note that the CBA establishes clearly defined standards and scopes of practice. As well, the CBA can

provide indicators to assist with the evaluation of performance which may lead to greater public accountability (Talbot, 2004). Another interesting point made by Reeves, Fox et al. (2009) is that competencies substantiate the significance of HCP-identified issues. Admittedly, prior to reading this claim I would not have identified this as a reason for endorsing the use of competencies but on further reflection it may just be an important and valid point. For when HCPs see themselves (i.e.; their concerns regarding practice) in the competency document it validates their experiences and would go far to negating the argument that competencies are elitist because they are developed by “experts” and not everyday practitioners.

Subsequently, as I move forward in my research I believe it is important for the reader to recognize that a competency is more than just a set of discrete knowledge, skills, and attitudes; it requires merging of the cognitive, affective, and psychomotor domains with a willingness to use them when providing care in real-life settings and is pivotal in IP working relationships.

Interprofessional Collaboration Competencies

IPC competencies are sought after as they are believed to set the stage for collaboration, provide the foundation for life-long learning, establish the groundwork for dialogue between education and practice, establish common accreditation standards, inform HCP scopes of practice, and assist with curricular development (CIHC, 2010; IPEC Expert Panel, 2011). Rogiers (2007, as cited in CIHC, 2010) envisions competencies as tools to help learners gain mastery of situations that will arise in one’s professional and private life; it is this sentiment, along with an integrative approach, that guided the work of CIHC in creating the National Interprofessional Competency

Framework (2010). The competency framework was supported by many underlying assumptions, such as: robust, comprehensive competency statements stand the tests of time; competency descriptors or indicators ascertain the knowledge, skills, attitudes, values, and judgments that are “dynamic, developmental, and evolutionary” (CIHC, 2010, p. 9); IP learning exists along a continuum and is cumulative; IPC is vital for improved patient/client/family and community health outcomes; the degree of IPC competence is contingent on the extensiveness of IPE and IP practice opportunities; the uptake of IPC competencies depends on the level of learner and the intricacy of learning tasks; implementation of IPC competencies may necessitate a change in how learners, HCPs, educators, and practice environments conceptualize collaboration; and, for IPC to thrive, both the learning and the practice cultures need to support IPC competencies (Bainbridge et al., 2010; CIHC, 2010).

Based on these assumptions, the CIHC (2010) identified competencies that are practice-focused, irrespective of skill level or practice-setting context, and fundamental to IPC as they describe the knowledge, skills, attitudes, values, and judgments necessary to practice collaboratively. The measure of competence is judged by the outcomes realized when the competencies are integrated. Each of the competencies (CIHC, 2010) is accompanied by descriptors/indicators (Appendix A), which can be used to substantiate whether results have or have not been reached and/or if specific conditions exist.

The six competency domains include: patient/client/family/community-centred care; IP communication; role clarification; team functioning; collaborative leadership; and, IP conflict resolution; where the first two competency domains influence and support the remaining four (Bainbridge et al., 2010). It is important to note that none of

the competencies can take the place of the other as all are necessary to realize IPC (Bainbridge et al., 2010). Influencing the way in which the framework is applied are three background considerations: complexity, contextual issues, and quality improvement. The skill level required to perform the competencies is contingent upon the complexity of the situation and therefore the complexity of the collaborative process. For example, relatively simple cases may only require the collaboration of one or two HCPs whereas more intricate situations will require more HCPs and thus more intricate collaboration. Contextual issues such as the health care environment and the comfort and skill sets of HCPs will also impact integration of the competencies. Differences will be observed between comprehensive and consistent teams (i.e.; in long-term care, pediatrics), teams and/or patients that only come together for short periods of time (i.e.; emergency or high turnover areas), and community settings where non-traditional care providers merge with the team (i.e.; community health and school health). Lastly, the concept of quality improvement underpins each competency and impacts the approach to collaboration. A team approach to quality improvement can more effectively address issues in any context and at any point along the simple to complex continuum (Bainbridge et al., 2010; CIHC, 2010).

In a similar body of work, which was informed in part by the CIHC (2010) design, the IPEC Expert Panel (2011) identified four core competency domains and associated competencies (behavioural learning outcomes) for IPC practice. Representing nursing, medicine, pharmacy, dentistry, and public health in the United States, the IPEC Expert Panel envisioned IPC as the vehicle to achieve safe, accessible, quality patient-centered care. These IP competencies were based on the following principles:

patient/family centered; community/population and relationship focused; process oriented; associated with developmentally suitable learning educational strategies and behavioral assessments; ability to be incorporated across the learning continuum; sensitive to various contexts and professions; written in common and meaningful language; and, outcome driven (IPEC Expert Panel, 2011). Building on general professional competencies, the expert panel identified values/ethics for interprofessional practice, roles and responsibilities, interprofessional communication, and teams and teamwork as the four core competencies (Appendix B) (IPEC Expert Panel, 2011). In order to develop and demonstrate these competencies, one must be able to reflect, be flexible, and adapt to variable care contexts and goals (Association of American Medical Colleges, 2011). It is important to note that the competency statements described “reflect the endpoint of initial health professional education (pre-licensure or pre-credentialing)” (IPEC Expert Panel, 2011, p. 30) as this was the scope of the work that was to be completed. However, the authors do go on to say that the competencies were constructed in a general way to facilitate uptake of IP learning beyond the pre-licensure level.

The CIHC (2010) and the IPEC (2011) competency documents are similar to one another in that they both recognize role clarification, IP communication, and teams/teamwork as key IP competency domains. As well, both manuscripts identify critical examples of each competency in the form of descriptors and/or behavioural indicators/outcomes. Although the CIHC (2010) document distinguishes three additional competency domains (patient/family/community-centred care, collaborative leadership, and IP conflict resolution), these behaviours are subsumed within the IPEC (2011) competency descriptors under the teams and teamwork and IP communication domains.

Likewise, the sentiment of the values/ethics competency domain found in the IPEC (2011) document is considered under the CIHC (2010) team functioning competency domain. Similar competencies and behavioural indicators have been identified by Banfield and Lackie, 2009; Bronstein, 2003; Hall and Weaver, 2001; Korner, 2010; Miller, 2004; Oandasan et al., 2006; Oandasan and Reeves, 2005; Orchard, Curran and Kabene, 2005; Skela Saviê, Pagon, and Robida, 2007; WHO, 2010; and, Yeager, 2005.

These competencies can be also used for faculty development purposes as well as in the creation of assessment instruments. For example, in a multi-site research study, Curran et al. (2011) used similar competencies to construct and validate a bilingual IP collaborator assessment rubric. I see great value in using these competency documents to provide the basis for a self-assessment tool, where practice-based HCPs can assess themselves and others on the team in relation to whether they possess the knowledge, skills, and attitudes necessary for IPC practice.

Productivity

“Improving productivity means doing the same amount of work with fewer people or doing more with the same number. It is about working smarter” (Doherty & Doult, 2009, p. 6). The quote provided by Doherty and Doult (2009) at first glance appears straightforward – if one is to realize increased productivity then one must exploit the ‘more-less’ dichotomy. However, upon further examination this description seems overly simplistic especially as it relates to health care because the notion of quantity (of time or of resources) cannot be a direct proxy for quality when considering human services. Moreover, there are factors other than working smarter that impact productivity such as the magnitude of work, how the work is organized, and if there are other types of

resources available (i.e.; technological or human) (Birch, O'Brien-Pallas, Alksnis, Tomblin Murphy, & Thomson, 2007).

Holcomb, Hoffart, and Fox (2002) suggest that despite being regularly used by management, the concept of productivity is fraught with challenges such as non-existent or differing definitions, limited and poor quality data, inconsistent measurement tools, and a lack of standardized analysis methods. When it is defined, productivity is typically described in terms of the relationship or ratio of outputs to inputs, where outputs are ideally in excess of inputs (Bloor & Maynard, 2001; Curtin, 1995; Holcomb et al., 2002). Within the health care system, productivity has been described in relation to either patient care or staffing patterns, where the goals are to provide a level of care that is satisfactory and affordable while managing staff within budgetary standards. Soltani (2007, as cited in Nayeri, Salehi, & Noghabi, 2011) described productivity as “the sense of one’s effectiveness, efficiency, and making the best use of staff ability, capacity and their skills” (p. 108). The term efficiency is frequently used synonymously with that of productivity; however, as Nayeri, Nazari, Salsali, Ahmadi, and Hajbaghery (2006) highlight, efficiency is the quantitative index of productivity, while productivity represents both quantitative and qualitative factors. Workload, work sampling, and work intensity are some other words commonly associated with the concept of productivity (Holcomb et al., 2002).

In an attempt to make clear the myriad productivity measures, Holcomb et al. (2002) classify productivity into four defining categories: 1) human resources, 2) material resources, 3) patient qualities, and 4) services provided. Human resources include regulated and non-regulated full-time and part-time staff and are typically measured

using hours of direct and indirect care, productive and non-productive time, skill mix, salary/benefit dollars, and education level. Material resources include equipment, supplies, and facility aspects that are calculated by using purchasing, maintenance, and repair costs, as well as considering capacity indicators such as the number of beds and/or units. Patient qualities that are typically considered are patient population and medical diagnosis where measurement data correspondingly comes from the census and diagnostic-related groups (DRGs), case-mix indexes, nosocomial rates, acuity levels, and morbidity/mortality rates. Finally, services provided are divided into the type of care (inpatient, ambulatory, home, or residential/long-term) and procedures (surgical, medical, assessment, and/or diagnostic) (Holcomb et al., 2002). Depending on the productivity equation, these four categories can either act as inputs or outputs.

Productivity Measures: Inputs, Outputs, and Outcomes

As was previously noted, productivity is usually calculated relative to inputs and outputs. Input indicators measure the characteristics of target populations, human resources, and/or financial resources that are allocated to a program or intervention (Horsch, 1997). Inputs have been described as the resources consumed (Williamson & Johnston, 1998 as cited in Holcomb et al., 2002); labour, materials, and equipment used (Edwardson, 1985 as cited in Holcomb et al., 2002; Bloor & Maynard, 2001); direct (salaries/benefits) and indirect (vacation, sick leave, absenteeism, presenteeism) costs (Dexter & Rittenmeyer, 1997 as cited in Holcomb et al., 2002); paid dollars per pay period (Holcomb et al., 2002); staff time (Bloor & Maynard, 2001); total time available for care (Harp, 2004); hours per patient day; and, the time, effort, knowledge, or skill expended (Evan, Schneider, & Barer, 2010).

“Output indicators measure the quantity of goods and services produced and the efficiency of production...” (Horsch, 1997, “Types of Indicators”, para.1). The primary outputs of productivity consist of the work or services yielded, the revenue that is attained, and/or the generation of data used to measure future productivity changes. Other outputs in productivity equations have ranged from goods and services (Edwardson, 1985 as cited in Holcomb et al., 2002; Bloor & Maynard, 2001); dollars of revenue (Dexter & Rittenmeyer, 1997 as cited in Holcomb et al., 2002); patient care hours in relation to the average daily census (Holcomb et al., 2002); to the amount of time billed or allotted to patient care (Harp, 2004). Satisfaction with work, morale, outcomes, and budget management are secondary outputs that are often realized by administration, staff, and patients (Holcomb et al., 2002) albeit sometimes with opposing views. For instance, increased productivity may satisfy administrators but it may also bring about increased workload for staff and as a result decreased quality time between staff and patients.

When the preceding inputs and outputs are used in productivity formulas various calculations can be obtained, such as: hours per patient day (HPPD), which amounts to either the total number of nursing hours per average daily census or to patient classification units divided by census; hours per patient visit (HPPV), which measures nursing hours per patient visit in the home care or ambulatory setting; total salary cost per unit of service (UOS) adjusted for acuity, where the UOS varies by the care delivery site (Beyers, 1998; Holcomb et al., 2002); and, per capita cost of care for a defined population (Berwick, Nolan, & Whittington, 2008). Data sources for measurement formulas consist of patient acuity databases, payroll records, staffing schedules, administrative records, and clinical databases. Measurement units for services provided

include unit of service, number of patient contacts, length of procedure (minutes, hours, or days), length of stay, and number of cases. The collection of data can occur in variable time intervals from every 24 hours, to biweekly, quarterly, and annually (Holcomb et al., 2002).

As is expected, technical problems in productivity measurement surface due to the many variations of inputs that will ultimately generate multiple forms of output. As a remedy to these technical difficulties, aggregate indexes for inputs and outputs have been created based on the assumptions of competitive private markets where “prices of inputs reflect their opportunity costs and prices of outputs reflect their value...” (Evans et al., 2010, p. 6). Yet, these assumptions may not and often times should not hold true in health services delivery, for the element of quality is missing. Merely counting activities as a proxy for input does not address the quality of patient care or clinical efficacy (Reese, 2010; Smith, 2010). As well, when aggregating activities, the issue of assigning value to the activity arises; this has traditionally been solved by using the cost of the activity as a proxy for its value. But this is misleading because expensive interventions do not necessarily yield improved productivity or enhanced outcomes (Smith, 2010).

Additionally, the calculations and data sources outlined above raise my concern. When productivity is calculated by these strictly quantitative measures, this infers that the care provided was appropriate regardless of who was providing it. Yet, this too is an erroneous presumption because the quantitative measure cannot speak to the quality of care provided. In other words, knowing how much time a HCP spent with a patient does not tell us what was accomplished during that time period. Were the patient’s needs addressed? Did the patient see the HCP that they wanted to see? Was the right HCP

seeing the patient based upon the patient's health care needs? Not all HCPs perform in the same way because they are, of course, human and for this reason one cannot presume that time equals appropriateness (or quality, for that matter) of care. Essentially, quality, cost, and access in the health care system must be balanced when evaluating productivity; however, this proves challenging as increases in one aspect may negatively impact the others (Fulton, Lasdon, McDaniel, & Coppola, 2008). For instance, increasing access may actually decrease quality and increase cost; whereas increasing quality may ultimately increase cost and decrease access.

Some argue that HHR productivity measures should consider health *outcomes* (e.g.; health status improvement or maintenance) rather than outputs, because measuring outputs does not adequately capture the complexity of health care nor does it measure the indirect time that is required for care (Evans et al., 2010; McGillis Hall, 2003; Brady, Byrne, Horan, Macgregor, & Begley, 2008). As Evans et al. (2010) explain, more procedures or more HCPs do not necessarily mean improved productivity or better health for those working in or accessing the health care system. McGillis Hall (2003) also considered outcomes, rather than outputs, as productivity measures in the Conceptual Model for Nursing Intellectual Capital. In this model, nursing knowledge indicators distinguish individual nurse characteristics that may also influence the productivity of care provided by nurses and include "educational preparation, experience, ongoing education, career planning and development stage, autonomy, organizational trust, and commitment" (McGillis Hall, 2003, p. 16). Nursing productivity indicators that link to system outcomes in the model include nursing costs (i.e.; salaries, time per client visit, time for direct client care), turnover, absenteeism, absence replacement costs, orientation

costs, and education costs; while those associated with patient outcomes include patient satisfaction and nursing errors (i.e.; medication errors) related to patient safety, urinary tract infections, and equipment (McGillis Hall, 2003).

Additional system outcome indicators found in the literature, which would be related to improved health outcomes, include reduced lengths of stay (Pearson et al., 2006; Suter & Deutschlander, 2010); acceptable costs per case; high-quality patient care (Pearson et al., 2006); decreased hospital costs (Nayeri et al., 2007); high innovation; decreased wait times; and, increased clinical contact times (Suter & Deutschlander, 2010). Additional patient outcome indicators include improved functional levels at time of discharge (Harp, 2004); increased satisfaction (Harp, 2004; Nayeri et al., 2007); increased life expectancy; changes in health status related to interventions; improved self-rated health; and, decreased disease prevalence (i.e.; diabetes, asthma, depression, obesity) (Sharpe, Bradley, & Messinger, 2007). Certainly, each of these outcome indicators would be important to consider; however, it should be noted that health outcomes are the result of many factors besides health care (i.e.; lifestyle, genetics, environment) and therefore caution should be taken when making productivity assumptions related to outcomes (Bloor & Maynard, 2001; Evans et al., 2010; Sharpe et al., 2007). It is oftentimes for this reason that output indicators are used in productivity equations; that and the fact that outcomes data is limited in many instances.

Productivity Measurement Methods

In the following section, various productivity measurement methods are presented along with research studies that have incorporated these methods. In addition, a discussion related to the unquantifiable variables of productivity will be presented.

Patient care hours per patient day by pay period. Holcomb et al. (2002) used the details gleaned from their concept analysis of productivity to design a method to measure the impact of a differentiated RN practice model on nursing productivity. In the pilot study, productivity was defined as the ratio of patient care hours (PCH) per patient day (PD) (output) to paid salary and benefits (input) over a 14-day pay period (PP). Patient acuity data were gathered through the GRASP system and were embedded in the PCH/PD data. The mathematical equation incorporated PCH/PD, average daily census, and payroll and nursing agency dollars (including productive and non-productive hours) for RNs, licensed practical nurse (LPNs), health care assistants, nurse managers (NMs), assistant NMs, education coordinators, care coordinators, and clinical nurse specialists. Final calculations represented “the number of hours of patient care provided per salary dollar paid for a given pay period” (Holcomb et al., 2002, p. 382).

Data from a medical, surgical, and telemetry unit were analyzed by 2-week pay periods prior to and after implementation of the differentiated nursing practice model. Because the units differed in patient populations, nurse to patient ratios, and the degree to which the new model had been put into practice, comparisons could not be made between units; instead comparisons were made within each unit on a before-after basis in relation to the care model change. The telemetry unit demonstrated a statistically significant increase in productivity ($p = 0.004$), whereas the medical unit showed a statistically significant decrease (≤ 0.001), and the surgical unit showed no significant change ($p = 0.687$). Possible reasons for the differences offered by the researchers included that data were lost during an upgrade of the nurse scheduling system, time delays related to securing data from the HR department, and the study units were among those affected by

a hospital re-organization. Although this pilot study had a small sample size ($n = 10$), it did illustrate that this type of measurement approach could detect changes in productivity (Holcomb et al., 2002).

Data envelopment analysis. The Data Envelopment Analysis (DEA) model is a mathematical self-weighting “method of combining variable indicators, including non-economic factors, into a single composite measure of efficiency” (Lake, 1998, p. 3) and can have either constant or variable returns to scale functions (Fulton et al., 2008). Efficiency in the DEA model is defined as a linear combination of the weighted outputs divided by the linear combination of the weighted inputs.

Fulton et al. (2008) used the DEA model to determine whether accurate cost models could be developed that included quality, access, and efficiency variables. Ordinary least squares (OLS) estimation, ridge regression, and robust regression were used to evaluate the DEA efficiency scores and the proxies used for quality and access (Fulton et al., 2008). Twenty-four facilities in the US Army’s hospital system provided the background for the study, conducted from 2001-2003. The researchers evaluated cost (dependent variable) as a function of numerous independent variables, including standardized workload, population, quality, access, time, medical center status, efficiency (generated from DEA), and interactions. The primary source for the data was the US Army’s medical data repository as well as survey data from the TRICARE Beneficiary Survey (TRICARE Management Activity, 2004 as cited in Fulton et al., 2008). Numerous proxies were used for data that did not have associated metrics. For instance, quality of care was proxied by a Department of Defense composite metric that integrated blood pressure readings, pap smears, mammography, prenatal screening, and cholesterol

screening (Fulton et al., 2008). Findings indicated that increases in quality directly increased costs; while efficiency explained 2% of the total cost structure in all models and was linked with decreased costs (Fulton et al., 2008). These findings suggest that the models created with the aforementioned variables provide reliable estimates of costs based on efficiency. However, I would argue that the idea of quality being proxied via measures such as pap smears and mammography is concerning for the same reasons as discussed earlier in the section titled, *Productivity Measures: Inputs, Outputs, and Outcomes*. That in fact, simply counting activities as a proxy for input does not address quality of care or clinical efficacy.

Case-mix indexes. To better understand the cost of care, the case-mix system was developed in which patients are categorized into homogenous groups based upon their use of resources and costs (Björkgren, Fries, Häkkinen, & Brommels, 2004). Assumptions of these types of patient classification systems include that patients spend most of their time on assigned units; all care providers spend their work time on assigned units and provide all care; and, patients' and families' educational level and psychological support needs are similar (Beyers, 1998). It is proposed that by adjusting for case-mix, the efficiency or productivity of care providers can be established. Dependency measures, an assessment of a person's independence when performing activities of daily living, are often used in case-mix systems as they can explain variations in resource use between residents (Björkgren et al., 2004). In long-term care settings throughout the United States (US) and Ontario, the most common case-mix system used is the Resource Utilization Groups (RUG-III) which is based on the Resident

Assessment Instrument (RAI), a multi-dimensional minimum data set (MDS) designed for use in long-term care.

In a study conducted by Björkgren et al. (2004), the RUG-III was compared with the nationally mandated HILMO “case-mix-like” system used in Finland to determine their utility as case-mix classifications (p. 465). The study sample included 1964 residents from 10 long-term care facilities in Finland. RNs completed the RUG-III and HILMO as well as documenting the time it took for direct and indirect care. In the first phase of the study, the systems were compared on their ability to forecast resident costs by means of “variance explanation, homogeneity of groups and differences in costs between groups” (Björkgren et al., 2004, p. 465). The second phase of the study evaluated the similarity between efficiency scores while adjusting for case-mix. The DEA methodology was then used to facilitate understanding of technical efficiencies in the long-term care sector (Björkgren et al., 2004). In the DEA model, case-mix adjusted resident days was the single output variable; while the number of beds in the unit plus full-time equivalents of RNs, LPNs, and aides acted as the four input variables. Findings demonstrated that the RUG-III explained 39% of resident specific cost, compared with 16% in the HILMO, suggesting that the choice of case-mix measurement systems significantly affects efficiency ratings (Björkgren et al., 2004). Björkgren et al. (2004) advise against using only cost-weighted activity indexes to assess case-mix systems as it is important to also consider whether the case-mix system categorizes residents into homogenous resource utilization groupings. Cost-weighted activity indexes attempt to measure activity and productivity over time by applying a weight to each unit of activity using the national average cost of producing one unit of activity. Labour productivity

indexes are obtained by multiplying the activities by their average costs, summing these numbers and then “dividing the total by the number of employees” (Bloor & Maynard, 2001, p. 107). The exclusion of activities related to teaching, research, and diagnostic services; the accuracy of national average cost weights; and, the exclusion of sub-contracted staff in the total number of employees are seen as some criticisms of this approach (Bloor & Maynard, 2001).

Work productivity and activity impairment questionnaire: general health. In a cross-sectional survey conducted in three hospitals in the southern US, Letvak and Buck (2008) examined the relationships between individual characteristics of nurses (age, sex, ethnicity/race, marital status, total years worked as an RN, height, and weight), workplace characteristics (hours worked, shifts, and unit type), job stress, and health (overall health, health problems, and job-related injuries) with the intent to stay in nursing. Three hundred twenty-three responses were received from a total of 2500 RNs. Work productivity was calculated using the Work Productivity and Activity Impairment Questionnaire: General Health (WPAI-GH), which measures absenteeism, presenteeism (defined as lost productivity while at work) (Tranmer, Guerriere, Ungar, & Coyte, 2005), work productivity loss, and activity impairment. The WPAI-GH calculated the mean work activity impairment at 12.7% (range 0-90%, SD = 18.56). It was found through linear regression analysis that predictor variables (i.e.; age, total years working as RN, quality of care, job stress, injuries, and health problems) explained 26.8% of the variance ($F=16.73$, $p<0.001$). The average age of the participants (40.2 years) was less than the national average (46.8 years) and correlated with years worked as an RN. As well, the RN participants reported that they were unable to meet patient needs, which was

interpreted as their inability to provide quality care, 12.7% of the time. As Letvak and Buck (2008) report, age, total years working, quality of care, job stress, job injuries, and health problems were factors associated with decreased work productivity. Given the current nursing shortages and aging personnel, these findings would suggest that nurse leader's need to place additional effort on finding solutions that address job stress, injuries, workload, and the health and safety of nurses (Letvak & Buck, 2008).

Work limitations questionnaire and health risk appraisal. In a study that examined the relationship of arthritis with presenteeism, Burton et al. (2006) used a modified version of the Work Limitations Questionnaire (WLQ) and incorporated it into a Health Risk Appraisal (HRA) questionnaire. The WLQ was used as it measures the health-related impact of chronic conditions on performance and includes four sub-scales: physical work activities, time management, mental/interpersonal activities, and overall productivity (Burton et al., 2006).

In 2002, the survey was distributed to all employees ($n = 73,500$) at a major financial service corporation in the US; of the 17,685 employees who responded, 16,651 met the inclusion criteria, with 14.8% ($n = 2469$) stating that they had arthritis and of those, 39.9% ($n = 986$) reporting that they were under medical care and/or taking medications for arthritis. Two multiple regression models were constructed; the first to compare each WLQ sub-scale (physical, time, mental, output) and overall work limitations to age, gender, health risks, and medical conditions; the second regression model calculated "the percent productivity loss for each group by controlling for demographics, health risks, and other health conditions" (Burton et al., 2006, p. 133). Findings suggest that arthritis is associated with lost productivity. Not surprisingly, the

greatest productivity effect of arthritis was on physical work activities, although the rest of the WLQ domains (time, mental, and output) were also affected. Compared to participants with low health risks, those with additional risks reported a 7% to 10% additional loss of productivity. Participants who reported receiving medication and/or treatment for arthritis had a 2.5% greater productivity loss independently attributed to their arthritis, which equaled approximately “\$1,250 per employee per year, or \$5.4 million to the corporation” (Burton et al., 2006, p 131). Although this study focused specifically on arthritis, it may have significant lessons for other organizations in relation to chronic disease management. Given the substantial costs to the organization, it would be wise to concentrate employee health management programs in the areas of chronic disease management, associated health risks, and co-morbidities in order to significantly decrease on-the-job productivity losses.

Return on investment. Return on investment (ROI) is described as an efficient way to measure net program benefits to program costs (Harp, 2004), in essence one is performing a cost-benefit analysis (Lofland, Pizzi, & Frick, 2004). As described by Lofland et al. (2004), ROI is one way to approximate the value of health technologies by asking the question: does the intervention increase work productivity while at the same time decrease medical expenditures?

In an effort to measure physical therapy (PT) performance, Harp (2004) developed and applied a measurement model that generated ROI for use in PT clinical programs. Typically, performance in PT programs had been based solely on productivity and revenue calculations; however, Harp (2004) argued that these may not be the most accurate indicators of performance. Instead, he proposed the addition of patient

outcomes, costs, and patient satisfaction along with productivity and revenue indicators in the construction of a performance measurement model.

Five performance criteria, relevant to PT practice and easily converted to monetary values for use in the ROI model, were derived from the literature and included: output (revenue for patients in the PT program), quality (patient outcomes expressed as return-to-work percentages), productivity (billable patient care time expressed as a percentage converted to monetary values), costs (administrative, equipment, salaries/benefits, education, and employee training), and customer satisfaction (satisfaction surveys). The customer satisfaction variable was reported as qualitative data and therefore not used in the ROI formula (Harp, 2004).

Archival data from 66 records of patients in a back and neck rehabilitation program were randomly assigned to two groups. There was a 10% difference in the ROI figures of Group 1 (226%) and Group 2 (235%), equating to a monetary difference of \$765, indicating a close relationship between the two groups. These results were then compared with traditional performance measures of financial investment (calculated by dividing the revenue by costs), which resulted in a higher figure for both groups than the ROI because the calculations did not account for decreased patient outcomes or decreased staff productivity. Based on the results, ROI provided a more comprehensive tool to measure performance than traditional evaluation measures (Harp, 2004).

Human capital approach/friction cost approach. Two approaches that can be used to identify the components of work productivity loss are the Human Capital Approach (HCA) and the Friction Cost Approach (FCA). Since being developed in the 1960s, the most widely used methodology for assigning financial value to lost

productivity of an individual is the HCA. HCA is based in economic theory from a societal standpoint and because of this it emphasizes lost productivity from an individual employee perspective. The HCA approximates the potential earnings lost as one hour of a person's wage for every hour of lost productivity due to a disease/disorder (Lofland et al., 2004).

Conversely, the FCA method, introduced in the 1990s, includes employer costs that cannot be assigned to individual employees making it the preferred methodology from an employer perspective. FCA considers friction periods, "the time needed to replace a sick worker and reach the productivity level of the previous well worker" (Lofland et al., 2004, p. 166), when estimating the monetary worth of lost productivity. Friction costs consist of (i) lost productivity that occurs prior to replacing the absent/ill worker, (ii) decreased productivity related to the replacement worker (assuming the replacement is by someone previously unemployed and thus unfamiliar with the job), and (iii) the cost of hiring, replacing, and training the new replacement. The assumption that the replacement employee is unemployed may be erroneous and as such is a limitation of this method. When using this methodology, the rate and length of the friction periods and the associated costs are required.

Both the HCA and FCA place a zero-dollar value on persons who are not paid for work outside the home. Depending on the circumstances, one method may be more appropriate than the other; however, both are valuable in that they can estimate the health-related productivity losses in relation to disease and treatments which helps society and decision-makers better estimate the value of healthcare interventions (Lofland et al., 2004).

The societal perspective was adopted by Lofland et al. (2004) in their review of health-related workplace productivity loss surveys that have a metric that directly converts into monetary figures. Work productivity loss is generally considered a function of a person's wage or compensation. Instruments were appraised for reliability, validity (content, construct, and criterion), productivity metrics, scoring technique(s), fitness for direct conversion into a monetary figure, number of items, administration mode(s), and the disease state(s) for which it was used. Eleven instruments were discovered, namely: the Osterhaus technique; Work Productivity and Activity Impairment Questionnaire; Health and Labor Questionnaire; Endicott Work Productivity Scale; Angina-Related Limitations at Work Questionnaire; Migraine Work and Productivity Loss Questionnaire; Worker Productivity Index; Health and Work Questionnaire; unnamed hepatitis instrument; Work Limitations Questionnaire; and, Stanford Presenteeism Scale (Lofland et al., 2004). Eight, of the eleven surveys that were discovered, were tested for reliability and validity. Six instruments captured metrics used for monetary translation; of those six, one survey measured absenteeism, while the others measured both absenteeism and presenteeism (Lofland et al., 2004). Lofland et al. (2004) found that there was no gold-standard to measure absenteeism or presenteeism; in fact, there was no gold-standard found for productivity measurement.

Unquantifiable Variables of Productivity

The process of providing health care includes variables that are difficult to quantify such as quality, staff skill level, caregiver characteristics, and care environment features (Beyers, 1998; Holcomb et al., 2002). Notably, many productivity measures pay little attention to the impact of knowledge, skills, attitudes, judgment, and

patient/provider experiences as these unquantifiable variables do not easily fit into economic productivity equations. As Boudreau and Ramstad (1997) explain, if an item's value cannot be objectively defined, measured, or verified it is not deemed a financial asset and as such is ignored when measuring productivity. However, as Evans et al. (2010) argue, human capital is one form of health industry capital that should be considered as an input asset as it contributes to the production process. Productivity calculations that do not take into account the impact of human capital are missing a key input variable that contributes to overall organizational performance.

Health care represents approximately one-tenth of modern economies and workforce labour inputs (i.e.; time and effort) constitute a large proportion of those costs (Evans et al., 2010). Health industry capital, one form of input, can be physical, human, or intellectual in nature; the latter forms speaking to the knowledge and skills human resources commit to the production process. Essentially, "...increases in productivity per worker, whether from more or better complementary physical capital, or greater skills and knowledge per worker, or from advances in the common possession of social know-how, are the basis for increases in commodities per person in a community..." (Evans et al., 2010, p. 4). It is essential then that human capital be considered when HHR productivity is examined.

Intellectual capital, which can be used to produce higher value assets for an organization, refers to all intangible knowledge assets owned by an organization including human, social, psychological, and organizational capital (Agor, 1997; Wright et al., 2001, as cited in AL-Ma'ani & Jaradat, 2010). The intellectual capital of an organization, in order of significance, consists of: (1) cognitive knowledge (the "know

what”), (2) advanced skills (the “know how”), (3) system knowledge and trained intuition (the “know why”), and (4) self-motivated originality (the “care why”). “Intellect clearly resides inside the firm's human brains” (Quinn, Anderson, & Finkelstein, 1996, p. 7). The descriptions of intellectual capital offered by Quinn et al. (1996) can be closely compared to the definition of competency as being *know-how* proposed by Lasnier (2000), Tardif (2006), and Goudreau et al. (2009).

Human capital, the primary source of organizational innovation and renewal, is described as the accumulated economic value of experience, creativity, enthusiasm, competencies, skills, and knowledge owned by workers and made available to an organization (Agor, 1997; AL-Ma’ani & Jaradat, 2010; McGillis Hall, 2003). Human capital theory assumes that there is full productivity (100% production for the duration of the employment period); full employment (no unemployment in the labour market); competitive labour markets; and, negligible transaction costs associated with payment or receipt of earnings. Essentially, “one’s workplace productivity is assumed to be directly proportional to one’s stock of human capital” (Tranmer et al., 2005, p.451). Human capital has economic value to an organization because workers’ knowledge and skills are useful assets that can be translated into practical activities that create a competitive advantage to other organizations (AL-Ma’ani & Jaradat, 2010; McGillis Hall, 2003). Kocakülâh and Harris (2002) report five key human capital practices that can increase profits. These include: 1) recruiting people who do not require significant training; 2) creating collegial workplaces; 3) ensuring open, two-way communication practices; 4) having clear rewards and accountability; and, 5) investing in training that adds value to

the organization. Some of these practices relate closely with the identified IP competencies presented earlier in this chapter.

The intangible nature of human capital makes it difficult to quantify, and thus calculate, as it is a new concept with few identified accounting measures for such things as creativity, lifelong learning, and accumulated learning (AL-Ma'ani & Jaradat, 2010). However, Kocakülâh and Harris (2002) argue that measurement can occur as long as there are flexible information systems and someone to track, analyze, and share the data and results throughout the entire organization. They suggest that measurement of human capital can happen by starting with efficient measures and benchmarks against prior performance that occurs yearly; choosing or developing measures that reflect the organizations' mission or strategy; and, creating measures to monitor key human resources practices that have been proven by other organizations to cultivate human capital (Kocakülâh & Harris, 2002). In keeping with this line of reasoning, IP competencies and their descriptors/indicators may provide the backdrop for measuring human capital in relation to IPC.

Another elusive productivity measure is that of quality, namely quality of care and quality of work life. As Suter and Deutschlander (2010) explain, dealing with quality of work life issues addresses HHR challenges and ultimately quality of care. Increasing workloads, acuities, and complexities coupled with the inability to provide quality care, workplace hostility, conflict, and deteriorating leadership negatively effects job satisfaction and morale (Letvak & Buck, 2008; Nayeri et al., 2011; Suter & Deutschlander, 2010). These destructive feelings lead to increased absenteeism which ultimately leads to decreased productivity and quality of care – it is a vicious cycle. By

improving the quality of the workplace and care experience, close relationships will be forged which will lead to enhanced recruitment and retention efforts, reduced job stress, improved absenteeism/presenteeism, and in due course, increased quality of care (Suter & Deutschlander, 2010).

In a cross-sectional study conducted by Nayeri et al. (2011), Iranian nurses' quality of work life (QWL) and productivity were investigated. Research questions and instrument development centred on nurses' perspectives of their QWL and their productivity, as well as the relationship between the two. The productivity survey included four dimensions: effectiveness, efficiency, commitment, and presence for the patient (Nayeri et al., 2011). Three hundred sixty nurses, working in the Tehran University of Medical Sciences hospitals, participated in the study. Almost two-thirds (61.4%) reported low to moderate QWL, while one-third (30%) described their productivity levels as moderate. Of the participants who scored their productivity as low, none reported their QWL to be desirable; whereas those who reported their productivity as high also rated their QWL as desirable (Nayeri et al., 2011). Effectiveness in caring for patients was rated as high (31.4%) or very high (41.1%) by the majority of participants and was perceived to be equivalent to their productivity. Efficiency, defined by Nayeri et al. (2011) as the quantitative feature of productivity, was interpreted as the ability to "provide maximum care to the most patients" and was rated as being at an undesirable level by one-third of their participants (p. 114). Another measured dimension of productivity, commitment, was described as being dedicated to work and the organization, being accountable, and promoting professional growth; almost two-thirds of participants rated their commitment as either low (18.9%) or moderate (39.4%). Finally,

presence for the patient (a sub-state of caring; being there) was also rated as low (28.6%) to moderate (36.7%) by two-thirds of the nurses. Nayeri et al. (2011) observe that the relationship between QWL and productivity is an important finding of their study suggesting that interventions that improve quality may also improve productivity.

In this review of productivity, the concept was defined, typical productivity measures were discussed, and various productivity measurement methods were presented. The discussion of important unquantifiable variables related to productivity was also offered. As can be seen, the variables of productivity differ depending on the purpose of the analysis and as such it remains a difficult concept to define, there continues to be no mutually agreed upon measures, and comparisons remain difficult across studies.

Chapter Summary

It is anticipated that this literature review has provided clarity in relation to the definitions, measurement gaps, strengths, weaknesses, and required attributes for IPC, competency versus competence, IPC competencies, and productivity. Admittedly, there were many substantial content areas to cover and each of these would constitute a formidable manuscript on their own. However, I believe that it was important to not only highlight the essential components of each but to present them in a way that linked them together so that the reader could have a deeper understanding of how I conceptualized my area of inquiry.

In relation to IPC and its associated competencies, I believe it is important to keep in mind that the way in which HCPs are educated directly affects how they work together on an IP team; if they learn in silos, they are more apt to work in silos. Fundamentally,

the productivity of the team may be significantly affected when team members have not been taught the competencies associated with IPC or how to use their common and complementary competencies in a collaborative way. Furthermore, the culture of the workplace, such as how the work gets done, who does it, the amount and quality of required services, and the health and satisfaction of providers is affected by whether there are opportunities for IPC and if there are expectations to work within a collaborative environment.

As is seen in the review of productivity, there are a multitude of methods used to measure this phenomenon depending on how it is defined. Traditional economic definitions focus on the numeric ratio of input to output, where the costs of production (input) are compared with the goods and services produced or the revenues generated (output). This approach has proven worthy in an economic business sense but what about in health care? As I reflect on the many ways of productivity measurement in health care, I am struck by the number that fail to incorporate human capital as an input indicator and offer that since the provision of health care is essentially a knowledge driven enterprise, the strictly quantitative approach is missing a key ingredient.

As discussed earlier, an important capital asset of any organization is its human capital, and in health care even more so. Without acknowledging the impact of HCPs' knowledge, skills, and attitudes on the production process, one omits a very important variable. I believe that maximizing productivity in health teams is dependent upon making best use of the knowledge, skills, and attitudes owned by members of the team in providing safe, high quality care. However, in order to do this, team members must be accustomed to working collaboratively and as such they need to incorporate the

competencies associated with IPC. It is with this in mind that I am choosing to include the concept of human capital as it relates to IPC in my operational definition of productivity. Hence, productivity in this study is defined as the sense of being efficient and effective when knowledge, skills, and attitudes are incorporated into practice. The driving force behind my definition comes from my interest in discovering how HCPs define being efficient and effective, their perception of whether they possess the competencies required to work collaboratively, and whether incorporating IPC competencies would change their sense of being efficient and effective, in essence, in changing their perceptions of being productive.

CHAPTER 3 THEORETICAL AND METHODOLOGICAL UNDERPINNINGS

A reciprocal relationship exists between theory and research, where “theory guides and generates ideas for research” and “research assesses the worth of theory and provides a foundation for new theories” (Polit & Tatano Beck, 2012, p. 131). In high-quality studies, a well-defined purposeful conceptualization of the characteristics and/or behaviours that affect interpersonal, environmental, or biologic factors needs to be considered as it will guide the research design (Polit & Tatano Beck, 2012). In other words, a strong theoretical framework or conceptual model is necessary as it helps the researcher determine what will be measured, how it will be measured, and what approach will be required.

In the first section of this chapter, I provide an in-depth presentation of the Health System and Health Human Resources Planning Conceptual Framework (Tomblin Murphy & O’Brien-Pallas, 2006), Analytical Framework (Birch et al., 2007), Simulation Model (Tomblin Murphy, MacKenzie, et al., 2009), and the Competency-based (subsequently re-named as Service-based) Health Human Resources Planning Framework (Tomblin Murphy et al., 2009, as cited in Tomblin Murphy et al., 2012; Tomblin Murphy, MacKenzie, Rigby, et al., 2013), as they provide the conceptual context for this study. A more concentrated discussion of the components that relate directly to IPC and productivity will be also presented. In the second section of the chapter, I present a comprehensive discussion of the mixed-methods approach to research and close with rationale for choosing this methodology for my study.

Theoretical Underpinnings

Human resources are fundamental to the delivery of health services and any challenges with its most critical element, the health workforce, will result in obstacles to improving health systems performance (Tomblin Murphy & de Campos, 2006). By better understanding the composition and distribution of the workforce, health worker behaviour, and regulatory and policy environments, effective interventions can be created that improve workforce performance (World Health Organization, 2008a).

HHRP is about having the right number and skill mix of HCPs in the right place at the right time (Birch et al., 2007). While this statement at first might seem logical and straight-forward, in reality the process of doing so is fraught with challenges (Bloor & Maynard, 2013; Bourgeault, 2013; Tomblin Murphy et al., 2003; Tomblin Murphy, MacKenzie, et al., 2009). Issues relate to limited and poor quality data (i.e.; inadequate patient and HHR inventory); healthcare governance (i.e.; deep-rooted power, unofficial networks, and normative values); steadfast age and gender roles; and, financial pressures (Ritchie et al., 2003; Tomblin Murphy & de Campos, 2006; Tomblin Murphy, MacKenzie, et al., 2009). As can be seen, HHRP can be a daunting task.

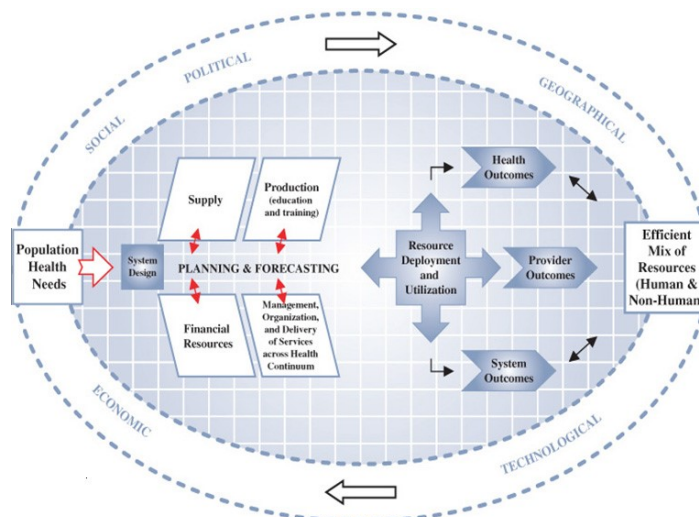
Approaches to HHRP generally fall into three broad categories: 1) utilization-based; 2) effective demand-based; and, 3) needs-based (Tomblin Murphy, 2002; Tomblin Murphy et al., 2003; Tomblin Murphy, Alder, & MacKenzie, 2008). The first two approaches concentrate on how many HCPs are required to maintain current service levels and how many HCPs are required to meet society's demand for and commitment to healthcare, respectively. These methods fail to consider health care needs or service requirements, and in doing so erroneously assume that age, need, number of HCPs, and

quantity of services required are constant, external to, and independent of other important factors (Birch et al., 2007; Tomblin Murphy, O'Brien-Pallas, Birch, Kephart, & MacKenzie, 2004). The third category, as its name implies, does focus on needs; specifically, how many HCPs are required to meet the health needs of the population (Tomblin Murphy, 2002; Tomblin Murphy et al., 2003). Needs-based HHRP allows planners to identify the services that are based on need, create inventive ways to provide those services, determine the types of HCPs that are required to provide said services, and decide the best way to deploy HCPs based upon their scopes of practice (Advisory Committee on Health Delivery and Human Resources, 2005; Singh et al., 2010). Ultimately, in this approach the requirements for the number and skill mix of HCPs are dependent upon the size, distribution, and needs of the population served (Tomblin Murphy, MacKenzie, et al., 2009). Needs-based HHRP is an innovative model that is enjoying increasing attention from the HHR community as it allows planners to strategize for a more efficient and effective health system.

The Health System and Health Human Resources Planning Conceptual Framework

The Health System and Health Human Resources Planning Conceptual Framework (Tomblin Murphy & O'Brien-Pallas, 2006) (Figure 1) is designed to capture the importance of planning for HHR requirements within the context of needs. It includes the essential elements of HHRP and considers both direct and indirect factors that impact decision-making, such as population health needs, education and training, the supply of HCPs, and the organization of the work HCPs carry out related to population health care needs (Advisory Committee on Health Delivery and Human Resources, 2005; Tomblin

Murphy, 2007). The following description of the Health System and Health Human Resources Planning Conceptual Framework is adapted from Tomblin Murphy (2007).



Tomblin Murphy & O'Brien-Pallas, 2006

Adapted from O'Brien-Pallas, Tomblin Murphy & Birch (2005), O'Brien-Pallas, Tomblin Murphy, Birch, & Baumann (2001) and O'Brien-Pallas & Baumann (1997)

Figure 1: Health System and Health Human Resources Planning Conceptual Framework

The outer oval of the framework (Figure 1) reveals that HHRP does not occur in isolation; that in fact, there are a multitude of factors that affect it. Within the oval, HHRP begins with determining the population health needs of the country, province, or region being examined. *Population Health Needs* are influenced by, and in turn influence, actual and perceived population health status, socio-economic status, demographics, determinants of health, and health behaviours and are affected by social, cultural, political, contextual, geographical, environmental, and financial factors (outer oval). *System Design* impacts human resources requirements since policy makers and funders, ideally in collaboration with stakeholders, determine the delivery models (e.g. primary health care, acute care) and the associated level of services required. System design is also influenced by inter-governmental commitments, for example, improving

patient safety, reducing wait times, providing home care programs, and increasing disease prevention initiatives. *Planning and Forecasting* reflects the variety of actual methods used to predict human and non-human resource requirements. The methods chosen are determined by traditional practices, availability of data, political demands, and the types of questions being asked and must be conducted with regular data analysis and outcomes assessment. *Supply* refers to the actual number, type, and geographic distribution of regulated and unregulated HCPs. Supply fluctuates according to many factors, such as: production (i.e.; participation rates, demographic and educational characteristics of HCPs); recruitment and retention; governance (i.e.; certification, licensing, regulation, scope of practice); provider-to-population ratios that are dependent upon economic trends, work incentives, life-style choices; employment status; the employment sector; and, death, retirement, emigration and/or immigration rates. *Financial Resources* provides an economic context from which to estimate the proportion of total resources that might be allotted to overall health care and the share to be devoted to HHR. Consideration of the level and distribution of population needs and the role human resources play in meeting those needs is given when determining how money will be allocated. A balance between non-human and human resources must be established. *Production* involves the education and training of future HCPs and is influenced by financial resources (i.e.: funded seats), population health care needs, and the future ability to meet those needs. *Management, Organization and Delivery* of health services are key variables that affect care delivery across all sectors and indirectly contribute to outcomes. Structural arrangements, the degree of formalization and centralization, environmental complexity, and culture shape the way work gets done, the amount and quality of care

provided, provider health and satisfaction, costs, and outcomes. *Resource Deployment and Utilization* reflects the amount, nature, and type of resources deployed and utilized to provide health services and meet the needs of the population. *Health Outcomes* are classified into individual health and population or community health. Primary and secondary sources of health status, such as population health surveys, mortality data, and hospital discharge data are used to examine these types of outcomes. *Provider Outcomes* include responses to work and the work environment such as: provider health status, retention rates, turnover rates, sick time, job satisfaction, and levels of burnout. *System Outcomes* are associated with the provision and use of health care resources in terms of costs, benefits, and changes. Some examples include hospitalization and readmission rates, home visits, and discharge efficiency. *Contextual Features*, including the social, political, geographical, technological, and economic contexts, represent social choices, policy frameworks, political will, geographic considerations, new technologies, limitations on resources, and the costs of providing greater levels of resources. Finally, the *Efficient Mix of Resources* refers to the number and type of human and non-human resources that are required to achieve the greatest outcomes for health, providers, and systems (O'Brien-Pallas, 2002, as cited in Tomblin Murphy, 2007).

When the needs-based HHR conceptual framework is examined from an IPC lens some important considerations arise in relation to how HCPs are educated and the resultant effect this may have on their capacity to collaborate, their ability to work to optimal scope of practice (SoP), and their level of presenteeism (defined as lost productivity while at work) (Tranmer, Guerriere, Ungar, & Coyte, 2005), all of which are ultimately related to productivity. The *Supply* and *Production* elements are impacted by

the educational characteristics of HCPs, the former element referring to regulated and unregulated HCPs currently in the workforce and the latter to the education and training of future HCPs (Tomblin Murphy, Birch, & MacKenzie, 2007). It is important to recognize that the way in which HCPs are educated directly affects how they work together in an IP team; if they learn in silos (as has certainly been the case until quite recently), they are more apt to work in silos and when they work in silos, inefficiencies in care provision is likely to result in decreased productivity.

In uniprofessional health education programs, students either are not exposed to and/or are unable to consistently apply the competencies required to become competent in IPC thus they are less likely to realize the potential that can be achieved in care provision when HCPs' separate and shared (read: common and complementary) competencies unite. On the other hand, when pre- or post-licensure students are given the opportunity to engage in IPE, it changes how they see themselves and others (Accreditation of Interprofessional Health Education Steering Committee, 2009). In this type of instructional design, planned exchanges between learners from different backgrounds transpire, creating the space to learn from, with, and about one another. As a result, they learn how to complement rather than compete against one another in the provision of care. As can be seen, the educational preparation of HCPs impacts the competencies they attain which then influence how they work together, effectively impacting the supply required.

Service delivery productivity depends to a great extent on the efficient and effective distribution and utilization of HCPs (Advisory Committee on Health Delivery and Human Resources, 2005). The *Supply and Resource Deployment and Utilization*

elements represent the numbers, type, and distribution of HCPs required in any given setting. These elements will be affected by HCPs' ability to collaborate. Any restrictions imposed by stereotyping, limited scopes of employment and/or practice, turf protection, threats to professional status, and/or unfamiliarity of collaborative competencies, will in turn effect individual and team productivity. To illustrate, if HCPs are not permitted to work to their optimal SoP, they are not using their full range of profession/designation-related competencies to provide care, effectively limiting their human capital inputs which theoretically is a form of decreased presenteeism and thereby negatively affects individual productivity. Contrariwise, if HCPs are permitted to work to their optimal SoP as well as to collaborate fully, their productivity levels should increase and the number and mixes required for the delivery of health care should change.

The *Management, Organization and Delivery* element provides the ideal backdrop to consider workplace culture in relation to productivity as it compels one to question how the work gets done (independent vs. interdependent), who does it (regulated vs. non-regulated), the amount and quality of required services, and the health and satisfaction of HCPs. Workplace culture informs the type of model of care that is employed (medical model vs. another more holistic model), the role expectations of all staff in the work environment, how decisions are made, to who is considered the 'leader'. Having HCPs examine their own capacity to collaborate and providing opportunity for them to discuss their views and experiences may help shed light on this component of the conceptual framework.

As a final point, the *Efficient Mix of Resources* (specifically, human in this case) will be difficult to determine until we can ascertain whether HCPs are able to collaborate

as well as to explore HCP insight regarding their on-the-job productivity. Not doing so could result in inaccuracies related to the types and numbers of HCPs required to meet population needs.

Needs-based Analytical Framework

The needs-based HHRP framework presented above provides the conceptual foundation for the design of an analytical framework (Birch et al., 2007) that focuses on estimating the future stock of HCPs required to meet the needs of the population by incorporating population health needs, levels of service to respond to health needs, and provider productivity as additional variables (Birch et al., 2007; Birch et al., 2009; Tomblin Murphy & de Campos, 2006). “The purpose of the analytical framework is to provide a link between the principles identified in the theoretical models and the application of these principles in health human resources policy development” (Birch et al., 2009, p. S58). The analytical framework consists of two independent components: *Provider Supply* and *Provider Requirements*.

Provider Supply is dependent upon two determinants: the stock of HCPs and the flow of services from that stock. The key provider supply question asks, “How many HCPs are available to deliver health-care services to the population?”. Provider stock relates to the number of HCPs with the required qualifications, per age and gender groups, who are available to provide health care. The size and duration of training programs, graduation rates, recruitment/retention rates, and age-specific entry and exit rates are required to determine these values. Provider flow considers the activities that the HCP stock performs and the time spent in the production of services and depends on participation rate (the proportion of stock participating in service delivery) and activity

rate (the quantity of time devoted to provision of care per HCP). Professional associations or payroll/employment records of health care facilities may be valuable sources for this information (Birch et al., 2009; Tomblin Murphy & de Campos, 2006; Tomblin Murphy et al., 2009; Tomblin Murphy et al., 2011).

Provider Requirements refers to the number and mixes of HCPs required to support a team-based approach to the equitable delivery of health care, and is dependent upon four elements: demography, epidemiology, level of service, and productivity (Birch et al., 2007; Tomblin Murphy & de Campos, 2006; Tomblin Murphy et al., 2009). Demography relates to the size and age/sex distribution of the population to be served for which HHRP is taking place. Changes over time related to aging, migration, birth, and death rates are also considered. National census data would be the ideal source for this required information (Birch et al., 2009; Tomblin Murphy & de Campos, 2006). The epidemiology component takes into consideration the population's level and distribution of needs (health, illness, and risk) for services independent of the demographic mix of the population. Indicators of health risk, morbidity, mortality, and subjective measures of health are appropriate and can be informed by health survey data or administrative health databases (Birch et al., 2009; Tomblin Murphy et al., 2007; Tomblin Murphy et al., 2011). Level of service corresponds to the amount of care that is required to address observed levels of need (health, illness, and risk) and would vary with the combination of need indicators used and the age, gender, and other characteristics of the patient/client population. Data regarding level of service could be sought from representatives of HCP and patient/client groups as well as from administrative data; however, existing level of service may be used as an initial value (Tomblin Murphy & de Campos, 2006; Tomblin

Murphy et al., 2011). Productivity is defined as the rate of service delivery by HCP per unit of time and depends upon the intensity of work, how the work is organized, technological inputs, and inputs from other HCPs. Administrative, professional associations, or payroll databases would be used to gather information such as the hours worked by HCPs (Tomblin Murphy et al., 2009; Tomblin Murphy & de Campos, 2006).

The key provider requirement question asks, “How many HCPs are required to ensure sufficient ‘flow’ of health care services to meet the needs of the population?”. Combining the first three determinants of the provider requirement component (demography, epidemiology, level of service) generates an estimation of the number of health care services required by a population, allowing for size, demographic mix, levels and distribution of health and illness, and planned services responding to those illnesses. The fourth component (productivity) translates the number of services required into the number of HCPs required to deliver them (Tomblin Murphy et al., 2011). This estimation is captured in the following illustration,

$$N_r = \sum_{age,sex} \left(\frac{\text{Providers}}{\text{Service}} \right) \times \left(\frac{\text{Services}}{\text{Need}} \right) \times \left(\frac{\text{Needs}}{\text{Population}} \right) \times (\text{Population})$$

where N_r is the number of required full-time equivalent HCPs (Tomblin Murphy & de Campos, 2006). Mathematically, the above illustration translates into the following formula:

$$R_t = \sum_{i,j} (N_{i,j,t} \times Q_{i,j,t} \times H_{i,j,t} \times P_{i,j,t})$$

Where:

R_t = the number of HCPs required to meet the service needs of a population at time t
(corresponds to N_r above)

$N_{i,j,t}$ = number of HCPs required to perform each service to patients of age group i and gender j at time t (i.e., the inverse of productivity) (corresponds to providers/services above)

$Q_{i,j,t}$ = number (or quantity) of services required by level of need per person of age group i and gender j at time t (corresponds to services/need above)

$H_{i,j,t}$ = the proportion of the population by level of health need for age group i and gender j at time t (corresponds to needs/population above)

$P_{i,j,t}$ = the size of the population in age group i and gender j at time t (population in the above illustration) (Birch et al., 2009).

Because the conceptual framework provides the foundation for the analytical framework, similar questions arise in relation to IPC, scope of practice, presenteeism, and productivity. The analytical framework considers provider supply in relation to provider requirements; where provider supply is dependent upon the stock of HCPs and the flow of services from that stock and provider requirements refer to the number and mix of HCPs needed to meet population health needs (Birch et al., 2009; Tomblin Murphy et al., 2009). The flow of services (inherent in supply) is of particular interest to this research study as it is concerned with the activities that HCPs engage in and the time they spend doing so. Beyond identification of activities and time, it is essential to also consider the knowledge, skills, and attitudes required to work collaboratively and whether the HCPs charged with providing services have the requisite competencies to do so.

The notion of level of services and productivity in the provider requirements portion of the analytical framework also deserves attention. Level of services coincides with the amount of care required to attend to health needs. Again, determination of how

to address the amount of care required depends on what resources HCPs use (i.e.; each other, technologies) when delivering team-based care and the context in which they work (i.e.; multiprofessional vs. interprofessional or independently vs. interdependently).

Deliberation is necessary in relation to whether HCPs possess the competencies related to working collaboratively. Lastly, the productivity element of the analytical framework prompts important questions such as: are HCPs able to work collaboratively with others, are they aware of the competencies related to IPC, how is their work organized, and what is their sense of their level of productivity?

Simulation Model

In order to implement the mathematical formula above, a system dynamics-based simulation model was developed (Tomblin Murphy et al., 2009) (Figure 2) that estimates and compares HCP supply to HCP requirements and calculates the difference between these estimates as the HCP gap (i.e., shortage or surplus) (Birch et al., 2007; Tomblin Murphy et al., 2008; Tomblin Murphy et al., 2009). Provider supply is derived from simulation modules for training and supply of labor; provider requirements are based on simulation modules for production of, and need for, health care services. It is important to note that there are strong relationships between the modules and therefore changes in one will result in changes in others (Tomblin Murphy et al., 2009). In addition, “the modular nature of the simulation model...means that these levels can easily be replaced by other values in order to consider the effect of changing current practice on the supply of, and requirements for, providers” (Birch et al., 2007, p. S10).

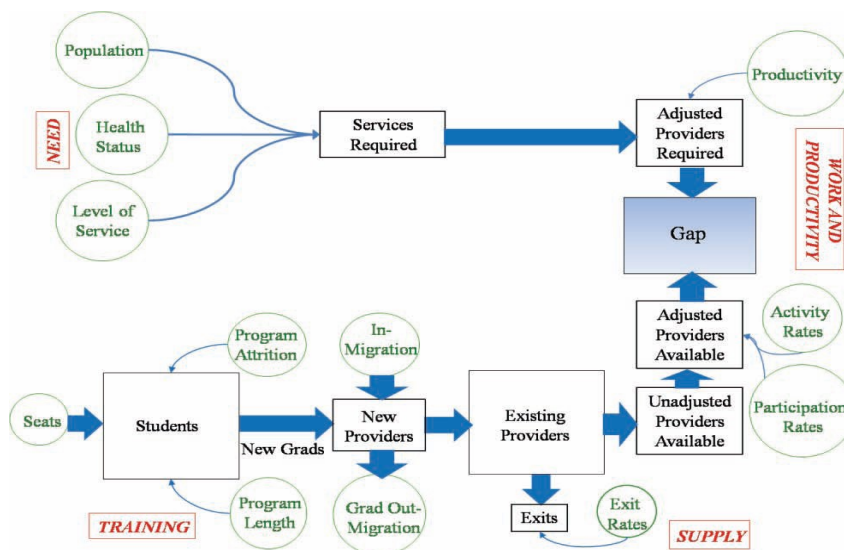


Figure 2: Simulation Model

The *Training* module (bottom left of diagram) focuses on estimating the flow of new graduates into the provider stock. Factors to be considered include the number of training seats in an educational program, the length of the education program, its attrition rate, and the rate of entry of new graduates to the stock of new providers (Tomblin Murphy et al., 2007). Graduate out-migration, those who graduate but do not enter the local workforce, is also taken into consideration within the rate of entry component (Tomblin Murphy et al., 2009). The *Supply* module (bottom right of diagram) approximates the future size of the HCP stock considering the existing stock, the numbers of HCPs entering the stock, and the number of exits leaving the workforce over time (Tomblin Murphy & de Campos, 2006; Tomblin Murphy et al., 2009). The *Work and Productivity* module (upper right of diagram) transforms the required need for health care into the required number of HCPs or teams based on estimates of the levels of participation, activity, and productivity of the HCPs (Tomblin Murphy et al., 2007; Tomblin Murphy & de Campos, 2006). This module considers the average number of hours per HCP (activity) and the average level of service delivery per hours of work

(productivity) in relation to the number of services required to calculate the overall average number of full-time equivalencies available to meet the needs of the population (Tomblin Murphy et al., 2009). Finally, the *Needs* module (upper left of diagram) is the mathematical representation of the estimates of the number of HCPs required to meet the health care needs of a known population, given their age and gender distribution based on the first three components of the analytical framework (demography, epidemiology, and level of service) (Tomblin Murphy et al., 2007; Tomblin Murphy et al., 2009).

The simulation model “incorporates a variety of quantitative and qualitative input variables, based on an environmental scan, research, and data availability” (Tomblin Murphy & de Campos, 2006, p. 6). Simulations are used to understand the comparative impact and combination of different policies on imbalances between human resource requirements and supply and can be applied to any policy context while accommodating differences in populations and health care systems (Birch et al., 2007). However, as identified by Tomblin Murphy et al. (2011), the accuracy of the simulations will rest on the soundness of the scenarios.

The simulation model is inextricably linked to the analytical framework and conceptual framework; for that reason, the line of inquiry is similar. Tomblin Murphy et al. (2007) state that the number of training seats available, the length of the education program, its attrition rate, the rate of entry to the stock, and out-migration are important factors to consider in relation to the *Training* module. As this module is directly related to the *Supply* elements of the conceptual and analytical frameworks, I therefore use the same line of reasoning as presented earlier to propose that consideration must also be given as to what has been taught and how these learners are educated. Are HCPs aware of

and able to consistently apply the necessary competencies for collaboration? Were they taught in predominantly uniprofessional programs with limited opportunities to learn from, with, and about other HCPs? Recall that when HCPs learn in silos, they have a greater likelihood of working in silos. Without this type of information and the assumption that HCPs work collaboratively because they work in close proximity to one another, the risk of miscalculating how many HCPs are actually required to meet population health needs becomes a threat. In essence, true numbers can only be determined once we know if HCPs are working collaboratively, to optimal scope of practice, and are productive while at work.

The *Work and Productivity* module considers the average number of hours per HCP and the average level of service delivery per hours of work in relation to the number of services required when calculating the overall average number of full-time equivalencies available to meet needs (Tomblin Murphy et al., 2009). Given that these are important matters, I contend that we also must consider ‘*what*’ HCPs are doing within those average numbers of hours and the level of service by exploring HCPs’ sense of their own productivity.

Competency-based/Service-based Health Human Resources Planning Framework

As was described above, identification of population health needs is an essential component of HHRP. Once needs are determined, it is critical to consider the knowledge, skills, and attitudes (read: competencies) that are required in order to meet the identified needs. The Competency-based Health Human Resources Planning (CB-HHRP) Framework (Tomblin Murphy et al., 2009, as cited in Tomblin Murphy et al., 2012) (Figure 3) was designed to do just that. Based on the analytical framework by Birch et al.

(2007), it measures requirements in relation to how many *competencies* are needed rather than measuring requirements in terms of how many HCPs are needed (Tomblin Murphy, MacKenzie, Alder et al., 2013; Tomblin Murphy, MacKenzie, Rigby et al., 2013; Tomblin Murphy et al., 2012). Through a competency-based approach, health workforce planners are able to move away from profession-centred strategies of HHRP toward identification of the specific knowledge, skills, and attitudes that are required to meet healthcare needs. By doing so, planners are offered more flexibility in cases where there are scarce resources, where population needs may not be well understood, or where HCP roles are not well delineated (Tomblin Murphy, MacKenzie, Alder, et al., 2013).

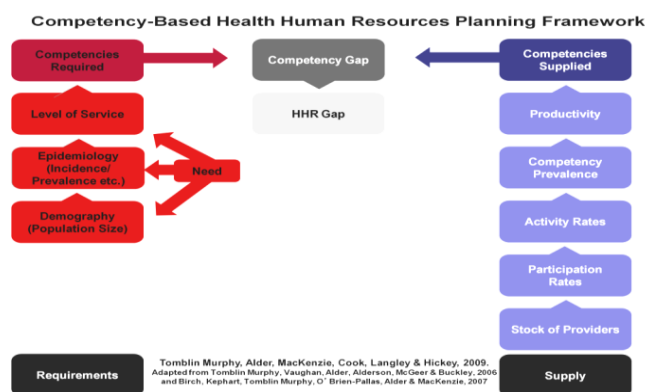


Figure 3: Competency-based Health Human Resources Planning Framework

The left-hand side of the framework, *Requirements*, refers to the need for health care services and is influenced by the size, age, and sex of the population (demography) that requires curative and/or preventative health services; the distribution and severity of illness including the variability of needs of those who are ill (epidemiology); and, the factors that affect service provision such as the location and existing infrastructure of care settings, social support, and financial constraints (level of service). When these three elements are combined, the number of competencies required for the delivery of patient care can be determined. That calculation can then be compared with the supply of

competencies that are available to meet patient's needs (Tomblin Murphy, MacKenzie, Alder, et al., 2013; Tomblin Murphy, MacKenzie, Rigby, et al., 2013; Tomblin Murphy et al., 2012).

The right-hand side of the framework, *Supply*, speaks to the amount and diversity of competencies available to meet identified needs across care settings. The supply of competencies depends on five components: the stock of providers, participation rate, activity rate, productivity, and competency prevalence. The stock of providers refers to the number of "registered/licensed" (Tomblin Murphy et al., 2012, p. 15) HCPs on hand to provide direct care as well as the numbers of those who do not provide direct care (i.e.; administrators, educators, researchers). Although unlicensed HCPs (i.e.; personal care workers, continuing care assistants) are not mentioned in the description of this framework, they too should be included in the stock as they possess competencies necessary to provide direct/indirect care and are an integral part of any health team. The participation rate element recognizes providers who work in clinical settings that are involved in direct care delivery as well as those who are not. The activity rate refers to the time in hours per HCP spent in delivering the required service. HCP productivity represents "the average rate of services per unit time delivered to people requiring care" (Tomblin Murphy, MacKenzie, Alder, et al., 2013, p. 15) and is dependent on the number of hours for care delivery, organization of work, technology, and accessibility to other HCPs, students, and volunteers. Lastly, the proportion of HCPs that have the competencies (knowledge, skill, and attitudes/judgments) required to provide the necessary care to meet patient needs is determined; this is known as the competency rate. When these five elements are combined, the number of competencies that can be supplied

is determined. The difference between the competencies required by patients and the number that can be provided by HCPs is calculated as the competency gap, which ultimately leads to identification of the HHR gap (Tomblin Murphy, MacKenzie, Alder, et al., 2013; Tomblin Murphy, MacKenzie, Rigby, et al., 2013; Tomblin Murphy et al., 2012).

The reader will notice that the explanation provided regarding the components of the CB-HHRP framework are similar in many respects to that given above in the description of the Birch et al. (2007) analytical framework, which is not surprising since the former is based on the latter. On deeper examination, the reader may also notice that the productivity element, originally under provider *requirement* in the Birch et al. (2007) analytical framework is no longer under the requirement element of the CB-HHRP framework; it is now subsumed under the competencies *supplied* element. This shift is logical because determination of how many HCPs are required depends in part on whether they can supply the competencies needed. Despite this change in position, both productivity components examine the average rate of services per unit time and as such the line of questioning offered earlier applies here as well – that in essence, it is more than rate and time that is important when determining productivity, it is also what HCPs are doing, how they are doing it, and who they are doing it with that must be taken into consideration. The competency prevalence component addresses the concerns raised as it measures the quantity of HCPs that have the competencies required to provide the necessary care.

Through repeated use of the CB-HHRP methodology, Tomblin Murphy and colleagues have discovered that the terminology did not quite portray the true meaning of

the approach. Hence, the title ‘competency-based’ has since been changed to ‘service-based’ to better capture that the emphasis of the methodology is focused on the health needs of people rather than on the needs of providers (Tomblin Murphy, MacKenzie, Rigby, et al., 2013). “...the unit of analysis is the particular health care service that must be performed by a HCP to address some health care need within the population being examined; this contrasts with most HHR planning approaches where the HCP is the unit of analysis” (Tomblin Murphy, MacKenzie, Rigby, et al., 2013, p. 612).

These needs-based and CB/service-based (SB)-HHRP frameworks not only provided the impetus for the proposed study, they also provide the foundation for the study. As was discussed in the literature review chapter, a new model of care that encourages collaboration is necessary if health system challenges are to be resolved. However, the question remains whether HCPs currently practicing in the health care system have the requisite competencies to work interprofessionally and collaboratively as many have been taught in the traditional siloed health education system. I also question whether HCPs would see benefit in incorporating these competencies into their repertoire of care. Would they see any benefit in working this way? As was also presented in the literature review chapter, productivity is typically defined as the ratio of input to output, as it is in the models presented here. But is this the way that HCPs define productivity? And would their definition change if the way they worked with others changed? As a result of the many questions that have been generated, I believe that it is important to delve deeper into the prevalence of collaborative competencies when examining productivity and needs-based HHRP. Having HCPs examine their own capacity to

collaborate and providing opportunity for them to discuss their views and experiences will offer valuable information to the HHRP community.

Methodological Underpinnings

All research methodologies have a history on which their philosophical underpinnings are built and provide a platform in which to conduct research. Informed by assumptions about what knowledge is and how it is acquired, these philosophical foundations shape the process of research and are important for researchers to reflect upon as they design studies. It is with this in mind that I offer a comprehensive discussion of the methodological underpinnings of my study. I begin by defining terminology that I believe is important for a deeper appreciation of research in general. Discussion of the ontological, epistemological, and axiological differences, as well as strengths and limitations, between the various research paradigms follows, which I anticipate will set the stage for a meaningful discussion of the mixed-methods research approach. The history, typologies, and assumptions of mixed-methods research will be presented along with key decisions that must be made when using this research method. As well, six major mixed-methods research designs will be described. Criteria for ensuring validity, reliability, and trustworthiness in research will be discussed. To close, I provide rationale for using the mixed-methods research methodology in my study.

Definitions

A paradigm, also known as a worldview, is a philosophical orientation of beliefs and assumptions by which a person experiences, connects with, and makes sense of the world (Creswell & Plano Clark, 2011; Wiggins, 2011). Worldviews differ in their ontology (nature of reality), epistemology (the relationship between researcher and what

is being researched in the pursuit of knowledge), axiology (values and value judgments), and their methodology (process of research) (Creswell & Plano Clark, 2011; Johnstone, 2004). As such, paradigms “guide scientists in terms of what they observe and study, the nature of the questions they ask about their objects of study, how they structure these questions, and how they interpret the results of their investigations” (Wiggins, 2011, p. 45).

A methodology is a ‘thinking tool’ that helps frame the research question and guide the methods and data analysis used (Giddings & Grant, 2007). Methodology has been described as a fundamental logic or way of thinking about data (Johnstone, 2004) or as a particular way of knowing reality (Sale, Lohfeld, & Brazil, 2002). It refers to the theoretical assumptions and values that support a research approach and appears to belong to certain paradigms and even specific disciplines. For example, medicine typically relies on the randomized controlled trial as the gold standard that provides the evidence on which its practice is based. Traditionally, the term ‘evidence’ has been assumed (both implicitly and explicitly) to mean legitimate empirical scientific studies for a range of health professions (Anderson, 1991; Dzurec 1995; Estabrooks, 1998; French, 1999; Porter, 2010; Poses & Isen, 1998). Historically, legitimate nursing research was also defined within this empiricist paradigm (Dzurec, 1995) but this singular definition of evidence did not fit well within the philosophical underpinnings of nursing. Consequently, the nursing profession advocated for evidence that extended beyond empirical research to that which included alternative ways of knowing generated from ethical, personal, and aesthetic theories (Paley, Cheyne, Dalglish, Duncan, & Niven, 2007).

Methods, on the other hand, are concrete and practical ‘doing’ tools that are used for collecting and analyzing data (Giddings & Grant, 2007; Johnstone, 2004; Wiggins, 2011). They are considered a-paradigmatic, so in theory any given method can be used with any given paradigm; however, in reality, some methods are better suited to certain methodologies and therefore certain worldviews (i.e.; open-ended interviews associated with the constructivist paradigm and survey methods with the positivist/postpositivist paradigm) (Giddings & Grant, 2007). Quantitative methods examine causal (linear) relationships among measurable variables by using statistics to manipulate numerical data so that the significance and reliability of relationships can be assessed. Qualitative methods offer insight into little known phenomenon by uncovering meaning, patterns, characteristics, contexts, and experiences (Morris & Burkett, 2011).

Defining mixed-methods proves a bit more difficult, for depending on whether the focus is on methods, processes, philosophy, or design, many different definitions have emerged. In one of the earlier descriptions, Green, Caracelli, and Graham (1989) defined mixed-methods as the use of “at least one quantitative method (designed to collect numbers) and one qualitative method (designed to collect words), where neither is inherently linked to any particular inquiry paradigm” (p. 256). A decade later, the focus changed from that of methods to one of process or methodological stance. Tashakkori and Teddlie (1998) defined the mixed-methods process as mixing in all phases of research – philosophical worldviews, inferences, and interpretations – thereby essentially evolving mixed-methods into a distinct methodology with its own philosophical underpinnings and techniques. In 2007, Johnson, Onwuegbuzie, and Turner offered another meaning based on the collation of 19 different definitions by a host of well

respected mixed-methods researchers. Like Tashakkori and Teddlie, they defined mixed-methods research from a methodological position – as a combination of qualitative and quantitative viewpoints, data collection, analysis, and interpretation techniques; but they also added an element of purpose – in that mixed-methods research was important to facilitate understanding and corroboration of findings (Creswell & Plano Clark, 2011). In a more recent definition by Creswell and Plano Clark (2011) many diverse perspectives are integrated to describe core characteristics, rather than a distinct definition, of mixed-methods research. In their description, the researcher bases the collection and analysis of both qualitative and quantitative data on research questions; mixes both types of data either concurrently or sequentially, or embeds one into the other; prioritizes one or both types of data depending on what the study emphasizes; uses a mixed-methods approach within a single study or over a program of research; draws on philosophical worldviews and theoretical frameworks to structure the mixed-methods study; and, combines quantitative and qualitative methods into the research design (Creswell & Plano Clark, 2011). From these broad descriptions and characteristics, it appears that a concrete definition remains somewhat elusive.

It is also important to note that there is great confusion regarding which terms to use when discussing mixed-methods research. Is it mixed or multi? Is it methodology or method? What is mixed? Is it a new paradigm? Or is it purely the combination of quantitative and qualitative methods? Unfortunately, there are as many answers to these questions as there are questions. A decade ago, the use of the word ‘multi’ was suggested to describe studies that used various research approaches to provide a more holistic answer to many research questions. Since that time many names have been used to

describe what Johnson et al. (2007) call “an intellectual and practical synthesis”, and include multiple operationalism, blended research, integrative research, multi-method research, multiple methods, and triangulated studies (p. 118). However, as mixed-methods theory and methodology have developed, the term mixed-methods research has gained favor (Polit & Tatano Beck, 2012) and will be used throughout this manuscript.

When the term ‘mixed’ is used, in most studies it is the methods (the doing tools) that are mixed, not the methodologies (the thinking tools) (Giddings & Grant, 2007); one would typically see the use of quantitative and qualitative methods within the same study and accordingly, if limited to the mixing of methods, no worldview contradictions should arise as methods are considered a-paradigmatic. However, if methodologies are mixed, incongruities may occur if those methodologies are from different paradigms (Morris & Burkett, 2011). For example, the worldviews from quantitative and qualitative paradigms are in opposition to one another (as the reader will see shortly in the discussion below) so when studies attempt to mix methodologies from these two paradigms, tensions surface and one methodology will often dominate over the other (Wiggins, 2011). On the other hand, methodologies within the same paradigm (i.e.; phenomenology and hermeneutics) can be mixed with no resultant contradictions as their underlying assumptions and values are almost certainly congruent with one another as they come from the same paradigm.

Interestingly, Patton (1988, as cited in Johnstone, 2004) would disagree with the position that paradigms cannot be mixed, offering that researchers should not have to choose between worldviews; that inductive and deductive reasoning can be complementary rather than competitive. At this stage in my research career, I am drawn to Patton’s argument as I see great value in using one methodology to complement

findings from another. My worldview favors the narrative inherent in qualitative research because I believe that it can generate in-depth understanding of a phenomenon. But at the same time, I also am aware of the importance of understanding cause-and-effect relationships. As I contemplate the practical use of mixed-methods research, I am struck by the importance of understanding the philosophical underpinnings of the various research paradigms.

Worldviews, Ontologies, Epistemologies, and Axiologies

Postpositivist paradigm. Most often associated with quantitative research, the logical positivist/postpositivist worldview arose from the time of Socrates and Plato when debates about singular truths transpired (Johnson et al. 2007). The logical positivist/postpositivist (or empirical) approach is based upon a reductionist perspective where “only a singular reality exists, which is universally constructed and objectively measured...[and] strives to prove a cause-and-effect relationship for all human experiences” (Lincoln & Guba, 1990 as cited in Wilson-Thomas, 1995, p. 570). Knowledge generation is based on determination (cause-and-effect thinking), reductionism (reducing complex entities to their most basic parts), detailed observation and measurement of variables, and verification of frequently refined theories (Creswell & Plano Clark, 2011). Logical positivists/postpositivists ontologically assume that reality is singular, objective, predictable, independent of human perception, and ultimately, material (Creswell & Plano Clark, 2011; Johnstone, 2004; Sale et al., 2002; Wiggins, 2011). As such, the postpositivist approach claims that only objective, rational methods be used in research as there is no room for a subjective, emotive process (Bungay & Keddy, 1996). Epistemologically, the logical positivist/postpositivist researcher is

considered independent from what is being researched; the researcher does not influence, nor is influenced by, the phenomenon under study (Johnstone, 2004; Sale et al., 2002) and can therefore understand reality through sensory observations (Wiggins, 2011). Distance and impartiality are cornerstones of this approach (Creswell & Plano Clark, 2011). From an axiological stance, postpositivistic research is value free and unbiased; as such, the researcher employs many checks and balances to ensure both, for example randomization, blinding, utilization of structured protocols, and using large sample sizes (Creswell & Plano Clark, 2011; Johnstone, 2004; Sale et al., 2002). A positivist/postpositivist methodology values observability; choosing and creating methods that manage observables and rejecting those that do not (Wiggins, 2011). Working from the top down, from *a priori* theory to data, the postpositivist's approach is deductive in either adding to or opposing theory (Creswell & Plano Clark, 2011). Strengths inherent in the postpositivist paradigm are in its ability to accurately operationalize and measure specific constructs; allow for group comparisons; examine the strength of relationships between variables; and, design models and test hypothesis. Despite its many strengths, this worldview typically separates information from a "real-world" context (decontextualization) (Castro, Kellison, Boyd, & Kopak, 2010).

Constructivist paradigm. In contrast to postpositivism, the constructivist paradigm, which hails from the Sophist era, accepts that there are multiple subjective truths based on one's construction of reality (Johnson et al., 2007; Sale et al., 2002). Typically associated with qualitative research, this approach accepts that reality is constructed and as such can only be understood by examining meanings (Creswell & Plano Clark, 2011; Johnstone, 2004; Wiggins, 2011). Epistemologically, there is

closeness or interrelatedness between researcher, participant, and the study phenomenon thus findings are mutually constructed within the context of the inquiry (Creswell & Plano Clark, 2011; Johnstone, 2004; Sale et al., 2002). As well, it is understood that reality cannot exist independent of a person's mind (Sale et al., 2002). From an axiological perspective, the constructionist acknowledges their values and biases and the values inherent in the data (Creswell & Plano Clark, 2011; Johnstone, 2004).

Constructivism is methodologically inductive where researchers, working from the bottom up, begin with participants' views and construct patterns and theories through the use of in-depth interviews, focus groups, and observations (Creswell & Plano Clark, 2011; Sale et al., 2002). Small sample sizes are acceptable as data collection continues only until saturation occurs.

Richly detailed descriptions of human emotions, beliefs, and behaviours are crafted from narrative accounts when explored within their original contexts. Moreover, the qualitative approach allows for a detailed analysis of complex human, family, and cultural experiences in a way that could not happen with measurement scales and multivariate models (Castro et al., 2010). Notwithstanding these strengths however, the constructivist paradigm is not without its limitations. Castro et al. (2010) identify difficulties when attempting to integrate data across observations and in evaluating relationships between constructs. As well, a lack of distinct prescriptive procedures and small unrepresentative samples, both of which limit the capacity for drawing conclusions and for producing generalizable findings, are considered limitations of this approach. Nevertheless, qualitative researchers would argue that these "limitations" per se are not applicable as replication and generalizability are not relevant to this paradigm.

Pragmatist paradigm. For decades there has been a divide between the quantitative and qualitative research traditions, prompting some to coin the term “paradigm wars” (Gage, 1989; Kelle, 2006; Wiggins, 2011) that resulted in the emergence of a new research methodology that combined these traditions in the pursuit of knowledge. Mixed-methods research can be positioned between the extremes of Plato (quantitative research) and the Sophists (qualitative research), as it attempts to respect the wisdom of both of these viewpoints while also searching for a practical middle ground for many research questions (Johnson et al., 2007). Mixed-methods research, identified by Johnson et al. (2007) as the third research paradigm, has been described as the combination of the fundamentals of both qualitative and quantitative research and is predicated on a pragmatic worldview, where the main issue is to determine what data and analyses are considered necessary to answer the research questions (Bazeley, 2009). Pragmatists refuse to be forced into a choice between postpositivist and constructivist research paradigms as they see both induction and deduction as important. The epistemological focus is to answer research questions rather than to adhere to any one research method. As such, mixed-methods researchers will use multiple methods to collect and analyze data to inform the questions being studied (Creswell & Plano Clark, 2011; Johnson et al., 2007; Polit & Tatano Beck, 2012).

In the pragmatist view, theory can be both generated and verified from a pluralistic real-world orientation (Polit & Tatano Beck, 2012). Ontologically speaking, mixed-methods researchers consider singular and multiple realities and perspectives when building theory and practice knowledge (Creswell & Plano Clark, 2011; Johnson et al., 2007). From a practical position, researchers collect data by the means that work best

to address the research questions (Creswell & Plano Clark, 2011). Accepting that there are multiple stances, mixed-methods researchers would include both biased and unbiased perspectives and reject an incompatibility argument between the qualitative and quantitative traditions maintaining that research paradigms can either remain separate or they can be mixed depending on what the research question(s) demand (Creswell & Plano Clark, 2011; Johnson et al., 2007).

It has been suggested that using a mixed-methods approach increases the confidence of study findings as it enhances validity, strength, and explanatory potential since the biases inherent in one research methodology may counteract biases in the other (Greene et al., 1989; Leahy, 2007; Polit & Tatano Beck, 2012; Thurmond, 2001). Other strengths noted in the literature include the potential of uncovering multiple perspectives that otherwise would have remained hidden; providing richness and detail to research findings; and, prompting new interpretations and areas for further study (Giddings & Grant, 2007; Greene et al., 1989). Tashakkori and Teddlie (2010) offer that the mixed-methods approach mimics everyday human problem solving in a way that neither quantitative nor qualitative methodology can do alone. Because human science research questions are often complicated and multi-dimensional those conducting research in this area are not only interested in what has happened but also in how or why it has happened and a mixed-methods research approach can help uncover the answers to what, why, and how (Tashakkori & Teddlie, 2010).

The complexity of mixed-methods research has been identified as a major limitation therefore researchers need to be well-versed in both qualitative and quantitative methods when undertaking this approach (Polit & Tatano Beck, 2012). When designing

and conducting mixed-methods research, researchers need to know the alternative positions (worldviews, ontologies, epistemologies, axiologies, and methodologies) between quantitative and qualitative methodologies and be able to articulate their worldview and rationale for using mixed-methods (Creswell & Plano Clark, 2011). Besides the complicatedness of mixed-methods research, it can also be expensive and time consuming when collecting, analyzing, and integrating two or more types of data.

Mixed-Method Design Principles

Because mixed-methods research is such a complicated process, there are several principles that Creswell and Plano Clark (2011) recommend researchers consider when embarking on this type of study. These include: appreciating that mixed-method designs can be fixed or emergent; identifying a design typology; matching the design with the research problem, purpose, and question(s); and, articulating the reason for using mixed-method designs.

Fixed or emergent mixed-method designs. In fixed mixed-method designs, at the outset of the study the researcher predetermines when the quantitative and qualitative methods will be used and follows set procedures when conducting the investigation. In contrast, in an emergent design the use of an alternate method occurs as a result of issues materializing during the research process usually because the initial method did not adequately address the research problem, purpose, or question. Although they are described as distinct categories, Creswell and Plano Clark (2011) view these designs as end points along a continuum with many mixed-method designs falling somewhere between the two. Given the fluidity of this continuum even if a researcher begins with a

fixed design, the study may in fact end with an emergent design based on interpretation of results from the initial phase of the study.

Design typology. In addition to considering whether the study will be fixed or emergent, researchers must also reflect upon the best approach – typology-based or dynamic – for designing their mixed-methods study. There are a plethora of typology-based approaches documented in the literature (Creswell & Plano Clark, 2011; Gilbert, 2006; Greene & Caracelli, 1997; Greene et al., 1989; Johnson et al., 2007; Kelle, 2006; Morgan, 1998; Morse, 1991; Patton, 1990; Sandelowski, 2000; Stekler, McLeroy, Goodman, Bird & McCormick, 1992; Tashakkori & Teddlie, 1998) that represent a diversity of disciplines (i.e.; evaluation, health sciences, education). The typology-approach highlights the classification of effective mixed-methods designs and how particular designs are chosen and modified depending on the study's purpose and questions. Creswell and Plano Clark (2011) suggest that the typology-approach is better suited to researchers new to the field of mixed-methods research as it provides well defined flexible options to assist with the conceptualization of a study.

For more seasoned mixed-methods researchers, a dynamic approach can be employed when considering the design of a mixed-methods study. Because mixed-methods research encourages creativity, there can be any number of designs possible. In a dynamic approach, rather than selecting a design from an existing typology, researchers plan a research study that takes into account and links the multiple components (i.e.; purpose, conceptual framework, question(s), and method) of the research design and allows the process to guide the approach (Creswell & Plano Clark, 2011).

Match design with research problem, purpose, and question(s). "...the questions of interest play a central role in the process of designing any mixed methods study" (Creswell & Plano Clark, 2011, p. 60). This sentiment evolves from the pragmatic worldview of mixed-methods research, where methods are selected because they can best answer the questions asked. Therefore, researchers must be able to clearly express their research problem and associated question(s) so that the best research design can be chosen for their questions.

Articulate the reason for using mixed-methods. Mixed-methods research is a challenging endeavor and therefore researchers should undertake this approach only when it is necessary and must be able to articulate their rationale for doing so. Two well-known frameworks that can assist researchers in their reasoning are those by Greene et al. (1989) and Bryman (2006).

Greene et al. (1989) offer five broad reasons for mixing methods, which are still used today in many studies, and include: triangulation, complementarity, development, initiation, and expansion. Triangulation occurs when researchers are trying to reach convergence, corroboration, and correlation between results by using different research methods (Creswell & Plano Clark, 2011; Johnson et al., 2007). In triangulation, multiple data sources, collection, and analysis techniques, and/or inferences are blended and contrasted thereby providing ways in which to verify and confirm findings (Giddings & Grant, 2007). Triangulation can be further delineated into four distinct types: data (using an assortment of data sources such as time, space, and person), investigator (using several investigators, interviewers, coders, or data analysts), theory (using multiple perspectives and/or theories to interpret findings), and methodological (using multiple methods to

study a phenomenon) (Johnson et al., 2006; Thurmond, 2001). Methodological triangulation has been further broken into within- and between-methods, where within-methods triangulation describes the use of *either* multiple quantitative or qualitative methods in the same study (not both) and between-methods as the use of *both* quantitative and qualitative methods within the same study (Johnson et al., 2006; Thurmond, 2001).

When results from one method elaborates, enhances, illustrates and/or clarifies results from another method, complementarity is said to have occurred (Creswell & Plano Clark, 2011; Johnson et al., 2007). Through complementarity, common characteristics and different facets materialize which adds credibility to a study (Johnstone, 2004). Whereas triangulation is meant to use different methods to assess the same phenomenon, the intent of complementarity is to use various methods to measure similar and different aspects of the same phenomenon (Greene et al., 1989). When mixed-methods research is used for development purposes, results from one method are used to inform sampling, instrumentation, and measurement in the other method. In a mixed-methods study with initiation as its intent, one method can help uncover contradictions and new perspectives, leading to the re-working of research questions or reconsideration of results in the second method thereby initiating further study. Finally, a study that aims for growth and breadth by using different methods allows for expansion of inquiry (Creswell & Plano Clark, 2011; Greene et al., 1989; Johnson et al., 2007).

Since 1989, researchers have provided many other reasons for using the mixed-methods approach, which Bryman (2006) collated into a comprehensive list, including to: triangulate for corroboration; use one method to offset the weaknesses and draw on the

strengths of the other; provide a more complete account of the phenomenon under study; account for structures in the social world (quantitative) while also providing a sense of process (qualitative); answer different research questions within the same study; help explain findings of one method by using the other; help explain unexpected results; assist in instrument development; facilitate sampling; increase the integrity of the study; provide contextual understanding; illustrate quantitative findings; improve the usefulness of findings for practitioners; confirm or discover; present a diversity of viewpoints; and, build upon findings. Bryman (2006) found that many studies used a combination of rationale to substantiate their use of mixed-methods; however, at the very least researchers should be able to articulate one explanation for doing so.

As can be seen by the myriad rationale given, much thought has gone into the reasons behind mixing methods. Nevertheless, there remains opposition to this approach. As was noted previously, some researchers argue that the paradigmatic contrasts between quantitative and qualitative methodologies are irreconcilable and therefore these distinct methodologies should not be mixed within a study. Further to this, other concerns are raised in relation to the large amount of data collected that could lead to false interpretations; increased biases resulting from investigator triangulation; lack of understanding of differing epistemologies leading to designs that are biased toward one particular methodology; and, unequal valuing of one paradigm over another (Morris & Burkett, 2011; Thurmond, 2001; Wiggins, 2011).

Key Decisions

Building on the principles and concerns presented above, researchers also need to make key decisions with regard to how the qualitative and quantitative aspects (also

known as strands) of the study relate to each other. A strand is “a component of a study that encompasses the basic process of conducting quantitative or qualitative research: posing a question, collecting data, analyzing data, and interpreting results...” (Creswell & Plano Clark, 2011, p. 63). Important choices have to be made when determining the level of interaction, priority, and timing of the qualitative and quantitative strands, as well as where and how mixing will occur within the study.

Level of interaction. The degree to which the qualitative and quantitative strands mix is the most significant decision a researcher will make when embarking on this type of study. Two obvious levels have been identified, either independent or interactive. As expected, an independent level of interaction is just that – the qualitative and quantitative strands (research questions, data collection, and analysis) are implemented separately; mixing only occurs during the interpretation stage when conclusions are drawn. In contrast, an interactive level exists when there is a direct interface between the strands before the interpretation phase. The interaction can take many different forms, in many different ways, and at any point in the study. For instance, the design of one strand may influence the design of the other or the data from one strand may be transformed into the other strand so that the data sets can be analyzed together (Creswell & Plano Clark, 2011).

Priority. The relative importance of one strand over the other is another key decision that researchers make, whether implicitly or explicitly. Certainly, there are concerns voiced (Gilbert, 2006; Wiggins, 2011) that due to the hierarchical nature of science, quantitative research frequently usurps qualitative research as the dominant paradigm and this argument is no different in mixed-methods research. Clearly, there are

two options to choose from: the two strands can have equal status or one can take precedence over the other depending on the purpose of the investigation (Creswell & Plano Clark, 2011; Leech & Onwuegbuzie, 2009). The researcher's worldview and skill set, resources (i.e.; funding), and the target audience are important factors that can influence which strand takes precedence (Polit & Tatano Beck, 2012).

Timing. Timing refers to pacing and implementation, or the temporal relationship, between the two strands and can be categorized in three ways: concurrent, sequential, or multiphase combination. Concurrent timing (also called simultaneous or parallel) refers to implementation of both strands during a single phase of the study (i.e.; during data collection or analysis) at the same time. In a concurrent design neither analysis builds on the other during the analysis phase nor are results combined until both strands have been collected and analyzed separately. A meta-inference is made that integrates the conclusions from each strand. With sequential timing, researchers collect and analyze one strand of data before moving on to the next and findings from the first strand inform other phases of the study. In multiphase combination timing, multiple phases are performed that include concurrent and/or sequential timing over a program of research (Creswell & Plano Clark, 2011; Leech & Onwuegbuzie, 2009; Onwuegbuzie & Johnson, 2006; Polit & Tatano Beck, 2012).

Mixing. The final decision for the researcher rests with determining at what stage of the research process each strand will be combined and what strategies will be used to do so. Will mixing occur during interpretation? During data analysis? Data collection? Or, at the design phase? Once this has been established, the mixing strategies appropriate for each of the stages are utilized. These include: merging the two data sets; linking the

analysis of one data set to the collection of the other; embedding one form of data into a larger design; or, using a framework to bind the two data sets together (Creswell & Plano Clark, 2011).

When mixing occurs at the interpretation phase, data from the two strands are collected and analyzed separately; the results from each strand are compared or synthesized and conclusions drawn. This is reflective of an independent level of interaction (Creswell & Plano Clark, 2011).

Mixing during data analysis involves merging the results from the qualitative and quantitative data sets. The researcher qualitatively analyzes the qualitative data and quantitatively analyzes the quantitative data then brings each analysis together for a combined analysis that compares one with the other. Mixing during data analysis can also occur when data from one strand is transformed into the other and additional analysis occurs on the transformed data (Creswell & Plano Clark, 2011).

When mixed-methods researchers are preparing to collect a second set of data they may link the results of one strand to the collection of the second; this would be considered mixing during data collection. In other words, quantitative results may lead to the subsequent collection of qualitative data (or vice versa) and influence the questions asked, participant selection, and/or data collection tool development (Creswell & Plano Clark, 2011).

Finally, mixing may occur during the design phase of the research process and typically takes three forms: embedded, theoretical framework-based, or program objective framework-based. Embedded mixing occurs when one strand is embedded into a larger research design (i.e.; a quantitative strand into a predominantly qualitative study).

The embedded method is purposely conducted to fit the context of the larger research design. Theoretical framework-based mixing involves the researcher mixing qualitative and quantitative strands within a framework that is guiding the overall research design. Whether within a transformative framework (i.e.; feminism) or in a substantive framework (i.e.; social science), the two strands are mixed according to the theoretical underpinnings. When mixing quantitative and qualitative methods in a program objective framework, the objectives of the program guides the combination of multiple projects or studies in a multi-phased program of research (Creswell & Plano Clark, 2011).

As is evident in the many decisions that researchers must make when embarking on a mixed-methods study, the process is complex. But when researchers consider each of the key decisions in relation to level of integration, prioritization, timing, and mixing a robust mixed-methods design emerges.

Mixed-Method Designs

There are a number of mixed-method designs found in the literature (Castro et al., 2010; Gilbert, 2006; Kelle, 2006; Kiessling & Harvey, 2005; Leech & Onwuegbuzie, 2009; Polit & Tatano Beck, 2012). For example, Leech and Onwuegbuzie (2009) use the key decision markers of priority (equal vs. dominant status), timing (concurrent vs. sequential) and mixing (partial vs. fully mixed) to develop a 2x2x2 matrix that yields eight mixed-methods designs: partially mixed concurrent equal status; partially mixed concurrent dominant status; partially mixed sequential equal status; partially mixed sequential dominant status; fully mixed concurrent equal status; fully mixed concurrent dominant status; fully mixed sequential equal status; and fully mixed sequential dominant status. To fully understand each design, researchers must appreciate how Leech and

Onwuegbuzie (2009) describe each marker. In relation to priority, the quantitative and qualitative methods used can either have equal status or one can take priority over the other depending on the purpose of the study. Timing can be concurrent, where both strands are enacted upon at the same time or sequential, where one strand follows the other. Fully mixed methods involves mixing quantitative and qualitative strands within or across one or more phases of the research process (i.e.; the research objective, data, analysis, and interpretation phase); whereas a partially mixed method would involve mixing only at the interpretation phase. To illustrate, in a partially mixed concurrent equal status design, the quantitative and qualitative strands have equal status and are conducted concurrently (and separately) before being mixed at the interpretation phase of the research study.

Similarly, another prominent mixed-method design typology by Creswell and Plano Clark (2011) reflects the decisions that researchers need to consider in relation to levels of integration, priority, timing, and mixing. Their six designs include: convergent parallel, explanatory sequential, exploratory sequential, embedded, transformative, and multi-phase. A discussion of each follows in relation to their purpose, paradigmatic foundation, level of interaction, priority, timing, point of integration, mixing strategies, and common variations researchers have used when implementing each design.

Convergent parallel design. In the convergent parallel design, previously known as a triangulation design (Polit & Tatano Beck, 2012), the quantitative and qualitative data collection occur concurrently with equal emphasis but their analyses are conducted separately. Once analyses are completed, the two data sets are merged; as such, there is an independent level of interaction until the interpretation stage where upon analysis,

comparisons, or transformations can result. This type of design is used either when a more in-depth understanding of a phenomenon is desired or when corroboration is required. A pragmatic worldview guides this design type. Common uses for this design include the convergence model (data remain separate until the discussion phase where it is compared and contrasted in hopes of confirming conclusions about a single phenomenon), data transformation (where greater emphasis is placed on the quantitative strand and as a result qualitative data is quantified, or vice versa), and data validation (using open-ended questions to confirm or validate answers to closed-ended questions) (Creswell & Plano Clark, 2011; Polit & Tatano Beck, 2012).

Explanatory sequential design. This interactive design is implemented sequentially in two phases, with quantitative data collection and analysis taking priority in Phase 1, followed by qualitative data collection and analysis (Phase 2) that builds on information from Phase 1. The two strands therefore mix during data collection, which can happen in one of two ways: either from quantitative data analysis to qualitative data collection or by using quantitative results to make decisions about qualitative research questions, sampling, and data collection in Phase 2. The worldview shifts from the postpositivist paradigm in Phase 1 to the constructivist paradigm in Phase 2 as the qualitative results are meant to help explain the quantitative results. The explanatory sequential design has two design variants where it is most commonly used for follow up explanations and less commonly for participant selection purposes (i.e.; researcher uses quantitative results to help select participants for a predominantly qualitative study) (Creswell & Plano Clark, 2011).

Exploratory sequential design. Beginning with qualitative data collection and analysis (Phase 1), this interactive sequential design then moves to quantitative data collection and analysis in Phase 2 that is informed by Phase 1. The main purpose of using this design is to test or measure qualitative exploratory findings. From a worldview perspective, constructivism takes priority but shifts to postpositivism in Phase 2. The point of interface of the two strands is during data collection, either from qualitative data analysis to quantitative data collection or by using the qualitative results to make decisions about quantitative research questions, sampling, and data collection in Phase 2. It is customary to use the exploratory sequential design for theory development (where emphasis is placed on the qualitative strand) or for instrument development (where emphasis is placed on the quantitative phase) (Creswell & Plano Clark, 2011).

Embedded design. In the embedded design the researcher collects and analyses both quantitative and qualitative data within a traditional quantitative or qualitative design; the purpose of collecting the supplemental strand is to enhance the overall primary design. The supporting data (either quantitative or qualitative) is collected either concurrently or sequentially with the priority data yet data analysis of each strand remains separate. This interactive type of design can be used in preliminary exploration before an experimental study; for a more complete understanding of an experimental trial (i.e.; process and outcomes); or as a follow-up explanation after an experimental trial. The paradigmatic foundations mirror the primary approach of the study, which can be either qualitative or quantitative. Mixing can occur at the design level where one strand is embedded within a design before, during, or after the dominant component is completed or it can happen when the secondary results are used to enhance planning, understanding,

or explanation of the dominant strand. There are two conceptual variants of the embedded design: one method is embedded as a supplement to the larger design (i.e.; embedded experiment, embedded correlational design, embedded instrument development and validation) or both methods are embedded in a larger overall design (mixed methods case study; mixed methods narrative research; mixed methods ethnography) (Creswell & Plano Clark, 2011).

Transformative design. In an effort to identify and challenge social injustices, a transformative theoretical framework is used to guide the methods and decisions regarding interaction, priority, timing, and mixing within the study. Qualitative or quantitative data are collected either concurrently or sequentially and priority is flexible (qualitative, quantitative, or equal). This interactive design mixes the strands at the design level by merging, connecting, or embedding the strands within a transformative (i.e.; feminist, disability, or socioeconomic) theoretical lens (Creswell & Plano Clark, 2011).

Multi-phase design. In a multi-phased design, which is also known as a triangulation design (Polit & Tatano Beck, 2012), qualitative and quantitative data are collected concurrently and/or sequentially over multiple phases of a program of research so as to address a program objective (i.e.; development or evaluation). If the design is concurrent, pragmatism is its main paradigmatic foundation; if sequential, it would depend on whether the approach was quantitative (postpositivist) or qualitative (constructivist). Using a program-objective framework, mixing (connecting, merging, and/or embedding) of the strands occurs at the design stage. This design is often seen in large scale program development and evaluation projects, multilevel state- or province-

wide studies, and single mixed methods studies that combine both concurrent and sequential phases (Creswell & Plano Clark, 2011).

To facilitate understanding and dialogue of mixed-methods research designs, Morse (1991, as cited in Polit & Tatano Beck, 2012) is said to have made a significant contribution by offering a widely used notation system that quickly summarizes the major features of any mixed-methods study. In this documentation system, shorthand has been created for each method where ‘Quan’ indicates a quantitative approach and ‘Qual’, a qualitative approach. Priority is signified by upper and lower case letters, where the dominant approach is written in uppercase. If there is equal status, both approaches are in uppercase letters. Timing (or sequencing) is denoted by the symbols + (for concurrent) or → (for sequential). Modification of Morse’s notation has been made by Plano Clark (2005, as cited in Creswell & Plano Clark, 2011) with the addition of parentheses () to indicate when a method is embedded; double arrows →←, to signify a recursive process (Nastasi et al., 2007 as cited in Creswell & Plano Clark, 2011); brackets [] when mixed-methods are used in a single study that is within a series of studies; and, an equal sign = to explain the purpose of mixing methods (Morse & Niehaus, 2009, as cited in Creswell & Plano Clark, 2011). To illustrate, a *QUAL + QUAN = converge results* indicates a convergent design where the qualitative and quantitative methods were of equal status, were implemented concurrently, and results of each strand converged; whereas, *QUAN (+ qual) = enhance experiment* means that the researcher used an embedded design where the qualitative strand was embedded in a larger quantitative experimental design to enhance the conduct and understanding of the investigation (Creswell & Plano Clark, 2011). Although the two typology approaches presented here vary, essentially they offer

similar formats that are very beneficial to researchers when designing rigorous mixed-methods studies.

Validation, Reliability, and Trustworthiness

Establishing high-quality investigations in mixed-methods research requires understanding of the differences between the postpositivist and constructivist paradigms in relation to validity, reliability, and trustworthiness. The concept of validity, while important to both paradigms, has different meanings and methods to determine its existence. Whereas reliability, an important construct in the quantitative methodology, has less significance to the qualitative researcher and is included in the notion of trustworthiness. A synopsis of each construct follows.

Validation and Reliability in Quantitative Research

Validation, in quantitative research, is a concern for researchers on two levels: the quality of inferences drawn from the results of the quantitative analysis and the quality of the scores from the instruments used. At its broadest meaning, validity in quantitative research relates to the soundness of a study's evidence and consists of four types: statistical conclusion, internal, construct, and external.

Statistical conclusion validity refers to the validity of inferences made regarding whether there is a true empirical correlation between the cause and the effect. As such, it is the researcher's responsibility to provide the most robust evidence that the relationship is real and that the intervention to test the relationship was fair. Internal validity is concerned with the validity of the inference that the independent variable, and nothing else, caused the results; essentially, that there is a cause-and-effect relationship between variables. Thus it is the investigator's job to rule out the possibility that something other

than the independent variable caused the relationship. Construct validity relates to the validity of inferences made from the observations in the study to the constructs that may be represented by the observations. For instance, researchers would want to determine how representative an intervention is of its underlying theoretical constructs (i.e.; that an intervention would have positive and favorable outcomes). External validity is associated with whether causal inferences can be generalized to different people, settings, time, or measures (Creswell & Plano Clark, 2011; Onwuegbuzie & Johnson, 2006; Polit & Tatano Beck, 2012).

At a more precise level, investigators are concerned with validity in relation to the quality of scores derived from an instrument in addition to the quality of the conclusions that can be drawn from the analysis (Creswell & Plano Clark, 2011). Validation is a process whereby the degree to which an instrument measures what it is supposed to measure is determined; it is the inferences from the scores of the instrument that are validated, not the instrument itself (Creswell, 2012; Polit & Tatano Beck, 2012). Through validation “the most we can conclude regarding the results of any one particular study is “we have shown the scale to be valid *with this group of people and in this context*” (Streiner & Norman, 2008, p. 251). Validation is now considered a unitary construct consisting of three types of validity testing: content, criterion, and construct (Creswell, 2012; Streiner & Norman, 2008). Content validation is commonly evaluated by a panel of experts and refers to the degree to which an instrument’s content represents the theoretical domain it is supposed to measure. An instrument is considered to have a high content validity if items reflect the various parts of the domain and it includes behaviours and skills germane to the content area (Aday & Cornelius, 2006; Leedy & Ormrod, 2005;

LoBiondo-Wood & Haber, 2010; Polit & Tatano-Beck, 2012). Criterion validation pertains to the degree that the results of one instrument correlate with another instrument that is considered the ‘gold standard’ for the measure (Aday & Cornelius, 2006; Leedy & Ormrod, 2005). Concurrent criterion validity requires the assessment of the level of correlation of scores between two tests, measured at the same time. Predictive criterion validity pertains to the degree of correlation between two measures of the same concept taken at different times; however, because of the passage of time, lower correlation coefficients are often seen (LoBiondo-Wood & Haber, 2010). Construct validation refers to the extent to which an instrument measures an abstract construct (characteristics, attributes, traits) as hypothesized by a related theory. When data are analyzed, the hypothesized relationship is determined in relation to whether it exists and, if so, how many correlations there are. Convergent construct validity is substantiated when the measure positively correlates with other similar measures of the construct; whereas divergent or discriminant construct validity is verified when the measure negatively correlates with constructs that are contradictory to the one being measured. Construct validity is suitable for abstract concepts and/or if there is no equivalent verifiable criterion for which to compare the survey question (Aday & Cornelius, 2006; Leedy & Ormrod, 2005; LoBiondo-Wood & Haber, 2010).

Reliability, another important criterion related to scientific merit of quantitative studies, most often refers to an instrument’s ability to consistently and accurately measure an intended characteristic and differentiate between individuals when administered to certain people under certain conditions (Aday & Cornelius, 2006; Leedy & Ormrod, 2005; Polit & Tatano-Beck, 2012; Streiner & Norman, 2008). It is also an

important concept in relation to data, where statistical reliability of results support an inference about what is true for a population (Polit & Tatano Beck, 2012). Three key attributes of a reliable scale include its stability, equivalence, and homogeneity. Stability refers to how consistent answers are when they are asked of the same people at different points in time (test-retest) or the extent to which two different versions of the same instrument yield similar results (parallel/alternate forms) (Aday & Cornelius, 2006; Leedy & Ormrod, 2005; LoBiondo-Wood & Haber, 2010). Equivalence relates to the consistency of answers when two or more raters use the same instrument (inter-rater) or when different but seemingly equal instruments are used to measure the same people at the same time (Aday & Cornelius, 2006; LoBiondo-Wood & Haber, 2010). Lastly, instrument homogeneity (or internal consistency), the most widely used reliability approach, is based on performance in a single sitting and pertains to whether all of the items measure the same characteristic or construct. Internal consistency can be assessed by one of four methods: item-to-total correlations, split-half reliability, Kuder-Richardson (KR 20) coefficient, or via the more commonly used alpha (α) coefficient or Cronbach's alpha (Leedy & Ormrod, 2005; LoBiondo-Wood & Haber, 2010; Polit & Tatano-Beck, 2012). Not surprisingly, the choice of reliability test is dependent on the type of scale. For example, when new scales are being developed it is oftentimes because there are no instruments available to measure the phenomenon of interest, therefore reliability tests that compare the new scale to alternate forms becomes problematic. As well, there may not be raters/observers involved in measurement as many instruments are self-rated, in which case inter-rater comparisons cannot take place. In such instances, the test-retest method or measures of internal consistency are the most appropriate approaches to test

reliability. However, it should be noted that both are prone to many sources of variance and should be interpreted with caution (Streiner & Norman, 2008). For instance, in the test-retest approach low values can indicate changes in the phenomenon, an unreliable scale, or sensitization of participants to the phenomenon due to retesting with the same instrument. And, because measures for internal consistency are based on performance in a single sitting, sources of variance related to response bias should be considered (i.e.; transient mood states).

Assessing Trustworthiness in Qualitative Research

Qualitative researchers generally adhere to the belief that “research conducted within different traditions must attend to different concerns...” (Polit & Tatano Beck, 2012, p. 583) and for this reason have supported other avenues besides validity and reliability for ensuring high-quality research studies. Although new approaches are found in the literature, Lincoln and Guba’s (1985) criteria are considered by many qualitative researchers to be the gold-standard and are therefore often used to determine trustworthiness (Polit & Tatano Beck, 2012). They propose that through consideration of four criteria – credibility (truth value), transferability (applicability), dependability (consistency), and confirmability (neutrality) – trustworthiness can be established (Lincoln & Guba, 1985). In 1994, Guba and Lincoln added a fifth criterion, authenticity (Polit & Tatano Beck, 2012).

In order to demonstrate truth value, the qualitative researcher must exhibit credibility. Credibility, perceived as the qualitative researcher’s substitute for internal validity, is demonstrated when research findings and interpretations are credible to the participants (Lincoln & Guba, 1985). Credibility is demonstrated by the ability to show

how interpretations were derived and include five major techniques to do so: prolonged engagement, persistent observation and triangulation; peer debriefing (provides an external check on the inquiry process); negative case analysis (refining working hypothesis based on new information); referential adequacy (archiving “raw” data against which preliminary findings are checked); and, member checking (comparing findings and interpretations with the source of the information, the participants). Member checking is considered “the most crucial technique for establishing credibility” (Lincoln & Guba, 1985, p. 314). Koch (1998) suggests including actual transcripts as appendices to the research report so that the reader can refer to the original text to ensure that correct interpretations resulted from the data.

Applicability, also known as transferability, relates to the concept of external validity in quantitative research and is the ability to claim that the results of research findings can be transferred to other similar settings or between two contexts.

Applicability can only be accomplished if the original contexts are described explicitly, defined as “thick description” (Lincoln & Guba, 1985). Once this description is supplied, the reader assumes the responsibility of judging whether transfer is possible.

Consistency is a key concept in the conventional definition of reliability, which is typically demonstrated by replication. Replication, however, in the constructivist paradigm is erroneous, for reality is forever changing and therefore an exact replication is unattainable. In qualitative inquiry, dependability provides a more suitable substitute for reliability. Dependability accounts for factors of instability and phenomenal or design induced change (Lincoln & Guba, 1985). To determine dependability, Lincoln and Guba (1985) offer several suggestions; however, in-depth discussion has been focused on the

inquiry audit. The inquiry auditor examines the process of inquiry and if determined acceptable, attests to its dependability. The auditor must be impartial to the inquiry but have significant experience to be trustworthy so that their judgments are accepted as valid. Explicit discussion regarding theoretical, methodological, and analytical decisions throughout the research study will allow the reader to audit the decision trail of the researcher so that dependability can be demonstrated (Koch, 1998).

Confirmability, speaks to the extent to which the data and interpretations are grounded in events rather than in the researcher's personal beliefs, where the emphasis of objectivity moves from that of the researcher to a more logical place, the data. The question then becomes, 'Are the data confirmable?', rather than questioning the characteristics of the investigator. To establish confirmability, the inquiry auditor examines the data, findings, interpretations, and recommendations for internal coherency and attests that the final product is supported by the data (Lincoln & Guba, 1985).

The fifth criterion, authenticity, refers to "the extent to which researchers fairly and faithfully show a range of realities" (Polit & Tatano Beck, 2012, p. 585). To facilitate authenticity, researchers put into words the tone of participant's lives as they are experienced by the participants by means of reflecting the mood, feeling, language, and context. When authenticity is conveyed, readers are able to vicariously experience participant's lives and the phenomenon under study.

Finally, reflexivity, and moral, political, and ideological value-commitments by the researcher must be emphasized during the research process. These components will support the reader in making the decision of whether the research product is believable or plausible (Koch, 1998; Lincoln & Guba, 1985). Reflection, as a part of reflexivity, is an

active process that results in learning with the express purpose of changing behaviours, perspectives, and practices, for it is more than merely replaying or thinking. Reflection provides a means to examine, question, and learn from experience (Cooney, 1999).

Validity, Reliability, and Trustworthiness in Mixed-Methods Research

Despite being one of the major issues in mixed-methods research, discussions regarding validity and trustworthiness are only in the initial stages. Some mixed-methods researchers have rejected the issue outright while others adhere to employing the traditional techniques for both strands. Onwuegbuzie and Johnson (2006) argue that validity is not about “singular truths” but is about being defensible to the practice communities to which the research findings are meant. As such, validity can have objective, subjective, and inter-subjective aspects depending on the audience.

There are also those mixed-methods researchers who avoid language that may be associated with a particular paradigm, for example validity representing quantitative research and trustworthiness representing qualitative research. Teddlie and Tashakkori (2003, 2009 as cited in Polit & Tatano Beck, 2012) advocate for the use of the terms inference quality and inference transferability; where the former provides criteria for assessing conclusions and interpretations; and the latter, criteria for assessing the degree to which findings can be applied to similar people, settings, time periods, and theory. Inference quality encompasses the quantitative concepts of internal validity and statistical conclusion validity as well as the qualitative notion of credibility and speaks to the believability and precision of the inductive and deductive conclusions. Inference transferability is an overarching term that relates to external validity from the quantitative strand and transferability from the qualitative strand (Polit & Tatano Beck, 2012).

Creswell and Plano Clark (2011) posit that mixing qualitative and quantitative methods raises potential validity/trustworthiness issues that go beyond those of the individual methodologies. They advocate for using different strategies that address validity in data collection, analysis, and interpretations depending on whether the data are merged (as in concurrent convergent, embedded, transformative, and multiphase designs) or connected (as in sequential explanatory, exploratory, embedded, transformative, and multiphase designs) (Creswell & Plano Clark, 2011). As can be seen, there are no set criteria in which to evaluate validity, reliability, and trustworthiness in mixed-methods research, only the directive that these very important considerations must be enacted to ensure high-quality studies.

Rationale for Using Mixed-Methods Research Design

In my quest to find answers to what I consider to be very important questions regarding the potential impact that IPC may have on productivity, and hence HHRP, I am reminded of all I that have learned about what constitutes knowledge and evidence in the health professions. I believe that in the study of health and illness, empirical science is essential and justified as it helps to build the required theoretical knowledge base as evidence for practice. But I also believe that it is not the only way of knowing; one must also consider that neither 'health' nor 'illness' stands alone for it is the human response to both, as well as the social relationships within healthcare, that are equally as important. The empirical approach is not appropriate for these types of enquiry as it often medicalizes the health care environment, disregards hermeneutic forms of evidence, and overlooks the link between existing data and clinicians' understanding of each situation

(French, 1999). Alternate paradigms that address the contextual, value-laden, oppressive, and/or political structures within health care are also required.

Evidence must extend beyond empirical research to that which includes alternative ways of knowing. I concur with Leight's (2002) position that to be effective in the current health care milieu, nurses (and possibly all researchers) must be well versed in dual languages – the language of science and the language of people. I propose that an understanding of Carper's (1978) four fundamental patterns of knowing can assist with the ability to navigate these dual languages; each is required for command of the profession and none are independently sufficient to explain all phenomena (Leight, 2002). Carper's (1978) thesis includes: empirics (the science of nursing – empirical, factual, and descriptive), aesthetics (the art of nursing – integration, experience, design of care, and relationships), ethics (the moral knowledge of nursing – duties, rights, and responsibilities), and personal knowledge (synthesis of perceptions, self-awareness, and integrity) (Dossey, 2008; Leight, 2002; Porter, 2010). Building on Carper's work, Munhall (1993, as cited in Dossey, 2008) introduced the pattern of not knowing; while White (1995, as cited in Dossey 2008) established the sixth pattern of sociopolitical knowing. Not knowing permits one to engage authentically in the moment, with no preconceived answers thereby allowing the emergence of new solutions, possibilities, and insights. While the final pattern of knowing, sociopolitical, addresses the important contexts of society, geography, culture, politics, and history in theory, practice, and research (Dossey, 2008). These patterns provide a full spectrum with which to consider knowledge in the health professions and as such provide a foundation for my study.

With this in mind, I turn to mixed-methods research as this methodology celebrates the many patterns of knowing. By using this research approach, I am able to explore and facilitate both quantitative and qualitative understanding regarding how HCPs' define being efficient and effective, whether they possess the competencies required to work collaboratively, and whether incorporating interprofessional competencies into their repertoire would change their sense of being efficient and effective, in essence, in changing their perceptions of being productive.

Chapter Summary

In the first section of this chapter, I provided an in-depth discussion of the Health System and Health Human Resources Planning Conceptual Framework (Tomblin Murphy & O'Brien-Pallas, 2006), Analytical Framework (Birch et al., 2007), Simulation Model (Tomblin Murphy, MacKenzie, et al., 2009) and Competency/Service-based Health Human Resources Planning Framework (Tomblin Murphy et al., 2009, as cited in Tomblin Murphy et al., 2012), as they provide the conceptual context for this study. The components of these frameworks and models that related directly to IPC and productivity were also presented.

In the second section of the chapter, I provided a deeper understanding of the language that I believe is important for an appreciation of research. The ontological, epistemological, and axiological differences, as well as strengths and limitations, of the three main research paradigms were presented to provide a more meaningful understanding of the various foundations of each research approach. The history, typologies, assumptions, and key decisions required for mixed-methods research was discussed and major mixed-methods research designs were described. Important criteria

for ensuring validity, reliability, and trustworthiness in research were also presented. To close, I provided rationale for my choice of using mixed-methods in my study.

CHAPTER 4 METHODS AND DESIGN

A mixed-methods research design guided this intervention study as it provided the means to answer each of the research questions presented below as well as to explore and facilitate both quantitative and qualitative understanding regarding how IPC affected HCPs' perceptions of their productivity. To begin, I revisit the definition of productivity to be used in this study and which assisted in the conceptualization of the study purpose and formulation of the research questions. A brief explanation of how the Service-based Health Human Resources Planning (SB-HHRP) Framework (Tomblin Murphy et al., 2012; Tomblin Murphy, MacKenzie, Rigby, et al., 2013) provided guidance for examination of these research questions is offered. I then speak to the design principles and key decisions made in relation to this mixed-methods study. The remainder of the chapter will address the particulars of the research design, namely: the setting, participant selection, recruitment strategies, sample size, data collection methods, data analysis plan, rigour in mixed-methods research, and ethical considerations. Given that this is a mixed-methods study, when appropriate, each of the aforementioned sections will offer a discussion of the actions that will be taken in relation to both the quantitative and qualitative strands.

Operational Definition, Study Purpose, and Research Questions

As was discussed in the Literature Review chapter, productivity is a challenging concept to define due in part to its multifaceted nature. Often productivity measures disregard unquantifiable variables, such as knowledge, skills, and attitudes (read: competencies), in favor of quantifiable input and output measures (e.g.; hours per patient day, total salary cost per unit of service) as these latter types of measures more easily fit

into mathematical equations that aim to quantify productivity. However, I believe that it is crucial to consider the knowledge, skills, and attitudes that health care workers own when examining HCP productivity especially in light of the fact that health care is largely a human enterprise. This sentiment is shared by others in the productivity field (Agor, 1997; AL-Ma'ani & Jaradat, 2010; Evans et al., 2010; McGillis Hall, 2003). Therefore, as discussed in the summary of Chapter Two, I have considered the concept of human capital in my operational definition of productivity, defining it as the sense of being efficient and effective when knowledge, skills, and attitudes are incorporated into practice. Once I had defined productivity in this way, I began to reflect upon the human capital (read: competencies) that is related to IPC and how it may or may not affect one's sense of being productive. From here, the purpose of the study emerged, and was three-fold: 1) to discover HCPs' understandings about IPC and their perceived level of efficiency and effectiveness when working with their team; 2) to determine the extent to which HCPs demonstrate the competencies that are related to IPC; and, 3) to explore whether self- and peer-assessment of the IPC competencies changes HCPs' sense of being efficient and effective. In essence, did it change their perceptions of being productive? The research questions (RQ) that emerged from this line of thinking and which guided this study were:

RQ 1: How do HCPs define IPC? What are HCPs' perceived level of personal and team productivity (efficiency, effectiveness) when working in a team environment?

RQ 2: To what extent do HCPs demonstrate performance of IPC competencies, as assessed using the Interprofessional Collaborator Assessment Rubric (ICAR)?

RQ 3: How did the self- and peer- IPC competency assessments change HCPs' definitions of IPC? What are HCPs' perceptions of personal and team productivity after completing the assessments?

There were two outcome (dependent) variables in this study, HCPs' definitions of IPC and their perceived levels of productivity; the intervention/explanatory (independent) variable were the self- and peer-assessments of the extent to which HCPs demonstrate performance of the IPC competencies.

The SB-HHRP Framework (Tomblin Murphy et al., 2012; Tomblin Murphy, MacKenzie, Rigby, et al., 2013) provided guidance for examination of these research questions. As described earlier in the Theoretical and Methodological Underpinnings chapter (Chapter Three), the SB-HHRP framework is comprised of two main components, *competencies/services required* and *competencies/services supplied*. Typically, the *services required* (and their inherent competencies) component reflects the population needs for health care services, for example, based on preventative and/or curative conditions such as diabetes care or cardiovascular disease. However, for the purposes of this research study, the service needs of the population were not in relation to an illness category per se, but instead it was assumed that the service required by most patients and families, regardless of their curative and/or preventative needs, was health care that was delivered in the most productive and collaborative manner. In other words, notwithstanding the demography, epidemiology, and level of service elements central to the *competencies/services required* component, in this study the only competencies required are those related to the delivery of interprofessional collaborative care that is productive. Therefore, the *competencies/services supplied* component in this study

directly pertains to the amount and diversity of the competencies available to meet the identified needs (in this case, productive and collaborative interprofessional care).

Particular attention was placed on the competency rate element of the *competencies/services supplied* component by determining how many HCPs have the knowledge, skills, and attitudes required to provide efficient and collaborative care.

Design Principles and Key Decisions

Based on the study's purpose and research questions I chose a typology-based, fixed, mixed-method design as this approach provided me with the flexible guidance required for conceptualization of my study. Specifically, I chose an embedded mixed-methods design as these designs are typically used when different research questions, requiring different types of data, need to be answered and a single data set is not deemed sufficient to address this need (Creswell & Plano Clark, 2011; Polit & Tatano Beck, 2012). When reflecting upon my rationale for using this methodology, I realized that my reasons were multifaceted and reflected the rationale offered by Creswell and Plano Clark (2011). Not only did I believe that this was the best approach to answer the different research questions within this study, I also had confidence that it would provide the opportunity to present a full description of IPC and its effect on productivity. In addition, I believe it will assist in the explanation of findings from the two strands (i.e.; do HCPs do what they say they could/would do in relation to IPC and productivity?), provide contextual understanding of IPC and productivity in the primary health care (PHC) setting, and most importantly, offer findings that will be useful to HCPs in collaborative PHC teams.

I believed that each methodological strand had the potential to enhance and clarify findings of the other. In essence, the strands were complementary to one another and were necessary to allow me to fully investigate the research questions presented above. It has been argued that when methodologies from different paradigms are mixed, incongruencies may occur because the worldviews of each paradigm are in opposition and one methodology may dominate over the other (Wiggins, 2011). In contrast, Patton (1988, as cited in Johnstone, 2004) argues that researchers should not have to choose between worldviews; that inductive and deductive reasoning can be complementary rather than competitive. I was drawn to Patton's (1988, as cited in Johnstone, 2004) argument that I do not have to subscribe to the notion that the paradigmatic contrasts of each method prevent their use in a single study. My worldview favors the narrative inherent in qualitative research because I believe that it can generate in-depth understanding of a phenomenon. But at the same time, I also am aware of the importance of understanding cause-and-effect relationships. I see great value in using one methodology to complement findings from another. As a mixed-methods researcher, I believe that I must be aware, and respectful, of the differing worldviews, ontologies, epistemologies, and axiologies of each paradigm to guide the research process. Each of these was discussed fully in Chapter Three.

As was also introduced in Chapter Three, key decisions in relation to the level of interaction, priority, timing, and mixing of the qualitative and quantitative strands must be made when implementing any of the six mixed-methods designs. In relation to these key decisions, the embedded design in this study was interactive, with priority placed on the qualitative strand, and data collection and analysis of each strand occurred

sequentially. To illustrate, HCP interviews related to RQ1 were conducted first; next, self-/peer-assessments using the Interprofessional Collaborator Assessment Rubric (ICAR) (Curran et al., 2011) were performed (RQ 2); followed by the second HCP interviews (RQ 3). The primary point of interface for mixing occurred at the design level, given that the embedded method (i.e.; the quantitative strand) was specifically fit into the context of the larger design framework (Creswell & Plano Clark, 2011); in this case, whether findings from the assessment of IPC competencies (quantitative strand) supported HCPs' views regarding collaboration and their sense of personal and team productivity (qualitative strand) and whether an opportunity to assess their ability to collaborate changed their perceptions.

Setting

The chosen setting for this study was the PHC sector in Nova Scotia. PHC is health care that attends to all factors that determine the health of a population and exists along a continuum that includes self-help, advocacy, health promotion, disease prevention, primary care, continuing care, rehabilitation, and palliative care (Nova Scotia Advisory Committee on Primary Health Care Renewal (NSACPHCR), 2003). Although it includes personal health services, it is also far more than that, as it is concerned with “income, social status, social support networks, education, employment, working conditions, social environments, physical environments, biology and genetic endowment, personal health practices and coping skills, healthy child development, health services, gender, and culture” (NSACPHCR, 2003, p. 1). As described by the Government of Nova Scotia (2010), PHC is the first stop for patients when they need health advice or care and is the “place responsible for coordinating access to other parts of the healthcare system”

(p. 10). As can be seen in these descriptions, the PHC model in Nova Scotia is immense, covering care from birth to death, and for this reason one would assume that a team effort would be required to help patients and families navigate through it, which is why it was an ideal setting in which to examine HCPs' ability to practice interprofessionally and collaboratively. In fact, both the Kirby Report (2002) and the Romanow Report (2002) advocated for PHC that was delivered by interprofessional teams or networks of PHC providers. How these teams might be structured and accessed would depend on the needs of the population served and for that reason would naturally be different in each community.

Because the delivery of PHC extends over such a vast continuum, a specific practice setting had to be chosen for this study in order for it to be manageable. As such, Community Health Centres (CHCs) were chosen because the care provided was posited to be interprofessional in nature, matching the level of services with community needs (Canadian Alliance of Community Health Centre Associations (CACHCA), 2011; Government of Nova Scotia, 2010). According to the CACHCA (2011) and the Canadian Association of Community Health Centres (CACHC) (2012a), a CHC is a publicly-funded, non-profit or government-sponsored association wherein residents and/or patients govern through an advisory board. CHCs offer a variety of services (primary, social, rehabilitative, and non-institutional care) to a particular local community that is defined by geography and/or barriers to access. Health care in CHCs is purportedly provided by interprofessional teams that emphasize prevention, health promotion, health education, and community development by working collaboratively with other organizations (i.e.; justice, education, community health boards, and community hospitals) to support

community health and to attend to the social determinants of health (CACHCA, 2011; NSACPHCR, 2003). CHCs are also known for providing culturally sensitive services (i.e.; aboriginal and immigrant care) and pioneering new types of service delivery models (e.g.; street services) (Johnson, 2006). Staff, including physicians, is typically remunerated by salary and/or capitation rather than fee-for-service.

A list of CHCs in Nova Scotia was compiled using information retrieved from the CACHC (2012b) website and through conversations with clinicians working in primary health care in Nova Scotia. This list was then sent to the Interdisciplinary Team Coordinator for Primary Health Care at the Government of Nova Scotia to determine its comprehensiveness. Once an inclusive list was determined, each CHC was contacted to establish whether it was appropriate to include in the study, the process of which is described in detail under Recruitment Strategies below.

Participant Selection

In addition to family physicians and registered nurses, there are a variety of regulated and non-regulated individuals who are integral in meeting the PHC needs of patients and families in Nova Scotia. Considered either part of the core team (those with long-term continuing relationships with patients and each other) or as ‘extended’ providers (those with shorter-term relationships with patients), these individuals may include, but are not limited to: nurse practitioners, public health providers, pharmacists, volunteers, social workers, dietitians, family care givers, midwives, physiotherapists, occupational therapists, paramedics, and alternative and complementary medicine practitioners (NSACPHCR, 2003; Government of Nova Scotia, 2013). It is important to

note that each PHC facility will have different core team membership, as the ultimate structure will depend on patient needs as well as geographical locations.

Even though all of the abovementioned team members are vital to the well-being of patients through their journey in the PHC system, only regulated and non-regulated core team members were invited to participate in the current study owing to the nature of the research questions. To explain, although the first research question could be asked of any member of the PHC team, the other two questions could not because of their intent. The second research question asks whether HCPs demonstrate collaboration and thus requires assessment of performance, which I believe places extended team members, family members, and volunteers in a precarious position for it is not reasonable to assume that these individuals would have enough exposure to, or information about, the various HCPs on the core team to judge their performance. Because the third question is inextricably linked to the other two, this also prohibited contributions by extended team members, family members, or volunteers as participants in this study.

In mixed-methods studies, participant selection decisions are generated from the research questions and hypotheses. In most mixed-methods studies both probability and non-probability techniques are used in the respective qualitative-quantitative strands; however, there are instances where either probability or non-probability sampling alone is suitable (Teddlie & Yu, 2007), as is the case in this study. Discussion regarding participant selection for each of the strands follows.

Qualitative Strands

RQ 1: How do HCPs define IPC? What are HCPs' perceived level of personal and team productivity (efficiency, effectiveness) when working in a team environment?

RQ 3: How did the self- and peer- IPC competency assessments change HCPs' definitions of IPC? What are HCPs' perceptions of personal and team productivity after completing the assessments?

Non-probability purposive sampling was used in the recruitment of participants for the qualitative strand of the study as it allowed for the intentional enlistment of individuals who had experienced the concepts/phenomenon being explored (i.e.; specifically HCPs who purportedly worked collaboratively in the CHC setting) (Creswell & Plano Clark, 2011). Maximum variation sampling, the most widely used method of qualitative purposive sampling, was employed as participants with diverse backgrounds and viewpoints were recruited, thus facilitating a complex depiction of the phenomenon under investigation (Creswell & Plano Clark, 2011; Polit & Tatano Beck, 2012). Participants were expected to be varied in relation to age, gender, level of education, employment status, scope of practice, and scope of employment. Given the interprofessional nature of the study, maximum variation sampling fit well and allowed for the sharing of differing perspectives in relation to IPC and productivity. Because all regulated and non-regulated core team members who were employed in specific CHC settings in Nova Scotia were invited by advertisement to take part in the study, non-probability self-selection sampling was used in conjunction with purposive sampling in the recruitment process.

Inclusion criteria for the qualitative strand (RQ 1 and 3) included: all regulated and non-regulated core team members who were currently employed in a CHC setting in Nova Scotia; worked in a team with at least one other HCP that was from a different provider group; and, were English speaking. Because responses to RQ 3 necessitated the completion of the self- and peer-assessments for IPC competencies (RQ 2), this was an additional inclusion criterion for that question only. Exclusion criteria included: extended team members, family members, and volunteers; HCPs who did not work in a team with at least one other provider group; were non-English speaking; and, in relation to RQ 3, those who did not complete the self- and peer-assessments for IPC competencies.

Quantitative Strand

RQ 2: To what extent do HCPs demonstrate performance of IPC competencies, as assessed using the Interprofessional Collaborator Assessment Rubric (ICAR)?

Participant selection for the quantitative strand of the study also employed non-probability purposive self-selection sampling, because HCPs working in the identified CHCs were free to choose whether or not to participate (Lund Research, 2012). Once participants were recruited from the CHC teams, those willing to assess others and/or to be assessed by others on their team were identified. If an adequate number of participants were recruited from the same CHC site, probability sampling would then be used to randomly select participants from the same core team to assess two other people on their team for performance of the IPC competencies.

Inclusion criteria for the quantitative strand (RQ 2) included: all regulated and non-regulated core team members who were employed in a CHC in Nova Scotia; who worked in a team with at least one other HCP that was from a different provider group;

were willing to assess themselves, willing to assess others on their team, or willing to be assessed by others on their team; and, were able to read English. Exclusion criteria included: extended team members, family members, and volunteers; HCPs who worked alone or in isolation from other providers; HCPs who were not willing to assess themselves, assess other HCPs on their team, and/or to be assessed by someone else on their team; and, those who were unable to read English.

Recruitment Strategies

Each of the identified CHCs was under the purview of a District Health Authority (DHA), which was governed by a Chief Executive Officer (CEO). An introductory email (Appendix C) was sent to each of the CEOs requesting an opportunity to discuss my proposed research study with them. Some CEOs forwarded the introductory email to the Director of PHC within their DHA and as such all subsequent communication occurred between the Director and myself. A script, which outlined the study purpose and areas of interest, was used during all telephone conversations to ensure consistent messaging (Appendix D). Following the telephone discussion, a Letter of Introduction (Appendix E) was forwarded to all CEOs and/or Directors. If they were supportive of the research and willing to have the study conducted at their CHC site(s), they were asked to return to me the Permission to Conduct Research Form (Appendix F) that was attached to their Letter of Introduction. When the Permission Form was received, I made telephone contact with the managers of each of the CHC sites to explain the research study and to discuss the appropriateness of situating the study within their CHC(s). If the site was deemed appropriate as per the criteria for CHCs discussed earlier in this chapter and managers were willing to have the study situated at their site, a Letter of Introduction for HCPs

(Appendix G) and an advertisement poster informing staff of the research study (Appendix H) were then forwarded to the CHC site managers with a request to either post a hard copy of each or to circulate the information via intranet throughout each centre.

Interested core team members were invited to contact me via email or telephone. During initial contact with these HCPs, I provided a full scripted explanation of the study (Appendix I). HCPs willing to participate in the study signed the informed consent at our first meeting. Owing to the sensitivity associated with assessment of performance (RQ 2), the informed consent stipulated that participants could choose to (1) only assess themselves; (2) assess other individuals on their team; and/or (3) be assessed by another individual on their team. If participants selected option (2), they were asked to sign a confidentiality agreement (Appendix J), prohibiting them from divulging the identity or the assessment findings of the person(s) they were assessing.

Sample Size

In a mixed methods study, a balanced approach for determining appropriate sample sizes that considers both quantitative and qualitative perspectives is recommended. In the qualitative strand, smaller samples that permit in-depth analysis ($n = 20-40$) may be necessary; whereas larger samples ($n = 40-200$) may be required for reliable statistical analysis within the quantitative strand of the study (Castro, Kellison, Boyd, & Kopak, 2010). As explained by Teddlie and Yu (2007), “combining the two orientations allows the MM researcher to generate complementary databases that include information that has both depth and breadth regarding the phenomenon under study” (p. 85). For some quantitative researchers, these differing sample sizes pose concerns regarding how one meaningfully converges or compares data. However, from a

qualitatively-oriented research perspective, differing sample sizes do not necessarily pose a problem because it is understood that the intent behind each methodology is different. For instance, quantitative data collection are aimed toward reducing random sampling error and making generalizations and thus require larger representative samples, while the intent of qualitative data collection is for in-depth understanding of a phenomenon which is best achieved with smaller samples (Creswell & Plano Clark, 2011).

Qualitative Strands

RQ 1: How do HCPs define IPC? What are HCPs' perceived level of personal and team productivity (efficiency, effectiveness) when working in a team environment?

RQ 3: How did the self- and peer- IPC competency assessments change HCPs' definitions of IPC? What are HCPs' perceptions of personal and team productivity after completing the assessments?

In the qualitative strand of the study, sample size was determined based on the total number of participants recruited and on informational needs, in essence, sampling continued until no new conceptual information was reached (also known as saturation) (Liehr, LoBiondo-Wood, & Cameron, 2009; Polit & Tatano Beck, 2012). Typically, in qualitative research the sample size is deliberately small so that in-depth individual experiences can be revealed (Baker, Wuest, & Stern, 1992); however, in maximum variation sampling, a larger than usual sample is typically required owing to the diversity of participants (Polit & Tatano Beck, 2012). The number of participants needed to reach saturation can also be dependent on the scope of the research question(s), data quality,

sensitivity of the phenomenon, availability of “shadow” data, and the skill of the researcher (Polit & Tatano Beck, 2012, p. 522).

In relation to the scope of the research questions, one must remember that “the broader the scope, the more participants will likely be needed” (Polit & Tatano Beck, 2012, p.521). In this study, the scope of the research questions was not overly broad as it focused on IPC and productivity in specifically defined PHC settings; therefore, a large number of participants were not anticipated to achieve saturation. Also, instead of having overly large sample sizes, longer and more intense interviews with fewer participants were conducted in order to achieve greater depth and richness of data. The quality of data can also affect the sample size in that if participants provide sufficiently detailed perspectives, saturation may be achieved with a smaller sample. It is important to consider that the sensitivity of the phenomenon under investigation may have particular impact in this study as I was asking participants to assess themselves and co-workers regarding their ability to collaborate, which may have led to feelings of embarrassment and thus limited their willingness to share their experiences in an interview format. Another consideration is whether “shadow” data are available, referring to data that are gathered from participants who not only discuss their own experiences but also the experiences of others. In this study, participants were asked to assess other HCPs as well as to reflect upon the productivity of their team, thus providing a broader perspective with richer detail and description. Finally, researchers with strong interviewing skills often require fewer participants because their ability to put participants at ease and invite candor during the interview leads to data saturation more quickly. Having conducted qualitative interviews in past research studies, I believe that I was able to create an

environment where participants felt safe to share their experiences. Considering all of the above-mentioned factors, I anticipated a maximum qualitative sample size of 20 participants per research question to allow me to adequately understand the phenomenon under investigation. The same participants who took part in the interviews for RQ1 were invited to take part in the interviews for RQ3.

Quantitative Strand

RQ 2: To what extent do HCPs demonstrate performance of IPC competencies, as assessed using the Interprofessional Collaborator Assessment Rubric (ICAR)?

In the quantitative strand of this study, all core regulated and non-regulated HCPs working in select CHCs in Nova Scotia were invited to participate. Power analysis was used to determine the appropriate sample size (n), as this approach is highly recommended (Polit & Tatano Beck, 2012). To calculate n , an alpha level (α , significance level; the probability of committing a Type I error or a false positive), power ($1 - \beta$, the complement of beta (β), where β is the probability of committing a Type II error or a false negative), and effect size (ES, the magnitude or strength of the relationship between the dependent and independent variables), must be established. Conventional values for α and $1 - \beta$ are .05 and .80, respectively, and were used in this study. ES must be estimated using available evidence, such as from earlier similar studies or from pilot studies; if there are no earlier studies and/or a pilot study cannot be conducted, researchers can, as a last resort, estimate whether the expected effect is small, medium, or large (Polit & Tatano Beck, 2012). Convention dictates that in a two-group test of mean differences, a small effect is .20, a medium effect is .50, and a large effect is .80. In situations where an analysis of variance (ANOVA) or Pearson correlations are the basis for power analysis,

conventional estimates of small, medium, and large ES are .01, .06, and .14 and .10, .30, and .50, respectively (Polit & Tatano Beck, 2012). In circumstances where multivariate procedures are used (e.g.; multiple regression, analysis of covariance [ANCOVA]), the power analysis is based on the number of predictor variables (independent variables), in addition to ES, $1 - \beta$ and α . Standard values for $1 - \beta$ and α remain at .80 and .05, respectively, but the ES is now a function of the proportion of variance of the dependent variable (Y), signified as R^2 , that is explained by the collective simultaneous effects of the independent variables (Polit & Tatano Beck, 2012). The R^2 must be predicted either from earlier research or by using the conventional values of $R^2 = .02$ (small effect), $R^2 = .13$ (moderate effect), or $R^2 = .30$ (large effect) (Polit & Tatano Beck, 2012).

Given that there were no earlier studies found that measured the impact of IPC competencies on HCP productivity or that used the ICAR tool in this way (Curran et al., 2011) and that multivariate statistics were anticipated for this study, conservative estimates of ES as described above were used to determine the sample size required while diminishing the risk of obtaining non-significant results.

In the quantitative strand of the study, seven variables were being measured: HCP job category (main variable estimated at a minimum of five different categories), employment status (three levels – part-time, full-time, and casual), job category of team members, gender (two levels – male, female), years of experience, years working with team, and number of co-worker interactions. Assuming that a minimum of five levels of profession/job category would be present in the final analysis, and two levels of the gender variable, a multivariate model power analysis was performed. Assuming a power of 80% and a significance level of 0.05, a sample size of 839 respondents would have

been necessary to detect a small effect (ES 0.02); 136 respondents to detect a moderate effect (ES 0.15); and, 81 respondents to detect a large effect (ES 0.30) on the questionnaire responses. As it was expected that the size of the entire population of HCPs working in the identified CHCs in Nova Scotia was relatively small, the realistic aim was to recruit a minimum of 136 participants.

Finite population correction. Because the entire population of HCPs working in CHCs was being selected for this study, and was in all probability relatively small, an infinitely large population from which to draw a sample could not be assumed and as such it was necessary to calculate the margin of error based upon the response rate, rather than the sample size. A margin of error denotes the amount of random sampling error in a survey's results. The larger the margin of error, the less confidence one should have that the results are close to the "true" numbers for the whole population. In cases where the ratio of sample size to population size (sampling fraction) may be greater than 5%, as in instances like this study where sampling is close to the entire population, the margin of error can be adjusted by using finite population correction (FPC) (Van Hecke, n.d.). FPC has the effect of reducing the margins of error and is calculated using the following formula:

$$\text{FPC} = \sqrt{\frac{N-n}{N-1}}$$

When the sample size (n) approaches the population size (N), FPC approaches zero, which essentially eliminates the margin of error. A series of sample size calculations for finding significant differences in the proportion of responses above and below a threshold, when making comparisons of two groups was completed and is presented in the Results Chapter (Chapter Five). A FPC for each calculation was

completed as well and reflects the size of the sample that was required to see significant differences in the proportion of responses.

Data Collection Methods

In an embedded design, both qualitative and quantitative data are collected and analyzed within a traditional qualitative or quantitative research design. Collection and analysis of the second data set can occur before, during, or after the data collection and analysis associated with the larger traditional design. As well, data in an embedded design can be collected either sequentially, concurrently, or both depending on the design variation. “Conceptually, there are two variants of the embedded design based on whether one method is embedded as a supplement to a larger design or both methods are embedded in combination within a larger design or procedure” (Creswell & Plano Clark, 2011, p. 95). Examples include when interviews are embedded within an experimental intervention trial or when a survey consists of both qualitative and quantitative information, respectively. In relation to this study, the self- and peer-assessments of IPC competencies, using the ICAR instrument (Curran et al., 2011) (quantitative strand), was embedded within the larger qualitative study that explored HCPs’ perceptions of IPC and productivity; data collection and analysis of strands occurred sequentially. The data collection methods for each research question are presented next.

Qualitative Strands

RQ 1: How do HCPs define IPC? What are HCPs’ perceived level of personal and team productivity (efficiency, effectiveness) when working in a team environment?

RQ 3: How did the self- and peer- IPC competency assessments change HCPs' definitions of IPC? What are HCPs' perceptions of personal and team productivity after completing the assessments?

The interviews for each of the qualitative research questions were semi-structured, non-directional, and interviewee-guided where a few prepared questions were asked so that a natural investigation of the experience was possible. The prepared questions were open-ended and broad so that they did not influence the participants' answers in any way (Baker et al., 1992). By listening carefully, I was able to introduce new questions as the interview proceeded. The first interview took place once informed consents were obtained, while the second interview was scheduled to occur on my receipt of the completed ICAR tools; timing was also dependant on participant availability. The second interview (RQ 3) was only conducted with those individuals who had participated in the initial interview (RQ 1) and who had completed self-and/or peer-assessments (RQ 2).

Interviews were conducted face-to-face or via telephone, in a place and time that was convenient and comfortable for each participant and in a quiet location free from distractions (Polit & Tatano Beck, 2012). I began each interview by asking demographic questions of the participants followed by a few open-ended questions (Appendix K and L). All interviews were digitally-recorded and transcribed verbatim, with all identifiers omitted (e.g.; names, places, provider groups). As well, I kept hand-written notes during the interview, so that I could record non-verbal behaviour (in the face-to-face interviews) and/or key words used by the participants.

Alvesson (2003) describes the interview process as a complex social, linguistic, and subjective event that demands a reflexive approach without which the interview

“risks being naive, and interpretations of it rest on shaky ground” (p. 14). A reflexive pragmatist approach to the research interview was undertaken in an attempt to reduce this naivety. Reflexivity requires the researcher to confront and re-evaluate the assumptions and beliefs of what the data represented. Exploration and self-examination are necessitated as it is understood that the researcher is part of the social world that is being studied. Pragmatism, as defined by Alvesson (2003), is the ability for the researcher to suspend doubt through the use of self-critique and bracketing. Bracketing is the ability to hold “in abeyance one’s preconceptions about the world and seeking (*sic*) to attain the genuine or true form of the things themselves” (Ray, 1994, p. 119). The pragmatist understands that the knowledge produced from the research may be totally different from what was intended at the start of the research process. To assist with this approach, throughout the research process I reflected upon my preconceptions of the concepts under investigation so as to uncover and examine my assumptions, biases, beliefs, contradictions, and experiences with IPC and productivity.

As it was my intent to conduct the interviews until saturation was reached, I expected that multiple interviews would need to be conducted for each research question to deeply explore the phenomena being studied. During the interviews, I encouraged participants “to say what they want to say in the way they want to say it” (Leedy & Ormrod, 2005, p. 149). I invited the participants to speak in a manner that was most comfortable to them and sought clarification as necessary. In an effort to ensure that I understood the essence of their message, I actively involved participants during the data collection and analysis phase by asking probing questions to ensure that I understood the meaning of what they had shared and by asking to meet with them to review my

interpretation of their interviews, respectively. This technique, known as member checking, is considered by some as an important way to verify credibility of qualitative data, for it is suggested that when participants confirm accuracy of a researcher's interpretations of data, a good representation of participant's truth has occurred (Polit & Tatano Beck, 2012).

Quantitative Strand

RQ 2: To what extent do HCPs demonstrate performance of IPC competencies, as assessed using the Interprofessional Collaborator Assessment Rubric (ICAR)?

To best answer this research question, regulated and non-regulated core team members in select CHCs in Nova Scotia, who were willing to participate in the study, were asked to assess themselves and two other randomly selected persons on their team for demonstration of the IPC competencies. The assessments were to be completed using the ICAR tool (Curran et al., 2011), which was converted from the original four-point scale to a nine-point scale (Appendix M) so as to enhance variability of responses (Hayward, Curran, Curtis, Schulz, & Murphy, 2014).

The original four-point scale ICAR (Curran et al., 2011) was developed in part as a response to increasing calls for a competency-based approach to IPE. An interprofessional multi-site research team developed and validated a bilingual interprofessional collaborator competency-based assessment rubric through a two-phase research process. In Phase One, a detailed comparative analysis of peer-reviewed and grey literature was conducted to identify and create a list of interprofessional collaborator competency categories, competency statements, and associated behavioural indicators (also known as performance criteria). These were then translated by Francophone

interprofessional educators to produce a bilingual document. A two-round Delphi survey was then conducted to validate the content of the rubric via a pan-Canadian group of English and French speaking interprofessional experts to determine the level of importance and clarity of each competency statement. Of the 25 Delphi experts invited to participate in Round One, 21 responded (response rate of 84%). The 21 participants from Round One were then invited to participate in Round two; 12 responded for a participation rate of 57 per cent. Experts were asked to rate, on a scale from one to five, the importance and clarity of the competency statements and behavioural indicators as well as to provide critique and recommendations.

The mean ratings for “importance” of the competency statements ranged from 4.33 to 4.95 and for “clarity” ranged from 3.25 to 4.48 on the first Delphi survey.

The mean ratings for “importance” ranged from 4.42 to 5.00 and from 3.82 to 4.82 for “clarity” on the second Delphi survey (Curran et al., 2011, p. 341).

From this feedback an expert informed set of competency categories, competency statements, and behavioural indicators was produced, which was then translated into French and English language assessment rubrics.

During Phase Two of the ICAR research project, the assessment rubrics created from the Delphi survey were evaluated for utility, clarity, practicality, and fairness through focus groups with college- and university-level health professional students and faculty from each of the participating academic sites. A total of 12 focus groups were held at the three academic sites – four in English and one in French for students and six in English and one in French for faculty. Thematic analysis with enumeration of subjective coded units was used to determine key themes across the competency categories. Key

themes identified included: structural/organization changes; use of language (e.g., terminology, wording, clarity); utility (regarding usefulness and applicability); fairness/bias; and missing components (e.g., addition of other potential dimensions or indicators/criteria) (Curran et al., 2011). Based on feedback received from the focus groups, revisions were made to the rubric and a final version was developed, which can be accessed via: <http://www.med.mun.ca/CCHPE/Faculty-Resources/Interprofessional-Collaborator-Assessment-Rubric.aspx> or: <http://bit.ly/Rubric>.

Reliability of the instrument has been determined for a modified version of the ICAR tool by Hayward et al. (2014). Based on feedback by a group of physician educators regarding the relevance of the original 31 BIs, modifications were made to the ICAR that resulted in an instrument that contained 17 BIs dispersed under the original six competency categories and alteration of the original four-point scale to a nine-point scale. Over a four week period, post-graduate medical residents were assessed using the modified ICAR by three different inter-rater groups (physicians, nurses, and AHP). Internal consistency, inter-rater reliability, inter-group differences, and relationship between rater characteristics and ICAR scores were analyzed using Cronbach's alpha, one-way and two-way repeated measures ANOVA, and logistic regression. High internal consistency measures were demonstrated for overall ICAR scores (Cronbach's $\alpha = .981$) and individual competency categories within the ICAR (Cronbach's $\alpha = .881$ to $.963$). There were no significant differences between scores of physician, nurse, and AHP raters on collaborator competencies ($F_{2, 5} = 1.225$, $p = .297$, $\eta^2 = .016$), which supports the inter-rater reliability of the modified ICAR. There were significant ($p < .001$) differences in the gender of participants from each rater group; male physicians (81.8%), female

nurses (92.5%), and female AHPs (88.4%) (Hayward et al., 2014, p. 1052). Rater gender was the only significant factor influencing scores with female raters scoring residents significantly lower than male raters (6.12 v. 6.82; $F_{1,5} = 7.184$, $p = .008$, $\eta^2 = .045$); however, there were no significant findings in relation to the gender of the resident being assessed (Hayward et al., 2014, p. 1049).

During the informed consent process, participants were asked to choose whether: (1) they were only willing to assess themselves; (2) they were willing to assess other individuals; and/or, (3) they were willing to be assessed by other individuals. In each CHC, three lists would be created: one of participants who were only willing to assess themselves; one of the participants who were willing to assess others; and, one of participants who were willing to be assessed by someone else. Participants who were willing to be assessed by someone else would be assessed by two different randomly assigned team members so that the possibility of response biases (e.g.; assessments made by a friend or adversary) could be avoided. Prior to receiving any identifying information, participants who agreed to assess other individuals were asked to sign the confidentiality agreement.

The nine-point ICAR tool (Curran et al., 2011) was offered as hard-copy, an attachment in an email, or as an Opinion survey to all participants. Participants assigned to assess other individuals were instructed that they would receive the names of the persons they were to assess and two ICAR tools for the assessments. All other participants were to receive one copy of the ICAR. Participants had two weeks in which to complete the ICAR tool; a reminder email was scheduled to be sent one-week after participants received the ICAR tools.

Data Analysis Plan

Generally, data analysis in any mixed-methods study involves analyzing the quantitative strand quantitatively and the qualitative strand qualitatively, using the standards of excellence for analysis of each type of data (Appendix N) (Creswell & Plano Clark, 2011) and then using techniques that merge or connect findings from both strands (Creswell & Plano Clark, 2011; Polit & Tatano Beck, 2012). Without this final step – integration of findings – the benefits of a mixed-methods study are lost.

In the embedded design, the primary data set (the qualitative data from RQ 1 and RQ 3) is analyzed to answer the primary research questions. The secondary data set (quantitative data from RQ 2) is then analyzed at the point where it is embedded within the primary design. The two sets of results are then connected into a combined analysis (a meta-inference) by relating them to each other, thereby facilitating comparisons and interpretations (Creswell & Plano Clark, 2011). The mixed-methods analysis helps determine how the secondary data substantiate or supplement the primary data. The intent of this embedded design was to use findings from one strand to complement findings from the other strand, with an overall goal of mixing the findings into a coherent representation of IPC and productivity. To reach this goal, the following analytical plan was implemented.

Qualitative Strands

RQ 1: How do HCPs define IPC? What are HCPs' perceived level of personal and team productivity (efficiency, effectiveness) when working in a team environment?

RQ 3: How did the self- and peer- IPC competency assessments change HCPs' definitions of IPC? What are HCPs' perceptions of personal and team productivity after completing the assessments?

The epistemological foundations of qualitative research include that truth is contextual, variable, and subjective and that multiple realities exist within explicit and changeable contexts (Cohen & Cameron, 2009; Liehr et al., 2009; Liehr, Smith, & Cameron, 2009). Applied thematic analysis (ATA) was used in the examination of the verbatim transcripts from the interviews as it provided a practical framework for systematic interpretive analysis. ATA is a rigorous, transparent, and credible process that draws from a broad range of theoretical and methodological perspectives to facilitate identification and exploration of themes from textual data. Of primary concern in the ATA process is the accurate and comprehensive representation of the voices of study participants (Guest, MacQueen, & Namey, 2012).

In keeping with the ATA approach, a qualitative thematic analysis codebook was created by using an iterative deductive and inductive methodology (Fereday & Muir-Cochrane, 2006; Guest et al., 2012). The codebook for each qualitative question (RQ 1 and RQ 3) is presented in detail in Appendix O. In the deductive approach, structured *a priori* codes were generated from the qualitative research questions, interview questions, and corresponding theoretical underpinnings. For each structural code, a code label, brief definition, full definition, and instructions for use were developed. Digital recordings of each interview were then listened to while the verbatim transcripts were read. During this time, each transcript was segmented and tagged with the appropriate *a priori* structural codes. Next, emergent content codes were generated iteratively and inductively by

reading and re-reading the interview transcripts to identify meaning that the text represented, while considering the research questions and theoretical underpinnings of the study. Explanation as to what each emergent content code meant and instruction for use were also developed and added to the codebook. Meaningful text within the transcripts were identified and tagged accordingly with the emergent content codes. Qualitative analysis was undertaken using computer software NVivo 10.

Inter-coder agreement was established via the subjective assessment approach, which is recommended for small samples (Guest et al., 2012). To validate the structural and emerging content codes, two transcripts from one randomly selected participant were chosen for re-coding, which was conducted by my PhD supervisor and one other PhD committee member who had expertise in qualitative research methodologies. When codes were different, the coders discussed reasons for the discrepancies, agreed on a solution, re-coded the master codebook, and revised code definitions. This process continued until a final codebook was developed (Appendix O). Once the codes/codebook was validated, coding continued with periodic re-checks.

The codes that emerged from analysis of interview data continued to be analyzed until overarching themes surfaced. Commonalities, differences, and relationships were examined by repetitively asking “What does the text mean to me? What specific instances of meaning exist in the text? Are there patterns of relationships among the instances of meaning?” (Guest et al., 2012). Once the analysis was completed and themes agreed to by the coders, member-checking was conducted with participants in individual interviews to validate the identified themes. All participants were contacted by email and

invited to review/discuss the themes with me, the researcher; over half of participants (n=8) responded to the invitation and all agreed with the identified themes.

Quantitative Strand

RQ 2: To what extent do HCPs demonstrate performance of IPC competencies, as assessed using the Interprofessional Collaborator Assessment Rubric (ICAR)?

Raw ICAR survey data were cleaned by hand-check to ensure that all behavioural indicators (BIs) for each competency category were represented on the Excel spreadsheet. A range check of data was conducted to look for any unusual patterns, missing data, outliers, and/or answers that did not make sense (i.e.: ICAR scores below 1 or above 9 on a Likert scale of 1-9). A number of additional safeguards were used to verify respondents, and included: cross-matching assigned participant codes with the actual codes that were entered on the completed Opinio ICAR surveys; verifying that the number of respondents per question matched the total number of participants in the study; and, confirming that demographic data entered by respondents matched demographic data obtained during the interviews.

Visual representations of the frequency distribution of data derived from completion of the ICAR tool was conducted and are presented in histograms in the Results Chapter (Chapter Five). The histograms were analyzed for symmetry, skewness, and modality to assist in the determination of whether data were normally distributed (i.e.; symmetric, unimodal, and not too peaked) (Polit & Tatano Beck, 2012). In addition to frequency distribution analysis, measures of central tendency (mean and median) were evaluated for each competency category and the behavioural indicators (BIs). In a normal distribution of scores, these measures will correspond to one another. As a general rule,

the mode or median is suitable for ordinal measures, while the mean is suitable for interval and ratio measures (Polit & Tatano Beck, 2012).

Measures of dispersion, how spread out the data are, indicate the variability of scores and include the range and standard deviation. The range is calculated by subtracting the smallest value from the largest but because of its simplicity is an unstable value that is used for descriptive purposes only and was not used in this study. In interval or ratio data, the most extensively used measure of dispersion is standard deviation (SD), described as “the average amount of deviation of values from the mean” or the index of variability for a set of scores (Polit & Tatano Beck, 2012, p. 387). It tells researchers on average how much scores deviate from the mean, so it can be taken to indicate the degree of error that exists when we use a mean to describe the entire sample. In normal distributions, there are three SDs above and below the mean, where 68% fall within one SD, 95% fall within two SDs, and 99% fall within three SDs (Polit & Tatano Beck, 2012). The nine-point ICAR survey (Curran et al., 2011) was constructed as a Likert scale and data were analyzed at the interval measurement level (Boone & Boone, 2012). A number of statistical tests were conducted for both the BIs (represented on the survey as the group of questions under each competency category) as well as for the competency categories themselves on the ICAR survey.

Calculations specific to the BIs included: descriptive statistics (mean, median, and SD); coefficient of variation; and, pointwise-biserial correlations of each BI compared to each of the competency category scores and to the overall survey score. Calculations specific to the competency categories on the ICAR survey included: descriptive statistics (mean, median, and SD); proportion of participants that scored above 5 (*‘expected’* level)

on the ICAR; coefficient of variation; 95%-90%-80% confidence intervals; Cronbach's alpha; and the pointwise-biserial correlation of the competency categories to the overall ICAR survey. Lastly, a series of sample size calculations for finding significant differences in the proportion of responses above and below a threshold, when making comparisons of two groups (i.e.; Male vs. Female), was completed. Three confidence levels (95%, 90%, and 80%) were used; the Power was kept constant at 80%. To finalize each calculation, three possible differences in the proportions (10%, 20%, and 30%) for each confidence level were used. A finite population correction for each calculation was completed as well. These corrections assumed that the groups being compared were equal in size, and were either 200, 100, or 50 in total.

Multivariate statistics. Researchers oftentimes include multiple independent variables to improve predictions of the dependent variable (Polit & Tatano Beck, 2012). When doing so, they must consider whether the results are affected by pre-existing group differences by using an analysis procedure that increases the precision of comparisons by statistically adjusting for differences between groups by removing the effect of covariates (Newcastle University, n.d.; Polit & Tatano Beck, 2012). One such method, analysis of covariance (ANCOVA), has features of both multiple regression (which estimates relationships among variables and controls for confounding variables) and analysis of variance (ANOVA) (which compares means of two or more groups). ANCOVA is a measure of how much variables change together and how strong the relationship is between them; it allows for comparisons between groups that are not comparable with respect to some important covariate (i.e.; variables that one suspects correlates with the dependent variable, such as age or education) (Newcastle University, n.d.; Polit & Tatano

Beck, 2012). By using ANCOVA, statistical conclusion and internal validity can be enhanced. In this study, the covariates include HCP profession (or job category), employment status, job category of other members of the team, gender, years of experience in current profession, number of years working in current team, and frequency of interaction. At the outset of the study, it was anticipated that ANCOVA would be completed; however, due to the small sample size obtained (n=15) it could not be done.

Mixed-Methods Analysis

In order to determine whether self-assessment for IPC competencies changed the way HCPs defined IPC and/or whether their sense of productivity was altered, after interview transcripts and ICAR survey scores were analyzed individually they were then analyzed as a unit for each participant. This was conducted so that any similarities or differences could be uncovered between what participants were saying and how they actually scored themselves for demonstration of the IPC competencies.

Rigour in Mixed-Methods Research

Concerns related to the quality, or rigour, of inferences made in a mixed-methods research design go beyond those that take place in each of the quantitative and qualitative strands; therefore, mixed-method studies should not only be judged in relation to the criteria standards of both strands but also for the soundness of the meta-inferences made from integration of the strands (Creswell & Plano Clark, 2011; Polit & Tatano Beck, 2012). “Research needs to be defensible to the research and practice communities for whom research is produced and used”, so in relation to quality, research ‘validity’ can have subjective, intersubjective, and objective components (Onwuegbuzie & Johnson, 2006, p. 48).

Although different terms are used in each of the strands to describe quality, both are concerned with ensuring that study findings are as meaningful as possible to the end users of the research. A detailed discussion regarding validity and reliability in quantitative research and trustworthiness in qualitative research was provided in Chapter Three; how they specifically applied to this study, is presented next.

Rigour and Validity in the Quantitative Strand

At a broad conceptualization, quantitative research consists of four types of design validity: statistical conclusion, internal, construct, and external. Each are described below as they related to this study.

Statistical conclusion validity. Statistical conclusion validity refers to “the degree to which the conclusions we reach about relationships in our data are reasonable” (Trochim, 2006, Conclusion Validity, para 3). There are two major threats to conclusion validity: the most frequent being the risk of finding no relationship when there actually is one (Type II error) and the less frequent threat of finding a relationship when, in fact, there is none (Type I error).

In regard to the first threat (Type II error), there are several key sources, which Trochim (2006) would describe as ‘noise’, that make it difficult to see a relationship (or the ‘signal’). These include low reliability of measures (e.g.; poor question wording, flawed instrument design), poor reliability of treatment implementation (e.g.; procedures inconsistently executed), random irrelevant events in the setting (i.e.; anything that may distract the researcher or participants), and random heterogeneity of respondents (i.e.; a diverse group of participants).

Specific to this study, each of these risks were plausible. Because I used a relatively new assessment tool, there may have been low reliability of measures; therefore, the internal consistency of the degree to which the behavioural indicators measured the same IPC competency in the ICAR assessment tool was determined through Cronbach's alpha and is discussed in the Results Chapter (Chapter Five). As well, there was a high potential for inconsistent implementation of the assessment tools because I asked participants to assess themselves and other HCPs on their team. For this reason, it was important for me to review with participants the correct method for completing the ICAR tool (Curran et al., 2011). Additionally, many participants may have completed the assessments during working hours which added to the possibility of high levels of distraction as a degree of variability. Although I could not control when the assessments were completed, I did encourage participants to complete it during times that were relatively quiet with little distractions. Finally, owing to the interprofessional nature of the study, I purposefully recruited a variety of HCPs from different provider/professional groups and was hoping for a high degree of diversity, which I acknowledge may have added variability to the study and threatened the statistical conclusion validity.

When considering statistical conclusion validity, researchers must also pay attention to threats to the 'signal' or the true strength of the relationship between variables, as well as to the amount of information to collect and the amount of risk they are willing to take when deciding if a relationship does exist (Polit & Tatano Beck, 2012; Trochim, 2006). One wide-ranging threat to statistical conclusion validity, which encompasses all of the noise-to-signal threats, is low statistical power. As discussed

earlier, statistical power ($1 - \beta$) is the likelihood that an effect will be detected when there is one to be detected and is the complement of beta (β), the probability of committing a Type II error (a false negative). Power is one of four interrelated components that can influence statistical conclusion validity; the other three are sample size (n), effect size (ES), and alpha level (α). “The goal is to achieve a balance of the four components that allows the maximum level of power to detect an effect if one exists, given programmatic, logistical, or financial constraints on the other components” (Trochim, 2006, Statistical Power, para 4). If one knows the value, or makes reasonable estimates, for three of the components, the value of the fourth can be calculated (Polit & Tatano Beck, 2012; Trochim, 2006). This technique, known as power analysis, can strengthen statistical conclusion validity and decrease the risk of Type II errors. As discussed earlier in this chapter, power analysis was used to estimate how large a sample was required in this study.

In relation to a Type I error (finding a relationship when, in fact, there is none), the main threat to statistical conclusion validity comes from conducting multiple analysis, not adjusting the significance level (α) to reflect the number of analysis performed, and continuing to assume that each analysis is "independent" of the other. For example, if α .05 indicates that five times out of 100 the result that was obtained through statistical analysis could have been by chance and then multiple analyses are conducted, then it would be plausible that one of the results were significant by chance alone, even if there was no real relationship in the data. Therefore, when multiple analyses are conducted and the significance level is not adjusted, there is a greater chance of seeing relationships

even when there is none. This threat to conclusion validity is known as ‘fishing’ (Trochim, 2006) and did not occur in this study.

Finally, either of these two statistical conclusion errors can occur when the assumptions regarding the nature of the data and the corresponding statistical tests used for analysis are violated. Many statistical analyses assume that the data are normally distributed; however, if this is not true and the test statistic is not appropriate for the data (i.e.; parametric versus nonparametric), erroneous results regarding the relationship occur (Trochim, 2006). As such, it is important to conduct measures for the frequency of distribution (depicted in histograms, bar charts, or percentages), central tendency (mean, median, and mode) and dispersion (standard deviation, range) in order to determine normal distribution and thus whether to use parametric or nonparametric tests (Trochim, 2006). These statistical analyses were completed for the quantitative data in this study and are presented in the Results Chapter (Chapter Five).

Internal validity. Internal validity is concerned with the validity of the inference that the independent variable, and nothing else, caused the results; essentially, that there is a cause-and-effect relationship between the variables in the study. Thus it is the investigators job to rule out the possibility that something other than the independent variable caused the relationship (Polit & Tatano Beck, 2012). Internal validity is not relevant in most observational or descriptive studies since no causal relationship is being examined; however, it is conceivably the primary consideration in intervention studies (Trochim, 2006). Although my study involves an intervention, it is not a typical quantitative intervention study, where there is a pre-test, intervention, and post-test. In this embedded mixed-methods inquiry, the quantitative strand is embedded within a

predominantly qualitative approach where there is a pre-assessment interview, self-assessments, followed by a post-assessment interview. It is a multiple group design; however, there is no control group as each HCP group will conduct self-assessments using the nine-point ICAR tool (Curran et al., 2011).

In multiple-group designs, the main threat to internal validity is selection bias, where the groups are not comparable before the study and as such there may be factors other than the intervention that causes differences between the groups. Threats to multiple-group designs include: selection-history threat (reactions to events, other than the intervention, that occur between pre- and post-testing, or in this case, pre- and post-interviews); selection-maturation threat (ongoing developmental processes that occur between pre- and post-testing/interviews and which may affect outcomes); selection-testing threat (the intervention informed or 'primed' participants in each group differently); selection-instrument threat (any change in the pre-and post-test/interview); selection-mortality threat (a nonrandom loss of participants between the pre-test and post-test/interview); and, selection-regression threat (different rates of regression to the mean in the two groups) (Trochim, 2006).

Participants in this study may have conceivably experienced each of the above-noted threats that may consequently affect internal validity. When researchers move from a single-group experiment to a multi-group experiment, they typically randomly assign participants to a control group that will be comparable to the experimental group. If participants cannot be randomized they are at least non-randomly assigned so that they are as equivalent as possible in order that comparisons can be made (Trochim, 2006). However, in this study, there is no control group and participants are not randomly

assigned; the groups are delineated by HCP classifications (e.g.; nurse, physicians, physiotherapists, etc), which does threaten the internal validity of this study.

There are also social threats or pressures to internal validity that researchers must take into account that can lead to post-test/interview differences that are not caused by the intervention. These threats often happen because the group participants and/or the researchers are aware of each other and the role each plays and/or are in contact with one another. The main social interaction threats include: diffusion or imitation of treatment (when the comparison/control group learns about the intervention from the experimental/program group, thereby jeopardizing the researcher's ability to determine if the intervention is causing the outcome); compensatory rivalry (competitive attitudes develop between groups and threatens to obscure the effects of an intervention); resentful demoralization (the opposite of compensatory rivalry, where participants in the control group become angry and give in, thus making the intervention appear more effective than it really is); and, compensatory equalization of treatment (researchers offset the perceived advantage of one group to the other, thereby limiting the ability to detect effects of the intervention). These social threats to internal validity can be minimized by ensuring that the groups are isolated from one another; unfortunately, this is often an unrealistic tactic and can lead to threats to external validity (Trochim, 2006). Since there is no control versus experimental group in this study and HCP groups will not be isolated from one another, there is a very real potential that social interaction threats occurred.

Construct validity. Construct validity relates to the validity of inferences made from the observations in a study to the constructs that may be represented by the observations. For instance, researchers would want to determine how representative an

intervention is of its underlying theoretical constructs (i.e.; that an intervention would have positive and favorable outcomes) (Creswell & Plano Clark, 2011; Onwuegbuzie & Johnson, 2006; Polit & Tatano Beck, 2012). Oftentimes construct validity is related directly to a measurement instrument's validity (along with content and criterion validity), but as Trochim (2006) offers it can also be an overarching category of a study in general, in that it is "generalizing from your program or measures to the *concept* of your program or measures" (Construct Validity, para 1). In essence, it is just as important that the independent variable (i.e.; the intervention) be a robust example of the construct as it is that the dependent variable measurement have a strong correlation to the outcome construct (Polit & Tatano Beck, 2012). Common threats to construct validity include: the Hawthorne Effect (participants' responses mirror their perceptions of how they think they should participate in a study); researcher expectancies (researcher's influence on participants' responses); novelty effects (participants and researchers modify behaviour based upon their reaction to a new treatment); compensatory effects (compensation for failing to receive a perceived beneficial treatment or demonstration by a control group that they are doing as well as those who received an intervention/treatment); and, treatment diffusion or contamination (when those in a treatment group drop out of the intervention). At this broad level, construct validity can be enhanced by thoroughly explaining the intervention, outcomes, setting, and population of interest and then by choosing the particulars that closely match those constructs. As well, at the end of the study it is important to scrutinize the extent to which the operations and construct corresponded with one another (Polit & Tatano Beck, 2012).

At the measurement of outcome level, investigators are concerned with construct validity in relation to the quality of scores derived from an instrument in addition to the quality of the conclusions that can be drawn from the analysis (Creswell & Plano Clark, 2011). Each of the three types of validity testing (content, criterion, and construct) was described in Chapter Three. Specific to this study, content validation (i.e.; the degree to which an instrument's content represents the theoretical domain it is supposed to measure) of the ICAR tool (Curran et al., 2011) was evaluated by a panel of IPE/C experts and was considered to have high content validity as the behavioural indicators and skills were evaluated as being germane to the content area of IPC.

Recall that criterion validation refers to the degree to which the results of one instrument correlate with another instrument that is considered the 'gold standard' for the measure (Aday & Cornelius, 2006; Leedy & Ormrod, 2005). To date, no other instrument similar to the ICAR was found in the literature making the determination of criterion validity difficult. However, if there is no equivalent verifiable criterion for which to compare the survey, construct validation is another suitable approach to measure instrument validation. Construct validation refers to the extent to which an instrument measures an abstract construct (i.e.; characteristics, attributes, traits) as hypothesized by a related theory. When data are analyzed, the hypothesized relationship is determined in relation to whether it exists and, if so, how many correlations there are. Convergent construct validity is substantiated when the measure positively correlates with other similar measures of the construct; whereas divergent or discriminant construct validity is verified when the measure negatively correlates with constructs that are contradictory to the one being measured. In order to argue that construct validation exists, both types

should be measured (Aday & Cornelius, 2006; Leedy & Ormrod, 2005; LoBiondo-Wood & Haber, 2010; Trochim, 2006). Scales that measure a trait, behaviour, or symptom should be homogeneous so that the researcher can interpret composite scores with some degree of confidence that the items are testing what they should. Items should moderately correlate with one another as well as with the total score; correlations lower than 0.20 should be discarded (Streiner & Norman, 2008). Cronbach's alpha was conducted on the ICAR to determine the degree of correlation between the behavioural indicators and the competency categories to ensure that it was measuring what it was intended to measure and are reported in the Results Chapter (Chapter Five).

External validity. External validity is associated with whether causal inferences can be generalized to different people, settings, times, or measures (Creswell & Plano Clark, 2011; Onwuegbuzie & Johnson, 2006; Polit & Tatano Beck, 2012). The threats to external validity are related to how variations in people, places, time, and conditions may affect the relationships between variables and thus the generalizations that can be made. External validity can be improved through careful consideration of how representative the sample or setting is to the population; in other words, is the sample/setting representative of the population to which the researcher wants to generalize results? In this study, multiple CHC sites and diverse HCP groups were invited to participate with hopes that this broad representation would improve generalization of the quantitative findings to other CHC settings that employ a diverse group of HCPs. However, because the setting is limited to PHC, the findings cannot be generalized to all health care settings or to HCPs who work in other health care settings.

Reliability. Reliability, another important criterion related to the scientific merit of quantitative studies, most often refers to an instrument's ability to consistently and accurately measure an intended characteristic and differentiate between individuals when administered to certain people under certain conditions (Aday & Cornelius, 2006; Leedy & Ormrod, 2005; Polit & Tatano-Beck, 2012; Streiner & Norman, 2008). The reliability of an instrument is closely associated with its validity; it cannot be valid unless it is reliable but reliability does not depend on validity (Tavakol & Dennick, 2011). The three key attributes of a reliable scale (stability, equivalence, and homogeneity) were discussed in Chapter Three. Stability was not evaluated in this study as test-retest using the ICAR tool was not conducted. Equivalence (e.g.; inter-rater reliability) is considered one of the best ways to measure reliability of an observation (Trochim, 2006) and was determined on a modified version of the ICAR tool by Hayward et al. (2014) as reported earlier in this chapter (see Data Collection section). This strategy supports Trochim's (2006) recommendation to establish inter-rater reliability outside of the context of the current study. Lastly, instrument homogeneity (or internal consistency), the most widely used reliability approach, was assessed by using Cronbach's alpha and findings are reported in the Results Chapter (Chapter Five). Internal consistency pertains to whether all of the items measure the same characteristic or construct (it is really correlating the test with itself) and is expressed as a number lying between zero and one (Tavakol & Dennick, 2011). If the items on the instrument are correlated to one another, the value of Cronbach's alpha approaches one. Because measures for internal consistency are based on performance in a single sitting, sources of variance related to response bias should be considered (e.g.; transient mood states).

Trustworthiness in the Qualitative Strands

Although new approaches to establish trustworthiness are found in the literature, Lincoln and Guba's (1985) criteria are considered by many qualitative researchers to be the gold-standard and are therefore often used (Polit & Tatano Beck, 2012). As presented in Chapter Three, Lincoln and Guba (1985) propose that through consideration of four criteria – credibility (truth value), transferability (applicability), dependability (consistency), and confirmability (neutrality) – trustworthiness can be established (Lincoln & Guba, 1985). In 1994, Guba and Lincoln added a fifth criterion, authenticity (Polit & Tatano Beck, 2012).

Credibility, perceived as the qualitative researcher's substitute for internal validity, is demonstrated by the ability to show how interpretations were derived and that the research findings and interpretations are credible to the participants (Lincoln & Guba, 1985). Five major techniques used to establish credibility were discussed in Chapter Three. Of the five techniques, member checking draws the most controversy. Criticisms range from the belief that not all participants will want to partake in member checking due to the emotionality of the phenomenon under study to the argument that participants have no more analytic or interpretive authority than the researcher, so member checking adds little to the analysis and interpretation. Other criticisms include that member checking may show partiality towards interpretations that place participants in a complimentary light; that it surpasses the expected role of participation in a study; and, that after synthesis and decontextualization by the researcher, participants may not even be able to identify their own experiences (Polit & Tatano Beck, 2012). Despite these criticisms, member checking was utilized in this study as I believe there is great value in

returning to the source of the transcripts – the participants – to ensure that I understood the message they intended to convey. Member checking occurred during the interviews through the use of probing questions to ensure that I understood their intended meanings. As well, once data were fully analyzed and themes identified, emerging interpretations were brought back to the participants for their reactions and to confirm accuracy.

Transferability, relates to the concept of external validity, where the results of research findings can be transferred or have applicability to other similar settings or between two contexts. Lincoln and Guba (1985) note that this can only be accomplished if the original contexts are described explicitly and vividly, often augmented by the inclusion of verbatim quotes, so that the reader can make the judgment of applicability or transferability of findings to other contexts. This rich portrayal of the research context, known as thick description, has an “evocative quality and the capacity for emotional impact” (Polit & Tatano Beck, 2012, p. 595). In my writing, I stayed true to the concept of thick description by vividly describing participants’ stories, peppering the portrayals with verbatim quotes, thereby allowing the reader to live vicariously through participants’ experiences.

Because reality is forever changing and therefore exact replication is unattainable, in qualitative inquiry, dependability provides a more suitable substitute for reliability (Lincoln & Guba, 1985). To determine dependability, Polit and Tatano Beck (2012) offer several approaches that take place at various stages during the study. Throughout the inquiry, careful documentation of all decision trails is crucial. At the data generation stage, triangulation of both data (i.e.; time, space, and person) and methods is often used. Member checking also qualifies as a strategy for dependability and was employed in this

study. At the data analysis stage, the inquiry audit is a valuable approach to determine dependability, where the inquiry auditor(s) examines the process of inquiry and if determined acceptable, attests to its dependability. The auditor must be impartial to the inquiry but have significant experience to be trustworthy so that their judgments are accepted as valid. During the analysis phase, the Subjective Assessment Approach was used to establish inter-coder agreement and thus ascertain dependability of findings. Explicit discussion regarding theoretical, methodological, and analytical decisions throughout the research study also allows the reader to audit the decision trail of the researcher so that dependability can be demonstrated (Koch, 1998) and was the approach taken in this study.

Confirmability, speaks to the extent to which the data and interpretations are grounded in the events rather than in the researcher's personal beliefs. To establish confirmability, careful documentation of all decision trails is essential so that an inquiry audit can occur where the data, findings, interpretations, and recommendations are examined for internal coherency and the final product is supported by the data (Lincoln & Guba, 1985). Thorough documentation of raw data, data reduction and analysis, methodological notes, and drafts of the final report were maintained so that an independent audit of the study could be conducted.

The fifth criterion, authenticity, refers to "the extent to which researchers fairly and faithfully show a range of realities" (Polit & Tatano Beck, 2012, p. 585). To facilitate authenticity, I put into words the tone of participant's lives as they were experienced by the participants themselves by means of reflecting the mood, feeling, language, and context. Finally, reflexivity, and moral, political and ideological value-commitments by

the researcher must be emphasized during the research process. These components support the reader in making the decision of whether the research product is believable or plausible (Koch, 1998; Lincoln & Guba, 1985). Through reflection, I contemplated my previous experiences in relation to the phenomenon under study.

Mixed-Methods Considerations

In mixed-methods research, additional strategies are required that attend to potential issues in data collection, data analysis, and interpretation that may put in jeopardy the conclusions drawn from the merger of the strands (Creswell & Plano Clark, 2011). These threats, and the strategies suggested to minimize them, follow.

Data collection issues. Inappropriate selection of participants for the qualitative and quantitative strands can be minimized by either (a) selecting the same participants when the intent of data collection is to follow up on findings, or (b) by choosing different participants when building or testing an instrument, typology, or intervention (Creswell & Plano Clark, 2011). The same participants were used in both strands of this study as the intent was to build on findings from each strand so that a comprehensive portrayal of IPC and its effects on productivity could be provided.

The use of inappropriate sample sizes for each strand of the study is also considered a threat to data collection (Creswell & Plano Clark, 2011). As discussed earlier, many qualitative researchers have no issue with different sample sizes in each strand as it is understood that the philosophical intent for each is different. However, in an effort to minimize threats to data collection in an embedded study, it is recommended to use large sample sizes for the quantitative strand and small sample sizes for the qualitative strand, which was the anticipated strategy in this study.

When choosing participants for the secondary strand, there is a potential threat for selection of people who cannot explain significant results (Creswell & Plano Clark, 2011). As such, it is recommended that individuals recruited for the qualitative follow up be the same as those who participated in the quantitative strand, which was how participant selection of RQ 3 was planned in this study.

Data analysis issues. Concerns surface when weak quantitative results are chosen for pursuit in the qualitative strand of the study or when weak qualitative strands are chosen for quantitative follow up (Creswell & Plano Clark, 2011). Strategies to minimize these threats include mindfully choosing results that need further explanation and using major qualitative themes for the basis of quantitative follow up. Since the qualitative strand that follows the quantitative strand in this study is in fact a follow up to both preceding strands, there appears to be no threat of choosing weak results – the themes that emerge from both qualitative strands will be connected to findings from the quantitative strand.

Another issue in data analysis of embedded designs is in using qualitative data in an intervention trial without having a clear purpose of its use. This threat can be minimized by explaining how each piece of qualitative data will be used in the study (Creswell & Plano Clark, 2011), which was adequately done in this study.

Interpretation issues. It is important to organize interpretation to fit the study design, therefore in this study, the interpretation was organized as follows: qualitative – quantitative – qualitative, followed by an overall interpretation. Additional threats to interpretation, which do not apply to this study, can also arise when the interpretation lacks an advocacy or social science lens (as in a transformative design); when the stages

of a multi-stage design are not related to one another; and, finally, when irreconcilable differences emerge between different researchers on the team (Creswell & Plano Clark, 2011). To remedy these issues, Creswell and Plano Clark (2011) suggest a return to a transformative lens during interpretation and a call for action based on the results, as well as to consider how to connect stages of a multi-stage design to an overarching problem, theory, or lens. In the case of conflict between research team members, philosophical and methodological differences must be negotiated as conflict arises.

Ethical Considerations

When research includes humans or animals, it must be done in an ethical manner that attends to the rights of the subjects involved. The following is a discussion of the principles on which the ethical conduct of research is based: beneficence, respect for human dignity, and justice (Polit & Tatano Beck, 2012).

Beneficence

Researchers have a duty to minimize harm and maximize benefits for participants and, as is increasingly more common, to maximize the benefit of the research for others as well. Specific rights that are included in the beneficence principle are the right to freedom from harm and discomfort and the right to protection from exploitation.

Right to freedom from harm and discomfort. It is essential that researchers avoid, prevent, and/or minimize harm or discomfort for study participants by utilizing tactics that diminish any physical, emotional, social, and/or financial harm. Only qualified investigators may conduct research and must be prepared to terminate any study that could result in injury, excessive stress, or death. Although guarding against physical harm is often straightforward, it is less straightforward when trying to save participants

from psychological harm, especially when conducting qualitative research as extensive inquiry may open repressed emotions (Polit & Tatano Beck, 2012).

With respect to this study, there were no greater physical risks than those experienced in daily life. Concerning psychological risks, participants may have felt that their confidentiality and/or privacy could be breached in light of the fact that they were asked to conduct peer-assessments. In truth, peer-assessments were not completed as the sample size was too small to ensure confidentiality within the individual CHCs. A fear of reprisal from other members of the team may have been a very real threat especially if discussions occurred related to the ability or inability of HCPs to perform the IPC competencies. Harm to self-image leading to emotional suffering may have occurred as participants might actually have believed that they and their team were collaborative until they assessed themselves against the IPC competencies; they may very well have felt embarrassed by poor performance of IPC competencies. Feelings of anxiety related to productivity (e.g.; feeling like they are expected to do more than what they normally do) and related to time necessary to participate (e.g.; may have required more time than usual to complete tasks/assess self, therefore impacting an already busy workload) may have arisen. Participants were told that if discussions during the interviews gave rise to issues that resulted in serious consequences (e.g.: stress), they could terminate the interview. No participants requested termination of the interviews. Social (group/relationships/cultural) risks may have included inappropriate or undesirable behaviour of participants toward each other due to misunderstandings or negative judgments encountered when performing self-assessments. Finally, the only identified financial consideration was the potential for participants to attend an interview on their day off.

Participants were informed that there may not be overt benefits to participation, other than giving voice to their experiences; however, this sharing might possibly help in the understanding of IPC and the effects, if any, on productivity. As well, participants may have gained a broad understanding of their own scope of practice and the competencies associated with IPC. Potential benefits to the health care system may be seen in increased job satisfaction and HCP efficiency.

Right to protection from exploitation. Participants must be assured that any information they provide while in a study will not be used against them. Moreover, because the researcher-participant relationship is a special one, any overt or subtle exploitation must be avoided. Overt exploitation can often be easily distinguished (e.g.; sexual harassment or misuse of human tissue), while subtle exploitation may be somewhat harder to recognize, such as the case when researchers conduct follow-up investigations on the progress of participants when in fact this was not agreed upon at the beginning of the study. This type of behaviour would be seen as taking advantage of the researcher-participant relationship (Polit & Tatano Beck, 2012). Participants in this study were told that they could withdraw from the study at any time and that withdrawal would not affect future working relationships with the researcher. They were also assured that participation in this study was not a condition of employment or of job performance evaluation/appraisal. If a participant had concerns regarding my conduct, they were instructed to contact my PhD Supervisor.

Respect for Human Dignity

Researchers must guard against any bodily, psychological, and cultural risk that would jeopardize a participant's dignity (Health Canada, 2007). This ethical principle includes the right to self-determination and the right to full disclosure.

The right to self-determination. Human subjects are autonomous and therefore capable of controlling their own actions; known as self-determination. As such, participant involvement in a study is completely voluntary and they have the right to ask questions, to refuse to give information, and to withdraw at any time without retribution. They also have the right not to be coerced, for example, by excessive rewards for their participation (Polit & Tatano Beck, 2012). Participants were informed that their participation was completely voluntary and as such it could be terminated at any time during the study without penalty. They were told that they had the right to ask questions and to refuse to answer any questions. At any time during the interviews the tape-recorder could have been turned off. There was no financial compensation in this study.

The right to full disclosure. Researchers are obliged to fully describe the nature of the study, researcher responsibilities, participant's rights, and any likely risks and benefits arising from the study. It is this right, coupled with the right of self-determination, that provides the foundation for the informed consent (Polit & Tatano Beck, 2012).

This study was fully explained during the initial conversation with all potential participants. Informed consent was obtained prior to the first interview and, in relation to RQ 2, participants were offered a choice of how they would like to take part in the research study by selecting whether they were: 1) only willing to assess themselves; 2)

willing to assess another individual; and/or 3) willing to be assessed by another individual. Due to the size of the sample, only self-assessments were conducted.

Justice

The word justice brings to mind fairness and equity and directly relates to the distribution of benefits and the burden of research, respectively. The idea of justice implies that no portion of the population be unfairly inconvenienced through research. The two rights related to the principle of justice include: the right to fair treatment and the right to privacy (Polit & Tatano Beck, 2012).

The right to fair treatment. "...no segment of the population should be unfairly burdened with the harms of research...imposes particular obligations toward individuals who are vulnerable and unable to protect their own interests..." (Health Canada, 2007, para 6). Consequently, participant selection should never be based on a population's vulnerability, such as in the case of children or institutionalized people (Polit & Tatano Beck, 2012). According to distributive justice, those who may benefit from research, whether it be individuals or groups, should neither be neglected nor discriminated against in the conduct of research (e.g.; excluding a particular group, like women for instance, from clinical studies) (Health Canada, 2007; Polit & Tatano Beck, 2012). This right goes beyond participant selection however, as it also means that people who refuse to participate or who decide to withdraw, can do so without repercussions; that respect is demonstrated for the beliefs and lifestyles for those with different backgrounds and cultures; that participants who need clarification have access to study researchers; and, that courteous and tactful treatment is provided at all times (Polit & Tatano Beck, 2012).

As was previously noted, study participants had the right to participate and to withdraw from the study at any time, should they agree to participate. In relation to respecting beliefs and lifestyles, I anticipated that participants would have a multitude of varying viewpoints/lifestyles which I welcomed as I believe this diversity enhanced the meanings that emerged from the stories shared in the qualitative strand. Participants were informed that they could ask clarifying questions at any time and were provided with my contact information.

The right to privacy. Research is intrusive; however, researchers are obliged to ensure that it is as unobtrusive as possible and that participants' privacy is maintained at all times (Polit & Tatano Beck, 2012). "...standards for privacy and confidentiality protect the access, control, and dissemination of personal information" (Health Canada, 2007, para 5), which help in protecting mental and psychological integrity.

All data shared by participants in this study was kept confidential. The results of this study will be published, but participants' names and identifying information will not be associated with the research. Participants were asked to provide an alias for use in the written report; however, due to the low sample size, these aliases will not be used for fear that participants may be unintentionally identified. Instead, participants were randomly numbered and these numbers will be used (i.e.; Participant1) in all writing/publications. A discussion was planned with all participants who agreed to assess another member of their team regarding the importance of maintaining strict confidentiality of the assessments. In addition, participants were asked to sign a confidentiality agreement prior to any peer-assessments being done. Data were kept on an encrypted laptop computer in a locked area for the length of time recommended by the Research Ethics Boards (REBs) in

Nova Scotia. At the end of that time period, paper-based documents will be shredded and electronic and digitally-taped data destroyed as per the protocols of the REBs.

Informed Consent Process

As part of the informed consent process, participants were provided information about the research and were asked clarifying questions to ensure that they understood the intent of the research study. Information that was integrated into the consent included: study goals, type of data to be collected, description of the data collection process (including participants' preferences regarding the format [email, Opinio, or hard-copy] of the ICAR tool), expected time commitment, disclosure that the research study is a component of academic requirements, participant recruitment procedures, potential risks, potential benefits, compensation (none in this study), confidentiality pledges (mine and the peer-assessors), voluntary consent, rights (to withdraw and/or withhold information), and contact information (for myself and my PhD supervisor) (Polit & Tatano Beck, 2012). Owing to the nature of this study, informed consents were developed based on the REB protocols for each District Health Authority in Nova Scotia.

Sharing Findings

Should participants' wish to learn about their particular assessments, I planned to provide them with that information – no participants asked for this. I believe that great value can also come from sharing the aggregate findings from each CHC setting back to that particular setting; therefore, this option was made available to the administrators of the CHCs. Comparisons between CHCs will not be provided however, as it is not my intent to create tension among the centers that have participated in this study.

Chapter Summary

In this chapter, I presented the design principles and key decisions I made in relation to this mixed-methods intervention study. The particulars of the research design, namely: the setting, participant selection, recruitment strategies, sample size, data collection methods, data analysis plan, rigour in mixed-methods research, and ethical considerations were discussed in relation to the embedded mixed-methods design and, where appropriate, in relation to both the quantitative and qualitative strands.

This mixed-methods study addressed HCPs' understanding of IPC and their perceived level of efficiency and effectiveness when working with their team; assessed whether HCPs demonstrated the competencies that are related to IPC; and, explored whether self-assessment of the IPC competencies changed HCPs' sense of being efficient and effective. An embedded mixed-methods design was used in which quantitative data were embedded within a qualitative design. The quantitative data were used to answer the question of whether HCPs working in PHC settings in Nova Scotia (specifically, CHCs) demonstrated IPC competencies. The quantitative data were embedded after the first qualitative strand and before the last qualitative strand to provide a means to assess IPC competencies and any perceived change in HCP understandings about IPC and their sense of productivity.

CHAPTER 5 RESULTS

In the following chapter, I present findings from the mixed-methods analysis. To begin, I will briefly re-visit the study purpose and its importance, the research methodology employed, and the guiding research questions. An overview of participant demographics will be presented, followed by the findings related to each research question. Lastly, the extent to which the findings from the qualitative strands converge with and/or diverge from the quantitative strand will be discussed.

Study Purpose and Importance, Research Methodology, and Research Questions

This doctoral research study, situated in CHCs throughout Nova Scotia, examined HCPs' capacity to collaborate and the subsequent effects this may have had on their perceived productivity. The purpose of the study was three-fold: 1) to discover HCPs' understandings about IPC and their perceived level of efficiency and effectiveness when working with their team; 2) to determine the extent to which HCPs demonstrated the competencies that are related to IPC; and, 3) to explore whether self- and peer-assessment of the IPC competencies changed their sense of being efficient and effective. In essence, did it change HCPs' perceptions of being productive?

As was discussed in the Literature Review chapter, the productivity of a team may be significantly affected if team members are not familiar with, nor use/perform, the knowledge and skills required to work collaboratively. As was presented in the same chapter, there are a multitude of methods used to measure the phenomenon of productivity, depending on how it is defined. I argued that the definition of productivity in the field of health care must acknowledge the impact of HCPs' knowledge, skills and attitudes (read: human capital) on the production process; otherwise one omits very

important variables in the determination of productivity. I speculated that once introduced to the IPC competencies, interprofessional human capital may begin to emerge in HCPs, and as a result HCPs may begin to reflect upon how they work within their team and possibly adopt more efficient and productive work practices. Accordingly, if HCPs adopt the competencies necessary for IPC, and in conjunction are able to work to their optimal scope of practice, the numbers required to meet population health needs may change to a more efficient mix where the right numbers of HCPs are in the right place at the right time performing in the ‘right’ way. As such, the level to which IPC occurs and the impact it has on productivity is of great importance to HHRP as the ability of HCPs to work in a more efficient manner may significantly influence health systems performance.

A sequentially embedded mixed-methods research design guided the study based on the ability to answer the following research questions (RQ):

RQ 1(qualitative strand): How do HCPs define IPC? What are HCPs’ perceived level of personal and team productivity (efficiency, effectiveness) when working in a team environment?

RQ 2 (quantitative strand): To what extent do HCPs demonstrate performance of IPC competencies, as assessed using the Interprofessional Collaborator Assessment Rubric (ICAR)?

RQ 3 (qualitative strand; mixed-methods question): How did the IPC competency self- and peer-assessments change HCPs’ definitions of IPC? What are HCPs’ perceptions of personal and team productivity after completing the self-assessments?

Demographics

Based on discussions with Vice Presidents and/or Directors of PHC within each of the then-existing nine DHAs in Nova Scotia, a decision was made to situate the study in six DHAs as these districts had CHCs that met the defined parameters of a CHC, as defined by the Canadian Association of Community Health Centres (2012; 2013). These parameters are outlined on page 8 of the Methods and Design chapter of this thesis. Ethics approval to conduct the study was received from all six DHA Research Ethics Boards. Within these six DHAs, 16 CHCs met the inclusion criteria to participate in the study.

Participant recruitment began at these sites in February 2014 and continued until November 2014; however, despite initial enthusiasm by HCPs to take part in the study, recruitment slowed significantly by May 2014. Alleged reasons for the dwindling recruitment are offered in the Discussion Chapter (Chapter Six). In an effort to increase enrollment, two study amendments were made, and approved by each DHA REB: 1) each participants' name would be entered into a prize draw; and, 2) requests would be made in each CHC for my attendance at staff meetings to explain the study and answer questions. Despite making repeated contact with all managers and/or Directors of the CHCs [n=16], I was permitted to attend staff meetings in only four.

Notwithstanding these amendments and the extended length of time for recruitment, a total of 19 HCPs were enrolled in the study; however, only 15 participants chose to complete all study components (two interviews and ICAR survey). Of the four participants who did not complete all study components: one moved out of province and chose not to take part in the second interview; one refused to participate in the interviews

for fear of retribution, despite being assured of study confidentiality; another withdrew from the study at the beginning of the first interview as she/he believed that since she/he worked in both acute care and PHC she/he could not separate the two experiences from her/his responses; and, the last participant took part in the interviews but did not complete the ICAR survey. Owing to the fact that each research question built upon the other to provide a full picture of IPC and productivity, any data that were collected from these four participants were not included in the analysis.

Of the 15 participants, two were male and 13 were female, with ages ranging from 31 to 64 years. The following professional designations were represented: social work, pharmacy, registered nurse, family practice nurse, nurse practitioner, physician, physiotherapist, and ‘other’. In order to protect participants’ identities, the number of participants per profession and per CHC cannot be provided. Eleven participants were employed as full-time equivalents, while four specified their employment status as either part-time or casual. The participants indicated that they worked with a variety of other HCPs in their CHCs, as illustrated in Figure 4. The category ‘other’ represented unit aides, students, continuing care coordinators, facility managers, and chronic disease managers.

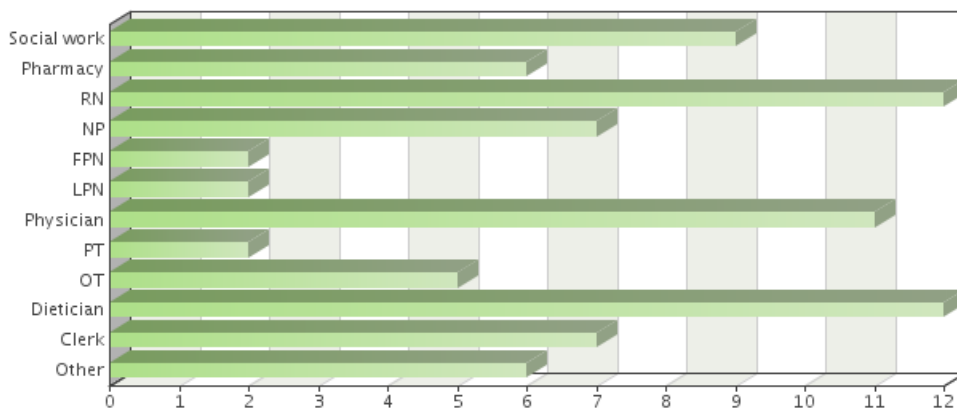


Figure 4: Other members on participants’ teams

Among the participants, there was a range of work experience within their chosen profession/job category, with approximately half (53%) having 21 years or more experience (Figure 5).

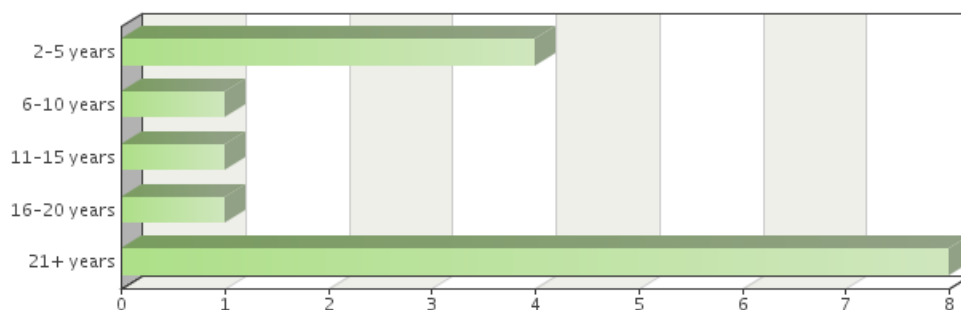


Figure 5: Total years of experience in current profession or job category

Fifty-three percent (53%) of participants had worked with their current team for more than six years (Figure 6).

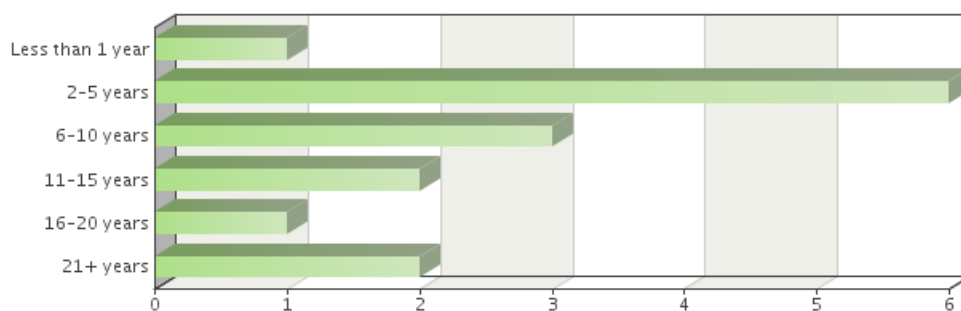


Figure 6: Total number of years working with team

It is important to note that despite a lower number of participants than originally anticipated, the sample represented a wide range of age groups, professional designations, years of experience, and each had worked with a multitude of different HCPs, which is representative of the population of HCPs working in PHC in Canada (Canadian Institute for Health Information, 2011; Conference Board of Canada, 2012). I believe that these attributes provide a robust and well-rounded picture that is suited to the investigation of IPC and productivity.

Qualitative and Quantitative Findings

In keeping with recommendations by Creswell and Plano Clark (2011), data were analyzed in the same fashion as they were collected - sequentially. Consequently, the findings from each research question will be presented sequentially and then followed with a discussion of the convergence and/or divergence of findings. Each of the qualitative research questions contains two sub-questions, thus emergent themes will be discussed under each of these sub-questions. Emergent themes are displayed schematically per qualitative research question in Appendix P and Q, respectively. Owing to the sensitivity of the topics under discussion, coupled with the small number of participants in each profession/job category, participants will be referred to by number (i.e.; Participant 1), rather than by the aliases that they provided during the interviews to ensure anonymity when using any direct quotes.

Research Question 1 Themes

To help set the stage for a discussion about IPC and productivity, and prior to asking them for their definition of IPC, participants were asked to reflect upon times when they had worked with HCPs from other disciplines – what the experience was like for them, what went well, what didn't go well? An interesting finding was that what they had to share from their reflections corresponded to their definitions of IPC. Therefore, their reflections are integrated into each of the themes rather than presented separately. The average length of the first interview was 43 minutes (range = 30 to 59 minutes), which generated 264 pages of textual data. Four broad themes surfaced in their definition: 1) *Understanding, Valuing and Using Team Expertise*; 2) *Communication is Key* (with

sub-theme: *Being Available*); 3) *The Impact of Belongingness*; and, 4) *Hierarchy-Turf Protection*.

Understanding, valuing and using team expertise. When participants were asked to reflect upon their experiences to provide a basis for their definition of IPC, all of them spoke about the critical element of knowing who was on their team and having to appreciate what each member brought to the team in relation to individual knowledge and skills so that they could best be utilized to meet the needs of patients. Participant 11 went further in her/his definition to describe collaboration as an action – a decision to collaborate – rather than something that inherently or naturally occurred in a team.

You either, like, kind of decide, I think, that you're going to work as a team or you decide that you're working individually and you'll just report to one another. Its understanding and having appreciation for everybody's skill set in a way that is deeper than OTs do this, physios do this. So it's also appreciating the people. So the individuals, their professions, and how it is that they...what their values and the resources that they bring.

Supporting the notion that IPC does not just 'happen', Participant 10 described an intention and a commitment by the team to work collaboratively and that, when seen by others, was unmistakable:

You have to have people that are committed to that process, that way of delivering care. And so you set up an environment. You set up a community. You set up a way of practice that's sort of, I don't know, a sort of philosophical approach that gets transmitted both formally and informally to everyone who comes here. So people understand that this is how we work. And mostly people understand this is how we work because they see it happening...And you see that this is what collaboration is, and you see that when the dietician speaks, everyone listens and then responds. And when the mental health worker speaks, the same thing happens. And I think that's how you make it happen.

Participant 7 metaphorically defined IPC as a puzzle, describing how HCPs combine their expertise to determine how best to meet the needs of patients:

I think collaboration is, you know, working together. ...being aware of what other people bring to the table, what they have to offer. And collectively figuring out...for the certain situation for that moment in time...who can bring what to improve that situation for somebody. And kind of bringing together and all contributing what you have to offer but also being able to, you know, each person being able to pull out what the others maybe don't have, to make, at the end, the puzzle kind of fit together.

Participant 10 also expressed the sentiment that IPC is about learning from and about one another to build upon each other's knowledge and skills:

So clearly what works well is that patients have the advantage of different perspectives, different skill sets in their care. You know, I have my skill set but I'm missing many things. And so, it is so easy and so nice to be able to walk across the hall and find someone who has those skills that you don't have that you're looking for, and be able to take advantage of that.

In order to be able to work in this manner, participants emphasized that role understanding was critical to, and formed the basis of, IPC. They explained that each member of the team had a responsibility to ensure that others knew about their areas of expertise, their professional knowledge and skills, and their role within the team. Not doing so would put them in jeopardy of having their roles defined for them, which could severely limit their contributions to patient care. As Participant 11 explained:

You need to not assume that anybody knows what your role is. People will decide what your skill sets are for you, if you don't.

Participant 7 corroborated Participant 11's concerns, describing how the assumptions she/he made about other's roles, based on what she/he thought she/he knew about these

professions, potentially limited her/his ability to collaborate with them for better patient outcomes:

I felt like I understood what a pharmacist does, and I understood what a social worker does. But in saying that, there was lots of stuff I still needed to learn. I even came to this job thinking, you know, I've been around the block for 20 years now. I kind of get it. But at the end of the day, no, I really needed to take the time to sit down and find out everything that our social worker can do. And that was for me to do my job, just to be able to pinpoint when I talk to somebody, "oh my gosh, the social worker is such a good person for this person". Because I knew what she did. I knew what she could offer. I knew the connections that she had.

Concern was expressed however that other HCPs on participants' teams did not know their scope of practice or how to explain to others how their unique contributions impacted the overall operations of the team. As a result, their involvement in care planning was limited and ultimately affected patient outcomes.

Trust and respect were described as integral to IPC; not only trust and respect for a person's knowledge and skill, but trust and respect that everyone on the team is of value. Moreover, participants expressed that when collaborating one must respect that people are busy and often have hidden workloads that are not apparent to others on the team. As such, even though one might have an understanding of another's roles and responsibilities, there was still a need to have a conversation about whether and how their skills could be used, as Participant 1 shared:

And I think you have to respect them as well because you might be suggesting things that are going to be more work for them. So it has to be in a way that makes it doable. And I think we sometimes forget that. You know, if we're working with nursing and we're saying, well, you need to do this and you need to do that and you need to that...well, they already have a really busy day.

Participants also described the importance of trust being a two-way street. Participant 5 described the trust that is required when asking for someone's advice:

If I'm collaborating with a physician because there may be a questionable diagnosis, and I'm not sure, you know, where to go or just wanting to make sure that I'm actually managing it in the most complete way and not, you know, missing something, I have to be able to trust that they as well have the expertise and skills and knowledge to be able to...advise me that maybe I might want to go a different way. So that trust of knowing...that person in their job, their role and what their expertise and skills actually could be, and should be, and actually are makes the difference.

This same participant also put forward that when knowledge of each other's roles was lacking, trust would also be lacking, resulting in a barrier to IPC.

When defining IPC, participants spoke about overlapping roles and responsibilities as a natural and expected component of collaboration; that professional silos could be disassembled because there was more in common between professions than was uncommon. Participant 6 equated role-blurring to being able to lose one's professional label:

I guess you'd sort of be able to drop your title. You know, I'm not just a pharmacist; I'm part of this team. And while you may have things that only you do in that team, there's a lot more interchangeability and several people can do several different things. And there's not just so much of those silos...

Unfortunately, where there is role-blurring, there is also role confusion. Participants described HCPs, particularly nurses, as historically assuming duties that would normally be done by other professions, for example responsibilities typically carried out by social workers, dieticians, or pharmacists. Difficulties ensued when these other professions joined the team and nurses had to relinquish these responsibilities back to the appropriate

professional. Participant 11 suggested that this phenomenon of performing duties that are the purview of others is neither universal nor reciprocal:

I always tell people nurses become social workers sometimes but social workers never become nurses.

In fact, most participants clarified that a single profession could not possibly meet the needs for all patients. Participant 9 provided insight:

I mean the best person for the job, that's who does it. I can be learning from you and you learning from me in that process. But when we talk about patient care, who's the best person for the job, for that particular aspect of the job? This whole thing... This idea of one person doing everything is not necessarily the best.

Most participants made it very clear that IPC was about having patients see the right person with the right skills to meet their needs. Ultimately, in their definition of IPC, participants emphasized that collaboration existed as a means to address patient needs and to reach a common goal. They characterized IPC as an opportunity to share different perspectives, to brainstorm various options for care, and to harvest knowledge from others that they may not have knowledge of themselves.

Communication is key. Of equal importance to understanding, valuing, and using another's expertise in the collaborative process is the ability of team members to communicate and to be available to the rest of their team. In fact, all participants mentioned communication as being crucial to collaboration, with many using the term 'being on the same page'. When asked to define IPC, Participant 5 characterized it as:

Collaboration for me is communicating, you know, with any provider or healthcare person like on the team... But it's a back and forth communication.

Participant 7 similarly described a back and forth discussion; a way of sharing with and learning from one another to advance patient care:

So it's the way we communicate with people. It's the way you interact with them. It's the way...you identify that there's something that you can't bring to the table but you know somebody else can do something. And so it's being able to...reach out, explain yourself well, you know, and be able to I guess work with other people for an end result in the best interest of whatever that is you're working for.

Without clear communication however participants acknowledged that IPC could not thrive as they would not have an opportunity to share with one another and, as a result, would not know the level of involvement of other HCPs in the patient's care journey or what challenges might lie ahead. Some also questioned the type of communication that was occurring in teams, whether it was truly collaborative or merely reporting to one another, as Participant 12 posed:

So historical [*sic*] collaboration is that you just talk about somebody together. But I don't know how much the talking or the reporting on a case, how much of that is actual listening or is it just reporting? And if it's just reporting, I think we should be kind of questioning ourselves and asking what the use of that is...I know that we've got collaboration going on in our team in our conversations. And I know I'm being collaborated with frankly when it's more of just a conversation than it is 'what do you think about this'? Because I don't know that it's always an honest ask. I think that there's some times in which people ask those things because they feel like it's the right thing to do.

Participant 5 also described having conversations with other team members because she/he saw it as the right thing to do. But her/his reasoning for doing so did not stop there, for she/he also saw it as a way to build trust and, in turn, foster a collaborative

relationship. This participant described how she/he purposively entered into conversations with another colleague to cultivate budding collaboration:

Discussing cases with the physician, even in cases where I didn't necessarily need to collaborate, if you know what I mean. I knew what I was doing because I had had my own clinics prior. So just really, you know, keeping her in the loop as to what I was doing, and was there anything else that she would be doing, reviewing cases with her. And just gradually she could really see that my line of thinking, my evidence-based practice, was very similar to hers.

Participants also used the words 'safety', 'respect', and 'trust' when describing the type of communication that was important to the collaborative process. Participants explained that they needed to give and receive respect in order to build a safe environment where one could be open and honest about their ideas, recommendations, and opinions. When safe and respectful conversations happened, trust within the team was nurtured. As Participant 10 explained:

And then there's this whole thing of safety, if you will. In any group, you have to feel safe to be able to say what you believe to be the situation. That obviously sort of rolls over into things like respect. When you're talking about collaboration, respect and safety sort of goes together, right? If you give somebody respect then they feel safe.

In addition to the conditions required for an open exchange of ideas (i.e.; safety) was the manner in which communication occurred in teams. Participants acknowledged the value of having formal methods that supported team dialogue such as consistent and regular time frames where team members could come together to connect with one another. Others spoke about the importance of having communication tools that supported open sharing within teams; however, the method of communication varied

widely depending on the geographic location of the CHC. Some participants described having only paper-based methods, while others either used electronic means or a combination of both. Regardless of the method used, everyone on the team having access to the information was considered vital; yet, as illustrated by Participant 9, that was not always the case:

Why is it every other profession can make a note on a client's electronic medical record but we can't? I'm not provided with tools to do what's considered to be a job these days anyway. I don't even have a computer.

It is noteworthy to mention that access to, and use of, electronic medical records (EMR) varies widely in CHCs across the province. Some participants described regular use of EMRs which enhanced team communication, while others had restricted or limited use. Participant 9 recounted being able to look at the EMR but not being permitted to input any information as this type of access was restricted to nurses and physicians in this particular district. Participant 7, from another DHA, described a sense of being disillusioned with EMRs as they were difficult to use and did not enhance communication between HCPs:

And I thought that the electronic chart was going to be more... I thought it was going to be shared between but it's not. I have two [EMRs] for this and this. I can't even...open them at the same time. I have to close one out, open one up, close one out, open one up. I have to sign this person in, go in and put my notes. And you know, a referral would come to me and it's like, "Oh, this is weird." And I think that name sounds familiar. So I look in the [EMR] and it's not there. I go back to the paper chart. I've referred this person out to Mental Health a year ago but the person who's referred to me hasn't looked in their paper file.

As can be seen in this description, this kind of failure in communication between HCPs could have a profound effect on patient outcomes as not all exchanges are being transmitted or received.

Besides the formal ways of communication, participants also reported that some of their most rewarding collaborative moments occurred informally. Participant 10 conveyed the importance of spur-of-the-moment conversations taking place after the formal team meeting:

But there would be communication that would go on. Sometimes informal – me walking over to the nurse's office or the nurse practitioner's office or the social worker's office or the dietician or whoever. Or vice versa. Or sometimes you're passing someone in the hall...so there would be different formats through which the collaboration would happen.

These informal types of sharing are depicted as a value-added to what may be in the written or electronic chart for they provided information that was often not captured in the notes, as described by Participant 15:

And yes, it's about leaving good notes and writing good notes in the chart. And our charts are generally very good around information that people leave in them. But there's also that other kind of communication that is, you know, the thing that may not necessarily be readily apparent in the chart. Like for instance, that the resident took a phone call on-call. And yes, there's a little on-call sheet they get scanned in but it's not right there. And so for the resident to say, "Oh, yeah, I spoke to them and this is what was going on".

Not surprisingly, participants described that there was more to communication than the ambiance of the gathering or the tools that were being used; the importance of being available to each other was vital.

Being available. The physical and mental presence of other team members, including the CHC manager, was of paramount importance when participants talked about communication in their definitions of IPC. Three-quarters of participants expressed the significance of the availability and accessibility of their team to support the collaborative process. As Participant 5 explained, physical presence could be as simple as taking a phone call or answering an email or as complex as all team members trying to be in the same space at the same time:

Sometimes you need a second pair of eyes to come in and actually see or assess the patient. Sometimes you may just need to be able to walk down the hall and to talk to them in person, not necessarily on the phone in front of the patient...

Notwithstanding the importance of physical presence, oftentimes the reality was that team members worked alone, either owing to geographical separation, the layout of the CHC, the nature of their work, or employment status. When team members were not present in the CHC, it was seen as a barrier to IPC as this separation made it difficult to draw from others' expertise, as Participant 10 explained:

Not many of us are here all the time. And so sometimes there's barriers with respect to, you know, I need to talk to so and so and they're not here. And so I much prefer to sit and talk with someone. You get a lot more done in a shorter period of time...it's very difficult to do the kind of collaboration that everybody was wanting [*sic*] to have because there was physical separation.

When asked if employment status affected their ability to collaborate, those who worked part-time or casual acknowledged that their scheduling made it difficult to communicate in a collaborative way with their colleagues. Participant 6, who worked part-time, shared:

It is for sure. Like I know one of the dieticians said last week, she said, you know, "There's many times when I think, oh, this person should see [Participant 6]. You

know, maybe they could just drop in. Oh, [Participant 6]'s not here." ...I'm not there so they [the patient] miss out on those opportunities.

Participants also acknowledged that making themselves available for meaningful communication takes time; nevertheless, it was perceived as time well-spent because they were able to problem-solve for better patient outcomes. As was explained, having more people involved increased their ability to get more done during a patient visit, which ultimately saved time for the patient and provider. When HCPs were unable to convene to discuss patient cases, it created barriers to IPC, as Participant 7 described:

And sometimes people aren't here. They have to be somewhere else. So I find time restraints are huge. Things that need to get done that should get done don't because it takes five attempts and three months to actually get a meeting with everybody that needs to collaborate to be there at the same time. And by that time, have you lost focus? Did you forget every point that was supposed to be made? Absolutely.

Varying payment models were believed to contribute to one's inability to make time for collaboration. Fee-for-service type models were described as an impediment because HCPs paid in this way would be less likely to take unpaid time to meet, and thus collaborate, with others.

Last but not least, when it comes to team communication, the importance of strong leadership is not to be understated. Participants shared that strong leaders supported interprofessional communication as they encouraged discussions, offered varying viewpoints, and were supportive especially when the team felt like they were struggling. When recounting how supportive a manager was, Participant 7 revealed:

[Manager] is still, you know, tied into the big wigs and the higher ladder. But at the end of the day...when it really does come down to the crunch, she really does

care. ...she really does care how we feel we're being treated. It might not change everything and it might not solve every single problem but at the end of the day, you know, you are given something to hang onto. You know, even though it's not working to the best that it could possibly be, she does matter. And it is important to her how the team is communicating and connecting.

The impact of belongingness. As an integral component of IPC, the importance of relationship building cannot be underrated. Nearly three-quarters of participants (n=10) reasoned that team members had to form a relationship with one another for a bond to be built and to thrive as a team. Participants shared that without knowing each other in this way, they could not reach the level of comfort that was necessary to foster trust and facilitate collaboration. Participant 1 and Participant 7 reported that they saw others as 'human' when there was an opportunity "hang out", which then made it easier to approach these people in the work setting. As Participant 1 further noted it was much more difficult to be disrespectful when you recognized that person as someone who has a life outside of their work persona:

And if you spend your break times together, you get to know people and it's pretty hard to be rude to someone who you know has a sick child or, you know, like when you know more about them.

The opportunity to socialize happened without ceremony for many of the participants, for instance at coffee or lunch breaks; other occasions occurred in a more formalized manner, such as going to restaurants or bars. A relaxed get-together, where HCPs could unwind and enjoy one another outside of the work environment was believed to be beneficial to IPC. As Participant 4 speculated, this type of social gathering helped to alleviate tension allowing people to better deal with stressful moments at work:

I think sometimes when we get out of this building and we go have a beer together and we relax and be friends that helps us when we come back on Monday. Right? It really does. When you're just constantly, you know, whose work is that or whose toes am I stepping on? ...And then that becomes so stressful in days that you forget about the fact that you're all human and you're all friends and you all like each other.

As was so succinctly captured by Participant 11, IPC really is all about relationships and the need for sound communication, respect, trust, and to appreciate what each person brings to the team.

Hierarchy-turf protection. Despite the positive attributes of IPC that were captured in participants' definitions, 80% (n=12) spoke about hierarchy as a barrier to IPC. They expressed that oftentimes this tone was set by the medical model that dominated many of the practice settings, where physicians were viewed as most important, followed by nurses, and then by all other HCPs (typically and, as participants pointed out, derogatorily designated as 'allied health'). Participants emphasized that the fundamental philosophical beliefs within the health system supported the notion of hierarchy, as expressed by Participant 7:

I mean it starts way back from just basic ideology about what roles are important in the medicine world. Because I think we've thought medically very western, that doctors are the *be all* and the *end all*.

This same participant went on to share that the way in which HCPs were educated greatly influenced and cultivated this hierarchical milieu:

I just think from the perception that those other roles come from, their education that directs their mannerisms or the way they think or the way they, you know, associate themselves per se with other collaborative professionals. And I mean,

not to slam doctors, but I know there is this tone with them as to what their role is and that they kind of supersede sometimes other roles and things like that.

Participant 12 supported the idea of higher levels of education and perceived power as the fundamental basis of hierarchy that thwarts communication and collaboration:

And so people with a certain level of expertise in an area in a group setting often are deferred to or sometimes they trump the knowledge of others. And people look to them to be the experts. So sometimes they attain power and sometimes they're given power or liberty or entitlement or whatever terminology you want to put to it. But they're kind of given or they assume it. And when that happens, I think it probably shuts down a lot of other communication that can happen around an issue.

Participant 10 corroborated that HCPs learn hierarchy but suggested that role-modelling of this kind of behaviour had a more profound effect than the educational system had:

But the real education that happens, the way that people behave is not what happens through the classroom. It's how people model themselves. And the modelling hasn't changed. So the modelling still tells us that the physician is the boss, and the nurse does what the physician says. And yeah, a physiotherapist can make a recommendation but, you know, whatever.

It appeared that some participants, such as Participant 13, wanted to make sure that I understood that HCPs who stood at the hierarchical vantage point did not wield this power deliberately but rather assumed their rightful place within the team based on their professional designation, as if it was expected that it came with the territory of that particular role. As she/he explained:

There wasn't blatant disrespect or, you know, bullying or name calling or anything like that but it was more, you know, I'm the clinician, I'm the physician, you're this...you don't do this, I do do this.

Conversely, Participant 14 claimed that disrespect shown to others by those with more power on the team was intentional and could potentially decimate collaboration within the team:

When that respected piece is missing, it spirals downward so fast because the sense of team right away is broken down, and you get a hierarchy. And when you have a hierarchy, your opinion isn't valued. And I say opinion; I mean knowledge, skills, professional input at the level that you should be recognized.

It is important to note that hierarchy was not limited to occurring only *between* the health professions but was also described as taking place *within* health professions. Participants, not of the nursing profession, recalled how they witnessed hierarchy and turf protection between the various disciplines of nursing, such as between licensed practical nurses, registered nurses, and nurse practitioners. Participant 7 described how she/he experienced this based on her/his advanced education:

I know for me as an NP coming, there was almost like an automatic sense that I thought I was better than everybody else.

She/he went on to explain that she/he took great pains to demonstrate that she/he was not being hierarchical and overtly tried to be inclusive of the other nursing professionals on her/his team.

Other participants also spoke of power and ego as elements that were intrinsic to hierarchy and that ultimately could affect patient outcomes. However, some participants shared clever ways that they used to circumvent the effects of this power, as Participant 8 revealed:

We have one of our doctors, he's really difficult. He gets in his moods. And like I've made suggestions. And he won't do it just because I suggest it. Like that's the

way he is. Everybody knows it. It's like a joke but it's not. When he was off one day, I asked the other doctor.

As is evident by participants' responses, IPC is a complicated entity with many facets to consider. Key features of the definitions shared included role understanding, communication, belongingness, and awareness of the inherent barriers.

As the second sub-question of RQ 1, participants were asked to reflect upon and share their thoughts about productivity; both their own and those of their teams. To facilitate a clear representation of participant responses, the themes associated with personal productivity will be presented first, followed by the themes linked to team productivity.

Three themes emerged when participants talked about their own productivity, and included: 1) *Achieving-Contributing to Patient Outcomes*; 2) *Completing the Checklist and Managing Shifting Priorities*; and, 3) *The Impact of Hierarchy and Bureaucracy*.

Achieving-contributing to patient outcomes. Eighty-seven percent of participants [n=13] shared that they felt productive when they were able to make a difference for patients; whether the patient was getting better, or not, was irrelevant. Participant 3 expressed this sentiment:

It's more like I feel like I actually made an impact on the patient...it's not like they're necessarily going to get well but it's more that they feel that they're more empowered, that they feel like they have more knowledge than they came in with, that they feel that they were listened to, that their needs were met. I guess that's when I feel that I've had a productive day...If I manage to keep somebody out of the hospital when I know in the past they probably would have ended up there because there is this support available, I guess I feel productive that way too.

Productivity for this participant was derived from how the patient felt about the encounter; essentially, she/he took cues from the patient – did they feel listened to, did they learn something? In her/his experience, patients oftentimes did not recuperate from an illness but that did not define whether or not she/he was productive. Participant 2 reported the same attitude in relation to improved patient outcomes and feeling productive:

So if a patient gets better or their quality of life improves then I've done my job. Then I'm going to feel productive.

Expanding on the concept of addressing patient needs was the ability to decipher *actual* need versus *perceived* need. Participant 10 equated the capacity to discern genuine need as a key element of feeling productive:

So you might be talking about someone with diabetes but the real issue is that they're homeless. So let's talk about the homelessness. You don't talk about the diabetes. You talk about the homelessness because that's what matters.

For this participant, productivity was about focus and unearthing the true object of care, which may or may not be in terms of physical ailments.

The majority of participants also disclosed that they welcomed contributions from other HCPs in the pursuit of addressing patient needs and that others' input did not present a threat nor diminish their feelings of personal productivity. Participant 12 explained:

I feel productive when I've met the needs and accomplished the requests or the care that's been needed for the people that we serve... And I've either done that on my own, I've done that in conversation with another provider, I've done that maybe in tandem with somebody, with another provider. I've improved the

quality... You know, either collectively, collaboratively, we've improved the quality of life of somebody. That's when I feel the most productive.

Participant 10 attributed their sense of personal productivity with working with other HCPs:

And so sometimes, particularly when it gets busy and you know that there's 2 or 3 or 4 or 5 people waiting out there, you're kind of processing and you're getting your work done but at the end of the day, you're not feeling completely satisfied. And I think mostly it's because there wasn't...really you didn't make any time and the opportunity to have the collaboration that needed to happen. So I think those are for me the times. I don't find it happens very often that when I do collaborate, it isn't a positive thing.

It is worth mentioning though that despite vehement support for IPC, when asked if they would still feel productive if they had to refer the patient to another member of the team because they could not personally address a patient's needs, a small number of participants admitted that they would not. Participant 6 shared:

No. It would kind of feel like I passed the buck off, even though they probably did a better job of it.

It was also important for some participants that I understand that productivity was not about the number of people who they saw in any given day but was based solely on improved patient outcomes. If they saw one patient in a day and were able to make a difference in their lives, they felt productive. Nonetheless participants also explained that they perceived that their managers did not feel the same way about productivity; for them, a productive clinic was one in which there was high turnover of patients per HCP in a specified period of time. In point of fact, some participants recounted times when they were chastised for not meeting quotas; others elaborated on their frustration of

having to capture their workday as statistics that did not adequately portray all that happened throughout their day or the hidden work involved. Participant 3 questioned how patient outcomes and productivity could accurately be captured:

...because sometimes you think how is this ever provable that I've actually made a difference?

Participants described feeling unproductive for many different reasons. It may be because they and/or the patient could not pinpoint the problem, despite having a cadre of HCPs with varying levels of expertise to assist. It may have been that the team did not have time to meet or not all team members were present at meetings; or it may have been because they were not being included in patient care decisions. Participant 7 shared her/his angst:

So that's the constant dilemma of me feeling productive. Like I'm being expected to see more patients. You know, there's a lack of understanding clinically of what I do. I'm not going to be paid for overtime. ...you know, I love what I do and that's what keeps me going. But a lot of times it's just you feel like a slave because it's like what they [management] need to get done to check off things on their agenda with very little understanding of what that it takes as a human being and as a professional person working with other people, you know, that may be easy to work with or may not be easy to work with.

Of interest is that all of these aforementioned reasons for feeling unproductive are linked closely to the defining elements of IPC, as expressed by participants.

Completing the checklist and managing shifting priorities. When describing the conditions that contributed to their feelings of productivity, the majority (87%) of participants emphasized the ability to strike items off their daily checklist while being able to prioritize their workload when unexpected situations arose.

Many participants chronicled coming into work early so that they could organize their workday and/or working late so that they could complete everything on their list, all while being on unpaid time. The feelings of productivity that participants experienced because of their ability to organize and accomplish daily tasks were captured by

Participant 13:

Getting everything on my checklist done. I make a list every morning. I'm Type A. I come to work half an hour early on my own accord, you know. And that's not time paid. But I like to have my coffee, I have my breakfast, I get on my computer. I make a list. Everything in my emails, I will flag it by colour coding, a level of priority. Then I make my to-do list for the day. If at the end of the day, that to-do list is done, I feel awesome.

Participant 11 recounted using checklists when experiencing burnout, which was attributed in part to feeling unproductive, because doing so created a sense of being focused and more efficient:

Like when I go through periods of burnout, I start to write down things to do today. And if I can check them off that I've done them then there's a sense of accomplishment.

Despite creating checklists, there were things that prevented participants' from completing all tasks. The most common reasons given were attributed to challenges with administrative responsibilities and patient appointments. For example, there were some participants who worked in CHCs with no administrative staff; in these cases, the HCPs themselves were expected to manage clerical duties as Participant 8 illustrated:

We have no admin staff. We do everything ourselves. You know, from patient booking to like scheduling to every piece of paperwork that has to come through. We have to register our own patients...we have to do everything.

Because of this, participants were forced to set aside time within their workday to complete this type of work while trying to juggle their patient workload. Yet, for Participant 5, patient care always took precedence so the administrative work would be done at the end of the day, which again, was often unpaid time:

And I do set aside time for admin because I don't get paid overtime. A lot of times I'm here anyway overtime. So I do set aside time. But I will cut into that to see a human rather than to do paperwork.

In the CHCs that did provide administrative staff, for the most part, they were seen as integral and supportive contributors to productivity. However, there were instances where they had an unfavorable effect on patient outcomes and thus on productivity, as captured by Participant 5:

The other aspect is obviously our administration. So that can be a barrier or it can make your day really work like clockwork. Because they're not really permitted to triage per se. They do know within reason the scope, like say, of the family practice nurses. But sometimes patients will be booked with them that maybe really more appropriately could have been seen by say myself or one of the physicians. And you know it's delaying them [the patient] because they're having to wait around...

Patients also have some bearing on HCP productivity. As is often the case, when patients book appointments to see a HCP, they are asked to disclose the reason for that appointment. The HCP then plans for the appointment, which often requires intensive preparation. When the patient does not show up for the appointment, the time taken for preparation is wasted and HCPs described feeling unproductive. Likewise, when patients booked an appointment for a specific issue and then disclosed multiple concerns during that appointment time, participants also reported feeling unproductive because depending

on the severity of the disclosure, the next patient would be delayed. Participant 5 recalled this type of situation:

Well, because people will come in and tell the front staff that they're, you know, in for a rash, and then you go to touch their arm and they're like, "Oh, I've been having pain in my left arm and heaviness." But only as they're leaving, right. So like you've already had their appointment and you're supposed to be on to the next person.

Participant 1 explained that when this happened, one had to re-prioritize their workload and try their best to deal with what was at hand in the present moment. If that could be accomplished, feelings of productivity were restored:

But you can't be too rigid around that because you're speaking with patients. And if a patient is pouring their heart out to you, just because their appointment time is over, you know, you have to think of a way to gently sort of close that off...whatever you're working on has to take a back seat. I think I always struggle a little bit with it but I try very hard to just prioritize. So you know, what is the most immediate concern and what can be left? So it's breaking it down into little pieces...I think it's the same with, you know, what makes my day productive.

In many instances, it took participants years to come to the realization that these circumstances did not have to affect their productivity unfavorably. Instead they learned that when unforeseen incidents happened, it was important to take time to re-focus and re-prioritize their day.

The impact of hierarchy and bureaucracy. Hierarchy and bureaucracy were noted by more than half of the participants (60%) as major barriers to personal productivity, as they also were in the discussion of barriers to IPC. Similarly, the types of hierarchy and bureaucracy described by participants were comparable to those mentioned

in relation to IPC: discordant management; class divisions between professions; negative influences from outside sources; and, confining and nonsensical policies.

Some participants disclosed that when they turned to those in authority to help solve issues that prevented them from being productive, such as colleagues who were not meeting work expectations, unmanageable workloads, or ineffectual policies, they were met with indifference. When recounting an incident in which help was being sought from a manager in relation to a lackadaisical colleague, Participant 2 revealed:

Like basically that's the frustration, is that I try to deal with it but I'm not really getting anywhere because these people don't work for me... So I have no real authority in saying, "Look, you do this or, you know, there's some consequences." I can't do that. All I can do is complain to my boss, who will complain to their boss, who might or... Right? And what I'm finding in this region is that there's a great deal of... a huge amount of complacency or burnout. It is bad. But it's also there are so many levels of management and bureaucracy. Everyone seems to be protecting their own job.

Participant 7 shared that despite best intentions to provide efficient, safe, quality care, hierarchy and bureaucracy ruled and thus had a profound effect on personal productivity:

You can say this is what we're going to do. But really if the person that can pull the rug out from underneath you or fit it nicely under your feet isn't onboard with you and isn't in the same line of thought process, that to me is the biggest barrier to feeling productive or not feeling productive.

Participant 11 substantiated that a purely bureaucratic approach to healthcare decision-making made no sense to those actually delivering said care:

And the regulations and the policies are different. So the regulation is saying A, B, C, but the policy is D. And they don't care about how much time that takes

within the healthcare delivery system to accommodate things that really should be just addressed. And you know, it's about budgets. They don't care.

As is heard in participants' voices, there is much pride in their ability to be productive while meeting the needs of patients and much frustration when something prevents them from doing so. Similar sentiments were shared when the discussion turned to team productivity and IPC.

When participants were asked to describe what it "looked like" when their team was productive, their responses could be clustered under two main themes: 1) *Right Person-Right Skills for Patient-Centred Care* and 2) *Collaboration Leads to Higher Productivity*.

Right Person-Right Skills for Patient-Centred Care. Patient-centred care was described by the majority of participants (80%) as the quintessential goal of health care teams and the barometer of productivity. In order to reach this goal, teams needed to collaborate, which would ultimately make them more productive, which in turn allowed them to be more patient-centred. It was described as a symbiotic relationship – without one, there could not be the other. Indeed, Participant 4 was quite emphatic that there really was no other choice when it came to team productivity:

So I think, you know, in order for us to be efficient, we need to work well. We need to figure that out. We need to figure out that, you know, our best work together will be the best for this client. And there is no other ifs, ands, or buts about it.

Participants also portrayed productivity as time-sensitive, one-stop shopping that improved the patient encounter. Participant 4 depicted the idyllic patient experience as being able to access the most appropriate HCP for the patient's needs in one clinic visit:

I know we're on a time limit but you [the patient] don't get kicked out of the door in 5 minutes. You can talk, you can go to the dietician, you can come back and see the dietician, you can see the NP. If you don't have a family doctor, you can get, you know, prescriptions. We have a doctor involved. You can see the pharmacist. You can have a social worker not only help with what may be immediately going on but that could, you know, look at your Social Service kind of thing, help navigate you through some of these systems or liaise with some of these others.

In fact, another participant from the same CHC as Participant 4 shared that if patients wanted an appointment with their physician yet that particular physician was fully booked, that another physician from the same CHC would see that patient so that they would not have to wait for another appointment. It is important to note that this was not the case in other CHCs involved in the study as other participants described reluctance by HCPs to overstep their boundaries and supersede another HCP's patient. Moreover, although it was important to participants that patients be active members of their own care; none of them went so far as to suggest that patients were actual members of the health care team but rather the recipients of care that the team provided in partnership with them.

In order to offer the finest patient-centred care possible, while at the same time yielding increased team productivity, participants insisted that patients needed to be seen by the HCP who was best-suited to address their health care needs. When HCPs had the requisite knowledge and skills and were able to work to their optimum scope of practice, it allowed for a seamless flow of patient care. Participant 5 provided an example of how this scenario played out in reality:

I worked in collaboration with the family practice nurse. She would see them first, do their blood pressure, ask them what meds they were on, get that clarified if we needed to get some from pharmacy list or whatever. And then I would go in and see them, and do the prescription, write them blood work if it hadn't been done like within...you know. And also remind them about all those other things. So even though it was quicker appointments, we were doing them more efficiently and effectively with two of us, you know, than we would have.

This same participant also noted that when working in this manner there was never a sense of isolation or a feeling like “it’s your problem” because in this team everyone was willing to do what they could within their scope to address the patient concern.

Remarkably, another participant from the same CHC stated that she/he could not speak about her/his team’s productivity as she/he had no idea if team members were productive or not. In other words, she/he identified team productivity as the accumulation of individual HCP productivity (read: silos) rather than as a collective entity:

I wouldn't know really if the rest of the team is being productive on any given day or not...I find some of the rest of us get more focused in on this is what I need to do, and this is what I need to do. And if it's not all done then we didn't help them [patients].

Participant 8 explained that there was a need to ensure that the CHC had the right number and combination of staff to attend to patient needs otherwise productivity would suffer. Determining who the right person was for the job at hand required effort on the part of each team member to ensure that others on their team knew of their knowledge, skills, and scope of practice so that they could be utilized to the best of their abilities.

Participant 5 suggested that it was not only important to promote yourself to others but to reciprocally learn about others:

Knowledge and education of the particular role that you yourself are in should almost be a constant communication like with regards to educating ...family, friends, community members, anybody you can on what you do, how you can do it. And again, within the team as much as possible. And if you're not aware of other people's scopes in your own team, to really ask them, educate yourself with the information that's available so that you know what everybody is capable of or should be capable of.

Participant 4 described the energy that went into making sure her/his team was aware of her/his abilities:

I sold myself a lot when I came in here, and I recognize that some people when they think social workers, they think we take people's kids away and all that stuff...they would never even have considered that I would work with somebody on maybe anxiety...So the people I did get [patients], I went to them [team members] as much as possible and said, "Listen, guys, I have this. He has this but he really needs to see a nurse or he really needs to see a dietician." So I got them involved with my clients and then it ended up being that they would ask me.

By taking a proactive approach to involve others, Participant 4 not only developed trust and built rapport with the rest of the team but also facilitated IPC, which as noted below was perceived to increase team productivity.

Collaboration Leads to Higher Productivity. Close to three-quarters (73%) of participants contend that IPC led to increased productivity and increased cost-savings to the health care system. As Participant 1 articulated:

I think it's just, you know, more people working together can get more done than when you're just working within your silo. And working together, you can be more productive. And by taking pieces, each one taking a piece and pulling their weight, that's going to improve the productivity.

When discussing productivity, at times the conversation turned to health care costs and the impact that IPC may have. Participant 15 suggested that on paper it might appear that having a variety of HCPs in any given setting increased costs; however, in due course it could actually decrease monetary strain on the system:

And our nurses are [DHA] nurses. So it's costing [DHA] to have nurses in this practice. And so that's more costly than if they weren't here. But you know, with patient X, Y or Z who because the nurse said we've got to think about skin care and pressure, you know, that's on the top of my agenda here... We work together to put things in place to prevent perhaps a skin issue. And then that person doesn't end up in hospital for 4 months trying to heal a huge sacral ulcer.

It was important for a number of participants to prevent patients from being admitted to hospital, not only for benefit of health system cost-savings, but mostly for the benefit of the patient.

As was revealed earlier about participants' definitions of IPC, good communication was paramount. Not surprisingly, this theme reappeared when they spoke about team productivity because IPC was perceived as the vehicle through which to develop efficient and effective methods to deliver care. Some participants described themselves as the 'pivotal hub' for team communication owing to their length of time on the team as well as the length of time they had in the community in which they lived and worked. Participant 10 explained that communication was vital to a sense of productivity:

We talked about these patients and we came to some conclusions, and the process seemed to work, and you feel good about it. The team is effective when they're interacting well and honestly and with respect.

As a final point, most participants maintained that in order to work interprofessionally, HCPs had to learn how to do so. Yet when questioned whether they

had been exposed to the knowledge and skills attributed to IPC some participants intimated that they had previous opportunity to attend IPE sessions, while others suggested that they had not. Nonetheless, all participants used terminology to define IPC in ways that linked closely with language found in the literature. For example, participants talked about the importance of understanding roles and responsibilities of other team members and appropriately including them in patient care planning; the value of good communication within the team; the impact of knowing one another on a more personal level; and, recognition of the influence that hierarchy has in their ability to collaborate.

Participants were also able to articulate how working collaboratively could possibly affect personal and team productivity. They identified the significance of being able to achieve the best possible outcomes for patients by making sure that the right people with the right skills were in place to meet patient needs. Participants also shared the ways in which they made sure they were productive – from making lists to managing shifting priorities. Throughout all of the interviews, the importance of good communication within the team was not to be understated. And finally, hierarchy and bureaucracy were considered detrimental not only to IPC but also to productivity.

Research Question 2

After completion of the first interview, participants were asked to assess themselves against the competencies that are related to IPC, using the Interprofessional Collaborator Assessment Rubric (ICAR) (Curran et al., 2011). Peer-assessments were not conducted because the number of participants at each site was too small to allow for randomization of HCPs doing the assessments or to ensure confidentiality. The ICAR is

comprised of six competency categories: *communication, collaboration, collaborative patient/client-family-centered approach* (for brevity, shortened to *patient/family-centered approach* throughout the remainder of this manuscript), *roles and responsibility, team functioning*, and *conflict management/resolution* (for brevity, shortened to *conflict management* throughout the remainder of this manuscript). As the reader will recall, each competency category consists of a range of behavioural indicators, describing the knowledge and skills attributed to that particular competency category (Appendix M).

The ICAR survey was distributed electronically to participants via the Opinio platform, where the BIs under the six competency categories were structured as individual questions for participants to score. The ICAR Opinio survey was set up as a nine-point Likert scale with scores ranging from ‘*Well Below Expected*’ (1-2), ‘*Below Expected*’ (3-4), ‘*Expected*’ (5), ‘*Above Expected*’ (6-7), and ‘*Well Above Expected*’ (8-9). There was also an option to choose ‘*Not Observed*’ (N/O) if the participant felt that they had no opportunity to/did not perform the BI. Given the description of possible choices, scores below five (i.e.; ‘*Well Below Expected*’ (1-2) or ‘*Below Expected*’ (3-4)) would indicate that the respondent was not performing the BI related to the competency, whereas any score at or above five (i.e.; ‘*Expected*’ (5), ‘*Above Expected*’ (6-7), and ‘*Well Above Expected*’ (8-9)) signified that the respondent was performing the BI.

Findings related to the ICAR self-assessments will be presented in the following manner: descriptive statistics for competency categories and BIs; Cronbach’s alpha and pointwise-biserial correlations of the competency categories; pointwise-biserial correlations of the BIs; and, a series of sample size calculations with finite population correction factors applied.

Descriptive statistics of the competency categories. Mean scores for all competency categories (Table 1) ranged from 6.38 [*Mdn* = 6.0; *SD* = 1.25] to 7.05 [*Mdn* = 7.0; *SD* = 1.39] with a median score of 7.0 for all survey responses, suggesting that overall participants believed themselves to be demonstrating the knowledge and skills attributed to each competency category at the ‘*above expected*’ level.

Table 1

Descriptive statistics of the ICAR competency categories

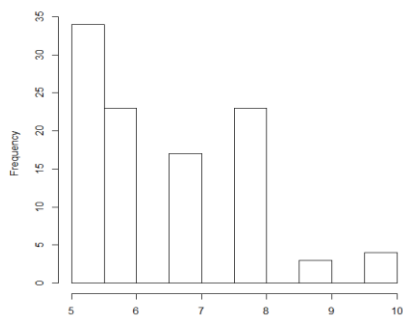
Competency Category	\bar{x}	<i>Mdn</i>	<i>SD</i>	%CV ^a	95% CI	90% CI	80% CI	Response Count
Communication	6.38	6.0	1.25	.196	+/- 0.25 [6.13,6.63]	+/- 0.21 [6.17,6.59]	+/- 0.16 [6.22,6.54]	100
Collaboration	6.70	6.5	1.45	.216	+/- 0.38 [6.32,7.08]	+/- 0.32 [6.38,7.02]	+/- 0.25 [6.45,6.95]	56
Patient-Family Centred Approach	7.05	7.0	1.39	.197	+/- 0.37 [6.68,7.42]	+/- 0.31 [6.74,7.36]	+/- 0.24 [6.81,7.29]	56
Roles & Responsibilities	6.72	7.0	1.27	.189	+/- 0.25 [6.47,6.97]	+/- 0.21 [6.51,6.93]	+/- 0.15 [6.57,6.87]	98
Team Functioning	6.89	7.0	1.15	.167	+/- 0.26 [6.63,7.15]	+/- 0.22 [6.67,7.11]	+/- 0.16 [6.73,7.05]	73
Conflict Management	6.43	6.0	1.17	.182	+/- 0.30 [6.13,6.73]	+/- 0.25 [6.18,6.68]	+/- 0.19 [6.24,6.62]	60

Note: ^aCV = Coefficient of Variation

The mean score was greater than the median (positive skew) in four competency categories (*communication* [\bar{x} = 6.38; *Mdn* = 6.0; *SD* = 1.25], *collaboration* [\bar{x} = 6.70; *Mdn* = 6.5; *SD* = 1.45], *patient/family-centred approach* [\bar{x} = 7.05; *Mdn* = 7.0; *SD* = 1.39], and *conflict management* [\bar{x} = 6.43; *Mdn* = 6.0; *SD* = 1.17] (Table 1), indicating that scores were clustered around the lower end of the ‘*above expected*’ level (≥ 6) on the Likert scale. These results may signify that the majority of respondents believed that they were performing the knowledge and skills attributed to these competencies at a basic

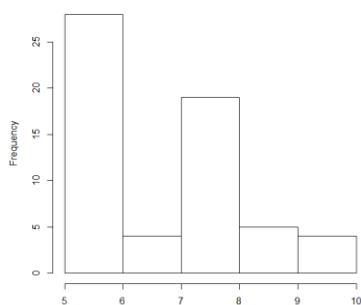
level at the very least. Given the qualitative findings presented in relation to the first research question, these results are somewhat surprising. In the first interview, participants were very clear about their belief that communication was critical to collaboration and that collaboration was crucial in their ability to meet patient/family-centered goals. In fact, meeting patient expectations and improving outcomes was described as their *raison d'être*. If this is the case, then it might be anticipated that these scores would be higher in these competency categories, presuming that people actually do what they say they do.

Histograms of each of these positively skewed competency category scores are captured in Figures 7 to 10.



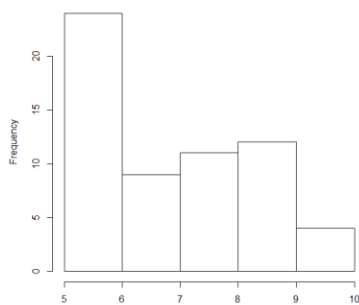
Range of ICAR Scores (10 represents N/O)

Figure 7: Histogram of Communication competency category



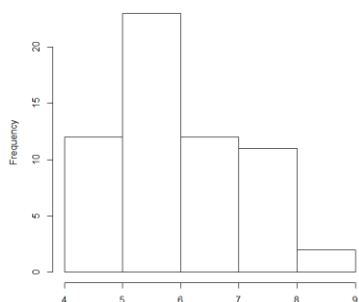
Range of ICAR Scores (10 represents N/O)

Figure 8: Histogram of Collaboration competency category



Range of ICAR Scores (10 represents N/O)

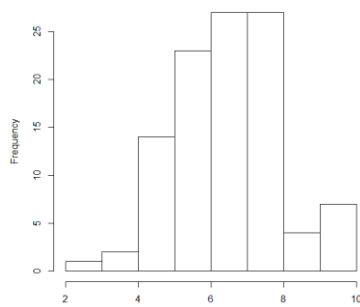
Figure 9: Histogram of *Patient/family-centered Approach* competency category



Range of ICAR Scores (10 represents

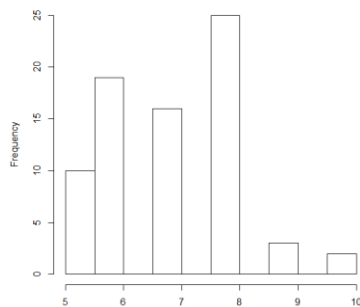
Figure 10: Histogram of *Conflict Management/Resolution* competency category

Mean scores for the remaining two competency categories, *roles and responsibilities* and *team functioning* were only slightly less than their median scores [$\bar{x} = 6.72$; $Mdn = 7.0$; $SD = 1.27$ and $\bar{x} = 6.89$; $Mdn = 7.0$; $SD = 1.15$, respectively] (Table 1), indicating that more respondents scored themselves in the higher range (*‘above expected’* to *‘well above expected’*) on the Likert scale. These results are in keeping with findings from the first interview where participants revealed the importance of understanding and articulating their roles and the roles of others on their team in order to improve team functioning. Histograms for these competency categories revealed a negligible negative skew (Figures 11 and 12, respectively), owing to the minimal difference between the mean and median scores.



Range of ICAR Scores (10 represents N/O)

Figure 11: Histogram of Roles and Responsibilities competency category



Range of ICAR Scores (10 represents N/O)

Figure 12: Histogram of Team Functioning competency category

The Coefficient of Variation (CV), calculated as the ratio of the standard deviation to the mean, describes the dispersion of a variable independent of its unit of measure; the higher the CV, the greater the dispersion (Institute for Digital Research and Education, 2015). Low variance is established when the $CV < 1$, while high variance is recognized when $CV > 1$ (Ready Ratios, 2011-2015). Since the mean and SD of a variable are expressed in the same units, when the ratio of the two is determined, the units cancel out thus rendering the CV unit-less, which provides great benefit in allowing CVs to be compared to one another in ways that SD often cannot due to the possible variation in their units of measure. When analyzing the competency category CVs (Table 1), all were well below the threshold of one, denoting low variance and suggesting that participants'

scores did not diverge greatly from the mean. Of all competency categories the greatest dispersion was assigned to *collaboration* [CV = .216], while *team functioning* had the least amount of dispersion [CV = .167], suggesting that even though there were more discrepancies in how each participant scored themselves in relation to how well they collaborated, they still believed that as a team they functioned collaboratively.

For every competency category mean score, confidence intervals (CI) were calculated for three confidence levels (95%, 90%, and 80%) (Table 1). The CI is the range of likely values for the population parameter based on the point estimate +/- the margin of error within a desired level of confidence (Boston University, n.d.). In many health-related contexts, a 95% CI is conventional; however, this is an arbitrary value and others can be used depending on context and researcher choice. It is for this reason that a series of calculations were estimated. It is important to note that due to the small sample size, wider intervals would be generated. Given the calculations, based on the sample size $n=15$, we can be 95% confident that the true population mean for each of the competency categories lies between the following intervals: *communication* [6.38 +/- 0.25]; *collaboration* [6.70 +/- 0.38]; *patient/family-centered approach* [7.05 +/- 0.37]; *roles and responsibilities* [6.72 +/- 0.25]; *team functioning* [6.89 +/- 0.26]; and, *conflict management* [6.43 +/- 0.30] (Table 1). All of the CIs are positioned at the 'above expected' level.

Descriptive statistics of the behavioural indicators. Of the 465 possible responses (number of BIs on the ICAR [$n=31$] multiplied by the number of study participants [$n=15$]), one response was missing and 21 responses were answered as 'not observed' ('N/O'), for a total response count of 443. Notably, 20 of the 21 'N/O'

responses were scored by the same individual who, in their role, had less patient/family contact than the other participants. Given their role, the 'N/O' response was reasonable for some of the BIs that involved care planning and/or provision of care (i.e.; BI 9, 11-15, 21, 22) (Table 2); yet, the remainder of the BIs that were scored as 'N/O' are puzzling because these knowledge and skills are not dependent upon relationships with patients but instead are more aligned with how one functions within a team. Despite this participant's claim that she/he worked collaboratively, these scores suggest otherwise.

Of the 443 responses, 94 (21%) were scored at exactly 5 (*'Expected'*), while 344 (78%) were scored at 6 or above (*'Above Expected'* to *'Well Above Expected'*) on the Likert scale, suggesting that participants believed that they performed the vast majority (99%) of the BIs attributed to the IPC competency categories. There were only five responses (1%) that were scored below 5; of these, four received a score of 4 (*'Below Expected'*), while one was scored at 2 (*'Well Below Expected'*). These scores were attributed to four participants, where one respondent gave two scores below 5 (scores of 4 and 2) (Table 2).

No individual participant averaged a score below five. One participant had the lowest overall average score of 5.32, as all of their responses were either 5 or 6 (*'Expected'* to *'Above Expected'*) on the Likert scale. In contrast, the highest average score was 8.1, as this participant scored themselves at 8 or 9 (*'Well Above Expected'*) for every BI. It is worth mentioning that three of the low scores were situated under the *Roles and Responsibilities* competency category, while the other two came from the *Conflict Management/Resolution* competency category. A review of each competency category follows next.

Table 2

Descriptive Statistics of the ICAR Competency Behavioural Indicators

ICAR Competency Behavioural Indicators	\bar{x}	<i>Mdn</i>	<i>SD</i>	<i>CV</i> ^a	% scores < 5	% 'N/O' ^b
Communication						
Confident, assertive, respectful manner	6.43	6.5	1.16	.180	0	6.7 (n=1) ^c
Communicates opinion/views	6.71	6.5	0.99	.148	0	6.7 (n=1) ^c
Responds in a timely manner	6.73	6	1.44	.214	0	0
Uses verbal/non-verbal strategies appropriately	6.20	6	1.21	.195	0	0
Logical and structured manner	6.27	6	1.28	.204	0	0
Explains discipline-specific jargon ^c	6.15	5	1.41	.228	0	6.7 (n=1) ^c
Uses strategies to communicate with individuals with impairments	6.14	5.5	1.35	.220	0	6.7 (n=1)
Collaboration						
Establishes collaborative relationships	6.79	8	1.48	.218	0	6.7 (n=1) ^c
Integrates information/perspectives from others in planning/providing patient care.	6.71	6.5	1.33	.197	0	6.7 (n=1) ^c
Shares information with other providers	6.86	6.5	1.46	.213	0	6.7 (n=1) ^c
Seeks approval of the patient when information is shared	6.43	5.5	1.65	.257	0	6.7 (n=1) ^c
Patient Family Centred						
Seeks input from patient/family	6.86	6.5	1.46	.213	0	6.7 (n=1) ^c
Promotes/integrates patient/family circumstances, beliefs and values into care plans	6.86	6.5	1.41	.205	0	6.7 (n=1) ^c
Shares options/information with patients/families	7.14	7	1.41	.197	0	6.7 (n=1) ^c
Advocates for patient/family as partners in decision-making process	7.36	7.5	1.39	.189	0	6.7 (n=1) ^c
Roles and Responsibilities						
Describes own roles/responsibilities	6.64	7	1.01	.152	0	6.7 (n=1) ^c
Promotes/includes the roles/responsibilities of all necessary care providers	6.86	7	1.23	.180	0	6.7 (n=1) ^c
Demonstrates professional judgment	7.00	7	0.96	.137	0	6.7 (n=1) ^c
Accepts responsibility for failure of goals	6.64	7.5	1.78	.268	6.7 (n=1) ^d	6.7 (n=1) ^c
Accepts responsibility for individual actions	7.07	7	1.00	.141	0	6.7 (n=1) ^c
Explains own scope of practice, code of ethics, standards and/or clinical guidelines	6.50	6.5	1.45	.224	6.7 (n=1)	6.7 (n=1) ^c
Shares evidence-based/best practice with others	6.35	6	1.39	.219	6.7 (n=1)	6.7 (n=1) ^c
Team Functioning						
Recognizes relationship between team functioning and quality of care	7.29	7.5	1.20	.165	0	6.7 (n=1) ^c
Recognizes strategies to improve team function	6.60	7	0.99	.149	0	0
Shares/alternates leadership with others	6.79	7	1.05	.155	0	6.7 (n=1) ^c
Recognizes themselves as part of a team	6.87	7	1.36	.197	0	0
Contributes to interprofessional team discussions	6.93	7	1.16	.168	0	0
Conflict Management						
Seeks perspectives/opinions of others	6.40	6	1.30	.203	6.7 (n=1)	0
Seeks clarification in a respectful manner	6.73	7	1.33	.198	0	0
Uses active listening when others are speaking	6.47	6	0.99	.153	0	0
Uses appropriate conflict resolution strategies	6.13	6	1.06	.173	6.7 (n=1) ^d	0

Note: Competency language adapted from the ICAR survey (Curran et al., 2010)

^aCV = Coefficient of Variation. ^b'N/O' = Not Observed. ^cResponses from same participant. ^dResponses from same participant. ^eOne answer missing.

Communication. Mean scores for the BIs under this competency category ranged from 6.14 [*Mdn* = 5.5; *SD* = 1.35] to 6.73 [*Mdn* = 6.0; *SD* = 1.44], indicating that participants believed themselves to be communicating at an ‘*above expected*’ level. This is in keeping with the importance that participants placed on the communication process when working with their teams. The lowest scoring BIs in this category were in relation to using verbal/nonverbal communication strategies appropriately in a variety of situations (BI 4), the ability to explain discipline-specific terminology/jargon (BI 6), and their capacity to use strategies that are appropriate for communicating with individuals with impairments (BI 7) (Table 2). Given the importance placed on communication as well as in advancing patient outcomes, as expressed by participants, these would be important skills for HCPs to improve upon. Positive skew was noted in all but one BI (BI 1) suggesting that in general participants scored themselves at the lower end of the Likert scale but still at the ‘*expected*’ to ‘*above expected*’ range. CV values for all BIs in this category ranged from .148 to .228, well below the threshold of one, denoting low variance where scores did not diverge greatly from the mean. Of all BIs in this category, the greatest dispersion is assigned to their ability to explain discipline-specific jargon (BI 6), while the capacity to communicate their opinion and pertinent views on patient care with others (BI 2) had the least amount of dispersion. No responses were scored below 5 (‘*expected*’) on the Likert scale; four of the BIs were scored as ‘*N/O*’ by two different participants (Table 2).

Collaboration. Mean scores ranged from 6.43 [*Mdn* = 5.5; *SD* = 1.65] to 6.86 [*Mdn* = 6.5; *SD* = 1.46], indicating that the majority of participants believed themselves to be collaborating at the ‘*above expected*’ level. Once again, this is in accordance with

what participants shared about their understanding of and ability to be collaborative. The lowest scoring BI in this category was in respect to seeking approval from the patient or designated decision-maker when information was shared with others (BI 11). It is interesting that when discussing collaboration very little was said about the role of the patient or family within the team, insinuating that the act of collaboration is reserved for team members and, as was noted previously, patients and family were recipients of care rather than members of the team. Negative skew was noted in one BI (BI 8) where the majority of participants (n=8) scored themselves at the '*well above expected*' range for establishing collaborative relationships. CV values for the competency category ranged from .197 to .257, still well below the threshold of one, but signifying that more variance in the scores deviated from the mean. The greatest dispersion can be assigned to participants' seeking approval from the patient/family to share health-related information, whilst integrating information and perspectives from others when planning and providing patient care (BI 9) had the least amount of dispersion. No responses were scored below 5 ('*expected*') on the Likert scale; all of the BIs were scored as '*N/O*' by one participant (Table 2).

Patient/family-centered approach. Three of the four BIs (BI 12, 13, and 14) in this category were positively skewed. All BIs were located in the '*above expected*' range, where mean scores ranged from 6.86 [*Mdn* = 6.5; *SD* = 1.46] to 7.36 [*Mdn* = 7.5; *SD* = 1.39], a finding that is not surprising given the importance that 89% of participants placed on achieving and contributing to positive patient outcomes during the interview. Seeking input from patients and their families and integrating patient/family circumstances, beliefs, and values into the plan of care were scored only slightly lower (*Mdn* = 6.5 for

both) than was sharing options and information with and advocating for patients and families (*Mdn* = 7.0 and 7.5, respectively). This may be a reflection of earlier scores that suggested that patients/families were not seen as actual team members and as such their input was not required to develop a plan of care. CV values in this category ranged from .197 to .213, still well below the threshold of one; where the greatest dispersion was found in seeking input from patients and families. Again, no responses were scored below 5 (*‘expected’*) on the Likert scale; all of the BIs were scored as *‘N/O’* by the same individual (Table 2).

Roles and responsibilities. The lowest mean score in this category was 6.35 [*Mdn* = 6.0; *SD* = 1.39] in the ability to share evidence-based or best-practice discipline-specific knowledge with others (BI 22), while the highest mean score was noted to be in relation to participants’ abilities to accept responsibility for individual actions (BI 20) [\bar{x} = 7.07; *Mdn* = 7; *SD* = 1.00]. Five of the seven BIs (BI 16 to 20) had median scores at or above 7, indicating that a large proportion of participants believed they were at *‘above expected’* levels for describing and promoting their own and others roles, demonstrating professional judgment, and accepting accountability for failure of goals and individual actions. The mean and median scores of two BIs (BI 18 and 21) were identical with scores of 7 and 6.5, respectively, while two BIs (BI 20 and 22) were positively skewed. The remainder (BI 16, 17, and 19) were negatively skewed, suggesting that participants’ observations relating to roles and responsibilities varied depending on the subject matter of the BI. CV values in this category ranged from .137 to .268, where the greatest dispersion was found in the acceptance of personal responsibility for the failure of collaborative goals. The large variation associated with this BI was due in part to one

participant scoring themselves in the *'well below expected'* range. Reflecting back on this participant's interview, this score is not at all unexpected as this individual unreservedly expressed frustration with poor communication and hierarchy within the team. This individual became quite emotional and expressed a personal loss of control within their scope of practice due to the hierarchy in the team; therefore, it is not at all surprising that there would be no ownership for poor outcomes as this individual felt left out of any decision-making. Three responses, by three different participants, were scored below 5 (*'expected'*) on the Likert scale; all of the BIs were scored as *'N/O'* by one participant (the same person who had scored themselves in this way for 20 of the BIs) (Table 2).

Team functioning. Mean scores for all BIs in this competency category were at or above 6.60 (6.60 [*Mdn* = 7.0; *SD* = 0.99] to 7.29 [*Mdn* = 7.5; *SD* = 1.20]), evidence of participants' beliefs regarding their ability to contribute to effective team functioning with the aim of improving collaboration and the quality of care. Being able to recognize the relationship between team functioning and quality of care was scored in the *'well above expected'* level, a finding that was not at all extraordinary given the prominence of achieving positive patient outcomes that were revealed in the first interview. CV values in this category ranged from .149 to .197, once more well below the threshold of one. The greatest dispersion was noted in the ability to recognize oneself as part of a team, where half of the participants scored themselves at or above the *'well above expected'* level. There were no responses that scored below 5 (*'expected'*) on the Likert scale; while only two BIs were scored as *'N/O'* by the same individual (Table 2).

Conflict management. While still at an *'above expected'* level, median scores of BIs in this competency were lower than in any other competency on the ICAR (three of

the four were scored at 6.0). Although participants did not speak specifically about conflict within their teams they did talk about the need for respect, open communication, and active listening which are all components of conflict resolution. And while the majority of participants alluded to how they dealt with disagreements, one participant denied ever experiencing conflict within their team. For all BIs, mean scores ranged from 6.13 [*Mdn* = 6.0; *SD* = 6.0] to 6.73 [*Mdn* = 7.0; *SD* = 7.0]. Three of the four BIs (BI 28, 30, and 31) in this category were positively skewed; even so, all of the BIs were at the *'above expected'* range. CV values in this category ranged from .153 to .203, still well below the threshold of one. The greatest spread occurred in the ability of participants to seek the perspectives and opinions of others, while the least dispersed transpired in their capacity to use active listening skills. Two responses, from two different participants, were scored below 5 (*'expected'*) on the Likert scale; one individual scored themselves at the *'below expected'* level for seeking the perspectives and opinions of others, while another scored themselves *'below expected'* for their ability to use appropriate conflict resolution strategies to manage and/or resolve conflict. This is in keeping with what this participant divulged during the first interview, sharing that they did not feel supported nor listened to by those on their team with whom they had a disagreement. None of the BIs were scored as *'N/O'* (Table 2).

Cronbach's alpha and biserial correlations of the competency categories.

Cronbach's alpha, the most widely used method for assessing internal consistency of a scale, describes the extent to which all items on a scale measure the same construct and is associated with inter-item correlation (Tavakol & Dennick, 2011). It is expressed as a number between 0 and 1, where 0 represents no relationship and 1 indicates full

relationship between items. A Cronbach's alpha between 0.7 and 0.8 is considered respectable and is indicative of a strong positive relationship; anything above 0.8 is considered very good (Sim & Wright, 2000). It is important to consider; however, that an alpha coefficient greater than 0.9 may suggest redundancy in scale items (Steiner & Norman, 2008). Because an instrument may measure more than one construct, it is recommended that alpha be calculated for each of the concepts rather than just for the entire scale (Tavakol & Dennick, 2011). Cronbach's alpha calculations have been computed for the competency categories as well as for the entire ICAR survey (Table 3).

Table 3
Cronbach's Alpha and Biserial Correlations of the Competency Categories

Competency Categories	Cronbach's Alpha	Pointwise biserial correlation
Communication	0.94	0.96
Collaboration	0.95	0.92
Patient-Family Centred Approach	0.97	0.87
Roles & Responsibilities	0.86	0.92
Team Functioning	0.94	0.84
Conflict Management	0.92	0.83

The pointwise-biserial correlation, also known as item-total correlation, can be regarded as a question-by-question equivalent of Cronbach's alpha used to approximate the degree of relationship between a naturally occurring dichotomous nominal scale (i.e.; correct vs. incorrect scores of a test item, coded as 1 and 0, respectively) and an interval or ratio scale (the total score on the test/survey). Pointwise-biserial values can range from -1.0 to + 1.0 and are used to approximate item discrimination (Brown, 2001; Considine & Thomas, 2005; Varma, 2006). The minimum threshold for a 'good' item is typically set

at 0.25 (Varma, 2006). Items with pointwise-biserial correlations lower than this threshold warrant examination as they may be worded ambiguously or may not relate to the content of the tool (indicating multidimensionality of items). In this study, the dichotomous nominal scale is denoted by scores below five (*expected*) on the Likert scale (coded as 0) and those above five (coded as 1) and the interval scale refers to both the competency category scores and the overall ICAR scores.

Cronbach's alpha for the entire ICAR survey was 0.980, a very high value indicating that it would likely be possible to remove individual questions without losing overall score information. As well, as can be seen in Table 3, Cronbach's alpha values are quite high for all competency categories, with *roles and responsibilities* having the lowest internal consistency (still very high at 0.86), and *patient/family-centred approach* with the highest at 0.97. Examination of the competency category pointwise-biserial correlations also shows a very high degree of correlation between items (Table 3), with *conflict management* having the lowest agreement with the overall survey (0.83, still high), and *communication* with the highest agreement (0.96). These high Cronbach's alpha and pointwise biserial correlation values suggest that all competency categories are related and measure the same construct, speaking to the reliability and construct validity of the ICAR.

Pointwise-biserial correlations of the BIs. Pointwise-biserial correlations for each BI compared to competency category scores and overall survey scores are displayed in Table 4. The higher the pointwise-biserial correlation, the more related the question/BI is to the particular competency category and/or to the overall survey.

Table 4

Biserial Correlation of the Behavioural Indicators

ICAR Competency Behavioural Indicators [n=31]	Pointwise biserial correlation with competency score	Pointwise biserial correlation with overall score
Communication		
BI 1: Confident, assertive, respectful manner	0.915	0.901
BI 2: Communicates opinion/views	0.861	0.909
BI 3: Responds in a timely manner	0.704	0.684
BI 4: Uses verbal/non-verbal strategies appropriately	0.969	0.887
BI 5: Logical and structured manner	0.895	0.867
BI 6: Explains discipline-specific jargon	0.844	0.854
BI 7: Uses strategies to communicate with individuals with impairments	0.882	0.719
Collaboration		
BI 8: Establishes collaborative relationships	0.918	0.924
BI 9: Integrates information/perspectives from others in planning/providing patient care.	0.947	0.897
BI 10: Shares information with other providers	0.931	0.870
BI 11: Seeks approval of the patient when information is shared	0.939	0.845
Patient Family Centred Approach		
BI 12: Seeks input from patient/family	0.932	0.893
BI 13: Promotes/integrates patient/family circumstances, beliefs and values into care plans.	0.947	0.816
BI 14: Shares options/information with patients/families	0.989	0.875
BI 15: Advocates for patient/family as partners in decision-making process	0.941	0.780
Roles and Responsibilities		
BI 16: Describes own roles/responsibilities	0.851	0.843
BI 17: Promotes/includes the roles/responsibilities of all necessary care providers	0.850	0.858
BI 18: Demonstrates professional judgment	0.871	0.868
BI 19: Accepts responsibility for failure of goals	0.771	0.705
BI 20: Accepts responsibility for individual actions	0.770	0.708
BI 21: Explains own scope of practice, code of ethics, standards and/or clinical guidelines	0.636	0.689
BI 22: Shares evidence-based/best practice with others	0.558	0.671
Team Functioning		
BI 23: Recognizes relationship between team functioning and quality of care	0.914	0.809
BI 24: Recognizes strategies to improve team function	0.924	0.706
BI 25: Shares/alternates leadership with others	0.779	0.714
BI 26: Recognizes themselves as part of a team	0.941	0.692
BI 27: Contributes to interprofessional team discussions	0.946	0.850
Conflict Management		
BI 28: Seeks perspectives/opinions of others	0.895	0.716
BI 29: Seeks clarification in a respectful manner	0.951	0.863
BI 30: Uses active listening when others are speaking	0.836	0.772
BI 31: Uses appropriate conflict resolution strategies	0.903	0.649

In relation to the competency category scores, all pointwise-biserial correlations indicated a strong positive relationship with scores ranging from 0.704 to 0.989, with the exception of two BIs (BI 21 and 22) located under the *roles and responsibility* competency category. The ability to explain one's scope of practice, code of ethics, standards, and/or clinical guidelines and the ability to share best practices received scores of 0.636 and 0.558, respectively, and while lower than the others are still within the acceptable range (i.e.; > 0.25). It is important to note that the exceptionally high scores may indicate overlap of concepts being measured and therefore less item discrimination.

The pointwise-biserial correlations with the overall ICAR survey scores, reveal only five BIs (BI 3, 21, 22, 26, 31) under four competency categories (*communication, roles and responsibility, team functioning, and conflict management*) that had scores less than 0.70, yet they were also above the 0.25 threshold. Again, because the majority of pointwise-biserial scores are well above the 0.70 mark, these BIs may be less discriminatory in relation to their associated competencies. When faced with high pointwise-biserial correlation scores, one must consider whether there is redundancy in scale items and whether that redundancy actually has negative effects on the outcome being observed. In this case, there may in fact be redundancy in the BIs but each was found to be critical of the knowledge and skills related to each competency category as was evidenced in the original ICAR survey development study (Curran et al., 2011). As is obvious in the pointwise biserial values of the BIs, once again the construct validity of the ICAR tool is demonstrated.

Sample size calculations with finite population correction factors. Given that this study had a smaller sample size than originally anticipated, a series of sample size

calculations for finding significant differences in the proportion of responses above and below a threshold (i.e.; 5 on the Likert scale), when making comparisons of two groups, was completed (Table 5). Three confidence levels (95%, 90%, and 80%) were used; the Power was kept constant at 80%. To finalize each calculation, three different possible levels of assumed difference (10%, 20%, and 30%) for each confidence level were used, where the ideal typically lies at +/- 10%. Since the population under examination (HCPs working in 16 CHCs in Nova Scotia) is not infinite, a finite population correction for each calculation was completed to reflect the size of the sample that would be required to see significant differences in the proportion of responses. The finite population correction assumes that the groups being compared are equal in size; calculations were completed for population sizes of 200 (total population of 400 split into 2 groups), 100 (total population of 200), and 50 (total population of 100).

Although total numbers of staff from every participating CHC were not made available, from the numbers that were obtainable, the total population of HCPs from all CHCs involved were less than 250; therefore, the closest and most realistic finite population correction factor for this study would be for the population of 50. Considering the data presented in Table 5, in response to RQ 2 (whether HCPs demonstrate the IPC competencies), with a sample size of 15 the prevalence of the IPC competencies can still be estimated, albeit with a greater assumed difference between groups (30%) and at a lower level of confidence (80%). Full discussion regarding the consequences of such prevalence estimates is presented in the Discussion Chapter (Chapter Six).

Table 5
Sample Size Calculations with Finite Population Correction

Assumed Difference	Confidence Level	No <i>fpc</i> ^a	<i>fpc</i> for each group N = 200	<i>fpc</i> for each group N = 100	<i>fpc</i> for each group N = 50
10%	95%	389	133	80	45
10%	90%	307	122	76	44
10%	80%	224	106	70	42
20%	95%	95	65	49	33
20%	90%	75	55	44	31
20%	80%	55	43	36	27
30%	95%	40	34	29	23
30%	90%	32	28	25	20
30%	80%	23	21	19	16

^a*fpc* = finite population correction factor

In synopsis, the results of the ICAR survey indicate that HCPs in this study assessed themselves at the ‘*expected*’ to ‘*above expected*’ level for all BIs and competency categories. Cronbach’s alpha reveals a very high level of correlation between the competency categories, while pointwise-biserial correlations reveal high item-total correlations, indicating the reliability and construct validity of the ICAR tool.

Research Question 3 Themes

Once participants had completed their self-assessments they participated in a second interview to discuss whether their definition of IPC had changed since evaluating themselves for the knowledge and skills attributed to IPC. The average length of the second interview was 39 minutes (range = 27 to 61 minutes), which generated 214 pages of textual data. Analysis of their verbatim transcripts revealed four broad themes: 1) *Relevancy of Competencies*; 2) *Broadened Definition and Heightened Awareness*; 3) *I Already Knew What It Was but There’s a Difference between Knowing and Doing*; and 4) *The Medical Model Usurps IPC*. Discussion of each theme follows.

Relevancy of competencies. Prior to exploring whether participants' definitions of IPC had changed, it was important to establish if they thought that the competencies were even relevant to their practice. For if the competencies were not applicable and were instead comprised of foreign concepts, it would naturally follow that there would not be a change in their definition, even at a basic level.

All participants reported that the IPC competencies were relevant to their daily work. But for some, they were far more than just relevant, they were fundamental to their collaborative practice. As Participant 7 explained, a team approach would not thrive without actualizing the knowledge and skills associated with IPC and therefore the means by which the competencies became reality were just as important as the competencies themselves:

And I think it's absolutely impossible to have a team, let alone a team approach that works, if you don't have the communication, if you don't have the collaboration, if you don't have the individual and group understanding of what each person's role is, what their responsibility is, you know? And knowing your own role and responsibilities but what everybody else kind of does and what they're going to do as part of the team. And to resolve conflict. Because I know when this team kind of became complete, and then it was like, okay, now let's get the wheels in motion, the conflict here was quite intense. Those things about roles and responsibilities. And I think the only thing that might perhaps be missing is the processes.

It was important to this participant that HCPs not only assess themselves but also take time to explore how they are going to accomplish the act of collaboration, for without doing so would result in virtually no changes to performance. As well, as this participant revealed, when teams begin to adopt a different way of working together there is often conflict, which must be managed in order for the team to thrive.

Participants remarked that the act of self-assessment was common because they were required to do so either as a condition of self-regulation or because they felt a personal sense of obligation to evaluate their capabilities. Despite the familiarity with self-assessment, appraising themselves for the knowledge and skills attributed to IPC, “was just a little bit different and better”, as Participant 5 shared. When asked why she/he felt this way, this individual revealed that it forced her/him to pause and reflect upon how she/he worked with the rest of her/his team and to consider what skills she/he may need to develop further. Participant 1 shared a similar sentiment:

So from my perspective, just taking the time to stop and actually look at what my thoughts were on collaboration or communication. Because so often we’re just go, go, go, do, do, do, we don’t take that moment to just kind of evaluate, you know, and look introspectively at what we’re doing and how we’re doing it, and is there any way to better do it. So I just felt that that was quite of benefit...it just made me even look at, okay, what else or how more can I do that?

Many of the participants mentioned the value of self-reflection that is often lost in the busyness of the work day and saw this opportunity as an asset that had the potential to improve their practice.

Notwithstanding the benefits that participants conveyed regarding this assessment process, a few indicated that they found it somewhat difficult to do as they did not know if they should compare themselves with others on their team or at the very least ask themselves how others might assess them if given the chance to do so. Participant 15 pondered this very question:

And I had rated myself as average. Which you know, so who do you compare yourself to? So when I compare myself to my peers here, average. Because, you know, we do things very similarly. So it’s always hard to know who you’re

comparing yourself to, you know? But I think sometimes the greatest learning is if I give myself a 7 and one of my colleagues gives me a 5. And then my job there is to sort of say, well, I wonder why that is. Is it an inaccuracy in my self-assessment or is it something to do with maybe the individual doing the other rating not having a clear idea of what I'm supposed to be doing?

This participant raises an important matter in relation to self-assessments, that of response bias, and forces the researcher to consider whether HCPs are honestly evaluating themselves. As was mentioned by a number of participants, peer-assessments may have provided more substantial information regarding their ability to collaborate.

When participants realized that they were demonstrating the competencies at an expected level, they divulged that they experienced a sense of pride and increased confidence, as Participant 13 shared:

I think they [the competencies] gave me that self-esteem and self-confidence that I knew I knew it and I knew my role but I didn't really shine the light on it until I was actually sitting down to think, oh, yeah, I am important. I'm just as important as anyone else here...I felt like I was outside looking in. And then after realizing, okay, I do that, I do that, we do this, it makes you feel very proud and a sense of...I felt very accomplished, proud and look at where we've arrived as to, you know, 3 or 4 years ago where it was horrible.

Despite many participants' acknowledgement of the advantages of self-assessment for the IPC competencies, Participant 12 expressed disbelief that anyone would find the competencies foreign since much of what has been spoken of recently, either within individual professions or throughout the provincial health system, had been about the ability to work collaboratively. This individual characterized the competencies as basic and questioned why in this day and age it would be important to examine

whether or not HCPs were demonstrating them since everyone should be at an expected level as a fundamental component of their role:

It's kind of like, you know, at a certain point in our career we should all be able to kind of be doing this. So it felt a little bit basic in that way. I guess that's what I was trying to say, was that, you know, you should be, this is how we should be communicating, and there shouldn't be...you know, we should be making decisions and we should be speaking to people in ways that are respectful but also assertive and not holding back, and doing what's best for the patient. So I felt a little bit like, why do we have to ask these questions?

Yet others reported the value of both reviewing the competencies and the process of assessment as these two acts could then be used as catalysts for team discussions regarding team dynamics, expectations, and hidden issues.

Broadened definition and heightened awareness. More than three-quarters of participants divulged that the opportunity to assess themselves also afforded them the chance to review the knowledge and skills that are recognized as fundamental to IPC. They shared that this experience either broadened their definition of IPC or, at the very least, heightened their awareness of collaboration as an essential component of working as a team. Many participants shared that the content of the competencies per se were not new to them but the process of critically examining their own performance against the competencies shed light on those for which they had to take more responsibility.

Participant 4 explained this phenomenon:

And so I guess maybe the definition can be... You know, in my mind, probably it has changed a little bit because I know that I have to do my part and I can't expect that somebody else is going to do something, and that I can just sit back and wait. I have to make that extra effort myself in order for me to feel effective in that. And if that means I have to make time to go speak to whomever or communicate

what I've done and where we plan on going, then I need to bring that up every time.

This participant perceived successful collaboration as a two-way street, where HCPs had a responsibility to one another to act on their knowledge and skills so as to advance IPC.

For other participants their definition of collaboration became broader, deeper, and more expansive, as Participant 1 explained:

I think it has in that it's broadened it a little bit. Because I mean I had in my head the whole traditional definition of collaboration. But you know, in searching for how collaboration could be and should be occurring in that setting, I started thinking, well, you know, it's more than just the team collaboration around a patient, it's knowing what's available and communicating when you're available and what's available from your end. And even if you're not all there at the same time, there is the possibility to collaborate. So I think it broadened it a little bit in that it doesn't have to be everyone all in the one spot at the same time.

Participants admitted that by doing the self-assessment they had a more solid understanding of what collaboration *should* look like in their practice setting; it made them more aware of when it was happening and when it was not. They also shared that it helped them identify areas in which they needed to develop. Participant 7 captured the sentiment of many of the other participants:

And it highlighted basically, you know, the general critical components of it. Individually for me, it identified areas that I kind of had an idea that needed working on. So it really highlighted areas that I would really like to continue to work on for the betterment of myself. But it was more so when I look at it, it is inadvertently to make me a better team player.

Others suggested that this type of tool could be used at a team level to assess team performance and possibly stimulate interest in learning how to collaborate better. For

instance, Participant 1 planned on speaking with their CHC manager to explore opportunities for a team exercise as a springboard for discussion and transformation:

I think I now have some ideas on some other things that we can maybe do. Like go back to [the manager] and say, you know, maybe we should do a role clarification exercise, and then maybe we need a little more information on how we refer to the others.

Some participants believed that they, and their team, were functioning at a high level of performance but shared that it was important to be vigilant in assessing these competencies to ensure that IPC was being maintained.

I already knew what it was but there's a difference between knowing and doing. All participants disclosed that they knew what collaboration was and that the competencies were not new to them. Approximately one-third (n=4) of participants acknowledged that they had had some type of introduction to IPC either through post-licensure education (i.e.; during masters degrees) or as part of a provincial health system initiative. None of the participants recounted receiving any IPE in their pre-licensure programs, which is not a startling finding given participant demographics.

Despite the fact that participants admitted knowing what IPC was, three-quarters divulged that, for them, it was not happening at all or at best happening inconsistently. Participant 4 reasoned that having a multitude of HCPs in one place does not make a collaborative practice:

...I walk in the door and the building says, you know, [name of CHC]. And so I think, okay, we're a collaborating team because we have social workers and we have doctors and nurses and dieticians and family practice nurses and nurse practitioners. We have everything you need here and so we're a team. However, when it gets down to this nitty-gritty of the question before, of the maintaining it,

then how do you do that? Just because we call ourselves this and we have team meetings doesn't mean we're actually maintaining and doing this 100% effectively all the time.

Participants suggested that the ability to evaluate whether one was collaborative required a certain level of vigilance because, as Participant 6 disclosed, people may think that they collaborate but in fact they may be far off the mark if they have no means by which to assess themselves.

Participants demonstrated various emotions when they were questioned about IPC and any changes they may have had in how they defined it. Some became visibly frustrated, some became angry, and some almost sad and dejected because as they explained, despite knowing what it entailed it still was not happening in their practice.

Participant 14 revealed such a feeling of angst and frustration when she/he shared:

Oh, I know what I'd like it to be and I know that it doesn't exist. It's in my mind how very, very hard I try each and every day I'm there to attain that goal. And it's so rare; it's almost a halleluiah moment. And you know what, the fact it isn't there, so consistently not there, that it builds up.

There were a multitude of reasons given for the lack of collaboration. Some participants attributed it to physical separation (i.e.; geographic distance) from team members as they were co-located at different sites within the DHA; others blamed high workloads and increasing wait times. Others spoke about more non-tangible barriers, like hierarchy and turf protection or HCPs not understanding each other's roles and therefore not being fully utilized in the delivery of patient/family care. Participant 9 described being confused as to how to make collaboration happen – whose role was it?

I think of collaborating is that we're all on this boat together so everybody take an oar. You know? I think we're still trying to figure out who sits in what row in the boat. Like who's the prime rower here? You know, what is your strong point?

For this participant, care delivery should depend on having the right person with the right skills working with the patient/family to achieve mutually set goals. But there seemed to be confusion as to whom that 'right' person was; was it dependent on title or on skill? A couple of participants described being at the breaking point and intimated that without any changes in the working environment, without being able to collaborate fully, they would have no other choice but to leave their position.

The medical model usurps IPC. Eleven of the 15 participants attributed the lack of IPC to the preservation of the medical model within the health care system. Many participants used the words 'old school' to describe the inherent power differentials that encumbered their practice. They perceived the physician as all-powerful; the one person on the team with the ultimate power to authorize whether or not IPC should and would occur. Participant 12 clearly explained why physicians had such power and influence:

So people attach patients to physicians. They don't attach patients to nurses, to OTs, to physios in quite the same kind of definitive way. But they do to physicians. So all of a sudden you're somebody who's had years of education, you make an extremely high salary, you can diagnosis, you can prescribe, and now you own the patient, you own the real estate. Everybody else just is renting space, you know, but you own it. Like you're owning this. The whole thing. You get to own what the person has, how the treatment plan is laid out. And anybody else is just kind of a consult on that. So you are the skipper.

This participant equated power with ownership and when someone owns something, they always have the last word, they are the ultimate decision-maker. Along with patient

ownership comes the authority to decide who else may enter into the realm of patient care. If the one person with the most power decides that they are not going to work collaboratively, then IPC does not advance.

CHC managers were seen as a close second to the physicians on the power scale as they too could thwart any attempt at making change with how the team functioned. Essentially, HCPs could decide to collaborate but without the two most powerful entities becoming allies with them, IPC would rarely happen, as Participant 2 explained:

Because when I want to collaborate or I want to set up something that will more effectively reflect a collaborative practice, oftentimes, you know, you've tried and the people who are in power will say no, and that's the end of that. And there's no discussion, there's no ability to move forward at all.

Even though some physicians were perceived as being anti-collaborative, for the most part, this did not put an end to HCPs attempts to institute a different way of working together. Participants understood that if they could entice one or two physicians, they would be more likely to succeed, as Participant 4 described:

So we have got the buy-in from most of the doctors here. And once we get the buy-in from the doctors, it seems the other disciplines will eventually follow. But there is an ego thing there. There is something on an individual level that says I can do this all on my own and I don't need...you know? And that's more, like I said, that's more individual than it is client-based.

Participants believed that making others understand how this type of working arrangement could be of benefit to them was key to recruiting others on the mission to instill collaboration in health care. A remark by Participant 12 captured the complexity that exists when people try to describe IPC in the real-world setting and may reveal why there is such confusion and resistance:

I think that people talk about collaboration as something that's really important to do. And I believe that it is. But it would be really good to kind of define it for truly what it is. So, if collaboration on [a unit] is that you sit around a big round table, and the charge nurse, the primary nurse, the resident, the third year medical student, the nursing student, and the attending, and the physio and the social worker all talk. And if the strongest voice in the room is the kind everyone defers to, whatever the decision that the physician needs to make about this situation, then... I think it's just really important that we kind of identify things...that we identify meetings before they happen as this is the way this one is going to go, I need some collateral and some feedback but at the end of the day, I'll make the decision. And if that's the way it is then great. If it's this is a decision that I can actually...that I think we should all make, or this is a treatment plan that I think we should all kind of contribute to, you know, let's all put our heads together and do this, then that's...you know. And who's to say that one or the other isn't collaboration? But I think when we say collaboration, one would maybe assume that I mean the latter of those 2 examples, not the former. But I just think that it would be good if we as healthcare providers, when we sit around these tables, to kind of say, okay, who kind of holds really the talking stick for the longest here and who gets to make the decisions?

This participant questioned whether the team was actually collaborating as opposed to merely consulting and/or coordinating care with one another. Clearly, as was suggested, honesty is crucial and teams need to begin talking about how they define IPC, how they negotiate roles, and ultimately, who holds the power and whether they are willing to relinquish it.

As is heard in the participants' voices, they found the IPC competencies to be relevant to the work they carry out each and every day within their teams. Many participants expressed that they had a better understanding of the specific knowledge and skills attributed to collaboration since given the opportunity to assess themselves. As

well, some shared how they could envision using the competencies to augment their current practice. Overall participants appeared to have a sound grasp of what IPC is; nevertheless, they also expressed doubt that they could actualize it in practice due to the many barriers that existed.

The second sub-question to RQ 3 asked participants to reconsider productivity, both their own and their teams, since completing their self-assessments. Again, in order to facilitate a clear depiction of participant perceptions, the themes associated with personal productivity will be presented first, followed by the themes linked to team productivity.

Two themes surfaced through the analysis of transcripts that related to changes in perceptions of personal productivity: 1) *A Status Quo Practice Environment Results in Status Quo Perceptions* and 2) *Looking at Productivity Differently*.

A status quo practice environment results in status quo perceptions. Fifty-three percent of participants denied that self-assessment for the IPC competencies actually changed their perceptions of personal productivity. Yet, this is not to suggest that these same individuals believed that they were productive, only that the act of assessment had no influence on their observations. For the most part they described their work situations as ‘status quo’; whether they believed they were collaborative or not was not of paramount importance to them because they perceived that the context in which they worked would not change, hence their productivity would not change. To illustrate, Participant 14 shared:

It’s so status quo...no one wants to ever move on into a more inclusive, all inclusive work environment. It will not be all inclusive. It isn’t. Those aspects of what you bring to the table aren’t recognized 90% of the time.

Because of limited collaboration, this participant could not envision a change in practice and hence any change her/his productivity. Likewise, Participant 6 admitted that self-assessment had not changed her/his observations either:

It hasn't really changed my perception because the role I'm in right now, I'm really not as productive as I could be, period. I've known that. It hasn't really changed.

Nevertheless, despite revealing that she/he was not as productive as she/he could be, Participant 6 still maintained that she/he was able to perform the collaborative competencies yet she/he did not relate this to productivity:

I guess I remember thinking as I went through it [the ICAR], okay, I do do a pretty good job of most of these. But I guess it didn't necessarily make me feel like I was more productive. I guess I think I'm very oriented to seeing an end product. You know, have I seen a patient, did they leave with something, or was there something done or a plan in place? That makes me feel productive.

The fact that this participant equated feelings of productivity to times when she/he was able to assist patients to attain positive outcomes is not surprising given that participants' associated productivity with achieving and contributing to patient outcomes as revealed in the themes of the first research question. What is remarkable however is that her/his description of personal productivity excluded other HCPs, almost as if the accomplishment of achieving positive patient outcomes was a solitary mission. Yet for other participants, their perceived level of productivity was influenced by the context in which they worked; if they were not permitted to collaborate with other HCPs or work to their optimal scope of practice, their productivity came into question.

Looking at productivity differently. More than half of participants (60%), including some of those who denied changes in their productivity, admitted that the

process of self-assessment compelled them to look at productivity in a different light. For example, despite declaring that productivity was linked to the achievement of patient outcomes, Participant 6 continued to struggle with associating productivity not only with the number of patients seen during a shift but also in relation to her/his perceived busyness by other HCPs. This participant shared that it was difficult for her/him to change how she/he characterized being productive because if other team members equated it with the number of patients seen, regardless of patient outcomes, then she/he would too. However, she/he shared that reviewing the IPC competencies necessitated a closer look at her/his beliefs:

And it was like, “Oh, so I’m not running around for 12 hours. Well, what am I doing then?” and having to kind of reconcile that. And say, okay, so I’m going to see 6 patients today but I’m going to make a big difference in their lives.

In contrast, other participants revealed that after reviewing the IPC competencies they characterized productivity differently as they no longer saw it as a personal failure (and therefore diminished productivity) when they could not address a patient/family issue on their own. Because of these competencies they saw that it was not about who does the work but whether patient’s needs were being addressed by the most appropriate HCP.

Participant 7 captured this newfound understanding:

Like it’s really what does this person need, you know? And they need that person that’s going to provide them... And so instead of looking at it as a loss in me that I wasn’t able to help them, no, I was because I got them to the right person.

Other participants, like Participant 4, admitted that self-assessment did change their sense of being efficient and pledged to use it on a continual basis to monitor progress:

...it definitely changes my perception of how effective I can be or can I do this a little bit better and more efficient so that I become more effective. Maybe if I collaborate a little bit this way. And so that is my responsibility to continue to look at those. And to not only look at those but influence how other people look at them, I think, and to highlight the importance of them, right? I think that's everybody's responsibility to be able to do that and to help us all grow.

Overall, there was a sense that adoption of the IPC competencies could improve personal efficiency *if* the environment allowed HCPs to practice in this way. At the very least, participants indicated that reviewing the competencies compelled them to reflect back on their team's progress and thus presented new ideas for how to advance IPC within the team.

In general, participant responses were divided in relation to the impact that IPC self-assessment had on personal productivity. On one end of the spectrum, participants admitted that they were either already productive or that they were not as productive as they could be, but ultimately the act of assessing themselves had no impact on those realities. At the other end of the spectrum, participants acknowledged that the act of self-assessment forced them to re-examine and reconsider their level of productivity and to deliberate on how they could work differently.

After participants had reflected upon their personal productivity they were then asked to consider whether the IPC competencies influenced their perceptions regarding their teams' productivity. Three themes emerged from the analysis of the interview data: 1) *Being Proficient In and Modeling IPC Competencies Positively Impacts Productivity*; 2) *People Leave, It's Just Natural Selection*; and 3) *The Effects of the 'Powers That Be' on Productivity*.

Being proficient in and modeling IPC competencies positively impacts

productivity. Despite having little influence on their perceptions of personal productivity, the act of self-assessment was not wasted for it afforded the opportunity for reflection on team productivity. Through this endeavor, participants not only realized that for the most part they did collaborate at a team level; they also recognized that collaboration positively impacted team productivity and ultimately patient/family outcomes. Some of the positive patient/family outcomes noted by participants included improved patient flow through the clinic, decreased wait times, increased HCP access, increased safety, and the ability to connect patients with the HCP that was most appropriate for their needs. HCP outcomes were also enhanced as noted by decreased sick time and absenteeism. In fact, one participant equated improved team collaboration with decreased vacation time use. When asked why this was happening, the participant explained that working collaboratively resulted in staff feeling fulfilled and therefore not rushing to take as much time off as they were when the team was dysfunctional and non-collaborative. So the question arises as to why participants saw little effect of self-assessment on personal productivity yet could see it in relation to team productivity? Perhaps, as Participant 7 intimated, it was because they identified so strongly with being a team as opposed to being an individual who works on a team:

...And so that has improved my efficiency in the sense that they understand what it is I can do that is above and beyond what they can do. But also in saying that, that I am just a team player as well. So my skills don't offer anything better than theirs. It's just different skills. So I think me becoming really jelled in my role and responsibility...actually even separately from my team collaborative role in that sense, is going to be something that's going to be advantageous to me being more productive long term in the future.

The vast majority of participants (93%) insisted that the ability to perform the IPC competencies would improve team performance as long as team members were acquainted with these knowledge and skills. As Participant 4 noted, adoption of the competencies could strengthen the team in a multitude of ways:

So I think if you establish these...and constantly, I think, you know, bring these up, hold ourselves accountable, do all these things, talk about it, train in it, whatever we do, it will absolutely affect not only efficiency but the team itself, team functioning and the team dynamic. You know, once we realize that you don't have to do everything yourself, that there's a whole team here to help you, you won't lose sleep at night. You know, this is not taking away from, this is adding to the service that you've already provided.

Most participants recommended using the IPC competencies as a gauge for team performance because, as Participant 15 explained, the knowledge and skills were observable:

You know, there's a certain concreteness to having these, the things that have been shown to make teams work well. So you know, so putting it out there as something concrete. And I think in doing that then it would certainly improve the efficiency of teams.

By using the competencies in this way, participants not only professed that their team's productivity would increase but also that HCP confidence and satisfaction would increase as well, which may possibly allow for heightened personal productivity.

According to Participant 10, a critical aspect of personal and team productivity was the ability of team members to care for one another:

The other thing that I think is very important is the function of the group, which often isn't even talked about, which is caring for each other and the catharsis that happens. So one of the interesting things that happens in our group, for instance,

is every now and then, someone will say, you know, I'm getting a little bit tired of this because we sort of go off topic so much and we don't work efficiently. And...I'll say, well, you know, what's happening here is not just talking about cases. There is a process of support and catharsis and release that's critical. It keeps us all healthy and it keeps the team going. And all that time that you think is wasted time, that's what's happening during that time. And so we don't want to make this a super-efficient process. You've got to let it happen. And if someone needs to go off on something or if the topic goes off on something, that's okay. There's a lot more going on than just the discussion of that case. And in fact in my mind, the collaborative process is as much and possibly more about that than the actual collaboration about the case.

The concept of team socialization and feelings of belongingness, although not captured in the ICAR tool, is an important one in the collaborative process and its effect on productivity should not be understated.

In order to maintain and/or increase productivity, it was important for participants to be able to role model collaborative behaviours for each other, the patient/family, as well as for new team members. One participant talked about the significance of making patients accountable; that they needed to be heard but they also needed to understand their role and responsibilities in their own care. Participant 1 explained that patients can affect productivity by becoming ambassadors to their own care:

But the other thing is you try to become more productive, right. You try to be more efficient. My approach...is very much around self-management. So it's not I'm going to look after you, it's how you can look after yourself. So what you end up doing is seeing people for a little longer but not as often at a time because you're teaching them. So you know, I think we're trying as much as we can to turn everything back to the patient, and therefore be able to see more and more people.

It was important to many participants that patients and families understand that the health care system was changing and, with that, their roles were changing too.

When Participant 5 recounted how new HCPs were orientated to the team, she/he described it as more than merely explaining how “things were done here” but rather how the team functioned and the role that new members would have within it:

...actually talk to them about, you know, you can send them here or you can utilize like our social worker, her role is blah, blah, blah. And our dietician is... So right from the very beginning, you're letting them know how the team works, what types of cases you might want to send to different team members, what they can expect...And it keeps the flow going. And we tell them like that is part of how we work as a team right from the beginning. So you sort of lay out those expectations of support and collaboration.

Also important to participants was the notion of evaluation of the collaborative process. Approximately one-third (n=4) of participants not only discussed the value of personal appraisal for the IPC competencies, but also evaluation of the team, for both collaboration and productivity. Participant 10 suggested using a tool as a guide for assessing whether the team is actually collaborative because there was no formal process in place to help them do so:

There is no real formal process to evaluate collaboration...So the tool that uses an evaluative process I think would be very useful...I mean maybe we are doing it all the time as I suggest informally without even knowing it. But at the same time, it's good to do it formally.

While participants recognized the value of informal evaluation of team functioning, they also acknowledged that a more formal process might be of value.

People leave, it's just natural selection. For those participants for whom IPC was a reality in their practice setting, when someone entered their team who did not endorse collaboration, it presented problems. Participant 10, who described their team as highly collaborative and productive, explained that the team would not tolerate someone who tried to take control over others nor would they change the way in which they worked to appease the power needs of the new person. Instead, the new HCP would have to adapt or leave the team:

...we've had many people that have come and they're here for a while and they sort of leave and say, well, this isn't right for me...I mean it's interesting the comments we get sometimes when people leave. And sometimes it's quite negative. But I think one of the things that needs to happen when you get into this process, when you immerse yourself in this culture, is you have to kind of give up some of those privileges, I guess, those things that come along as a physician, for instance, with being in control. I mean this place wouldn't tolerate someone who wanted to take over, to have control. And so some people have trouble with that.

Other participants concurred that people self-select whether or not they fit with the philosophical underpinnings of a collaborative team and if their beliefs do not correspond with the central tenets of IPC they often leave the team.

Participants also described people on their teams who refused to collaborate but who also refused to leave the team. When this happened everyone was put into a precarious situation as the work of the team was undoubtedly affected. Participant 8 shared the effects to the work of the team when another team member refused to attend case conferences:

...like there's some people that just don't get it. Like one of the other RNs, when she's responsible, she just... It's all you could do to pull her teeth to come. And she doesn't see it as important. When she hasn't come, we just meet without her

and then go and tell her. Like that's all there is to it. What can you do if somebody is going to refuse to come? Then we have to still do our part. Well, it just means the rest of the team functions and she's the odd man out. I mean we're still going to do what we have to do for the patient.

In this situation it was important for the team to continue to try to meet the patient's needs albeit without an important member of the care team. When they could, the team would encourage other RNs to become involved in the meetings to maintain some type of nursing voice. Participant 8 admitted that the team had received some education regarding how to function collaboratively and therefore posited that it was a personal choice of the RN to not be a contributing member of their team.

Likewise, HCPs who wanted to work collaboratively, but found themselves in teams that maintained power and hierarchy, often wanted to leave their team because they felt unproductive and unfulfilled. Participant 2 described how the inability to work collaboratively affected the sense of being productive and ultimately resulted in surrender or abandonment:

Well, it's the frustration that I've spoken about, right. The production is not what it could be at all. It's extremely difficult to... You know, there's so many gaps and so many barriers. You know, there are some really super bright people, really committed people, but it's just almost impossible for them to...advance isn't the right word because advance to me indicates promotion. And it's not about promotion. And so when they're never able to create anything, generally speaking, they either...they just stop trying or they leave.

Clearly, participants believed that an unwillingness or inability to collaborate affected productivity for, in either case, a decision must be made about whether to acquiesce or to leave the situation. In both of these circumstances, HCPs would be less than enthusiastic

about their work conditions and therefore it stands to reason that they would also be less productive.

The effects of ‘the powers that be’ on productivity. Despite the desire to work collaboratively and to be as productive as possible while doing so, almost all of the participants (n=12) talked about the barriers that existed outside of their immediate team that prevented them from realizing these goals. Some of the impediments described included flawed productivity measures used by administration, little understanding of IPC by CHC managers, system bureaucracy, and discrepant funding arrangements.

Participants argued that administrators placed too much emphasis on the statistics of the clinic, such as the number of patients seen per day or the time spent per patient rather than the outcomes that may have been reached. Others complained that their managers did not understand the underpinnings or the importance of IPC to the productivity process and therefore did not endorse it at a realistic level within the clinic. According to Participant 2, this was a significant barrier:

I think that again the biggest barrier is actually not within the team, it's above the team. So the team can have all of the best intentions in the world, and they can understand what the competencies are and try to meet those, and so forth. But when you don't have any collaboration with the managers, nothing is going to change.

Having a manager that did not support IPC had a profound effect on how the work got done and who did it – some participants believed that they were not being used to their full potential and as a result patients suffered and productivity was not optimal.

Bureaucracy was also considered to be a significant impediment to team productivity. Participant 11 described a situation very similar to those mentioned by other participants:

...I had a client that called me, and the welfare worker wouldn't give her money for her bus pass because she wasn't going to some sort of program that he had sent her to. And she told me that she was doing the same thing [the recommended program] through another agency... So I called the [welfare] worker, and the worker said, well, if I get something from [name of program] saying that the client is active with them then I'll issue the bus pass. So I call the [name of program] and say I'm working with this woman, and she tells me she goes to your program, she needs a bus pass. The social worker is not giving her the bus pass. Can you write a letter to them saying blah, blah, blah? He said, "I can't have a conversation with you about this client because she's not given me consent."

As only one of many stories that participants shared regarding system rules, regulations, and policies, it became obvious that not only was collaboration put in jeopardy but that productivity suffered immensely. There did not seem to be any coordination or communication, not to mention collaboration, happening in these situations.

Many participants, including the physicians in this study, acknowledged that fee-for-service payment models presented barriers to IPC and productivity as the focus was more on quantity of care rather than on quality of care. As Participant 10 explained, in the long run collaboration saved time but in order to collaborate one needed time; unfortunately, in a fee-for-service model, time was always in short supply. Another participant recalled that despite wanting to be present at team meetings, physicians had to stop attending as they were not getting paid for the meeting time. This resulted in a fractured process as the team member with the most decision-making and prescribing power was absent, which gave rise to more work by the rest of the team as they could

suggest care options but then had to meet separately with the physician to have these decisions authorized.

Participant 14 clearly expressed anger and disappointment when recalling an incident where physician funding affected care:

You know why they set me up with just a nurse? You can't bill twice. I said, "Who's coming in on that with me as a doctor?" "Oh, no one. You can... You're on your own." I said, "but I never even met her [the patient] this morning". And they said, "No, no, you go in alone." I said, "No, that's not the way it goes. Because as sure as anything, there will be something, a prescription". They said, "No, no, because you can't bill twice in one day. We already saw her this morning." And I said, "I'm not talking about money, I'm talking about patient care". And you know what, they refused to assign a doctor with me. And guess what? She was circling the drain as sure as shit. She was circling that frigging drain.

As this participant had predicted, the patient was extremely ill and required a team approach to her care. Nevertheless, the focus on how one got paid, rather than on the patient's needs, ultimately affected the team composition.

Participants who were proponents of non-fee-for-service models explained that this type of arrangement allowed for more time with patients as well as more time with the team. Nevertheless, Participant 15 raised an important point to consider in relation to alternate funding models:

We're a non-fee-for-service practice. And so for us to take, you know, half an hour of our day ...so 15 minutes at the beginning of the morning and 15 minutes at the beginning of the afternoon, and have these huddles with everybody there...there are no financial implications for that... I am mostly a proponent of non-fee-for-service practice because I think patients get better care that way. But the reality of that is probably less patients will be seen.

In this era of health care, where people are having greater difficulty locating a primary care provider, the thoughts shared by Participant 15 warrant further consideration. If funding models are changed so that more time can be spent in team meetings and with patients/families, the outcome of that may be that fewer patients are being seen in any given day. This will have a profound effect on wait times and access and ultimately productivity. Perhaps the answer is not changing how one gets paid but instead changing who has the ultimate power within the team to make patient care decisions.

Convergence and Divergence of Findings

Data analysis in sequential mixed-methods studies, including embedded designs, requires connecting the analysis of both the qualitative and quantitative strands (Creswell & Plano Clark, 2011). In this exploratory sequentially embedded design, the results from the ICAR survey not only provided answers regarding the extent to which HCPs demonstrated performance of IPC competencies, but also helped to determine whether HCPs actually did what they said they do in relation to IPC when these results were analyzed in relation to the themes uncovered from the qualitative analysis. To accomplish this analysis, the data from each participant (interview transcripts and ICAR scores) were analyzed as cases or units. Significant findings are presented next.

As was previously reported, mean scores of all competency categories revealed that participants believed they were demonstrating the IPC competencies at an *'above expected'* level (≥ 6 on the 9-point Likert scale). When the knowledge and skills attributed to each competency category (i.e.; the BIs) were analyzed, data showed that 21% were scored at the *'expected'* level (score of 5), while 78% were scored at the *'above expected'* to *'well above expected'* levels (scores of 6-7 and 8-9, respectively),

indicating that participants believed they were performing 99% of all the knowledge and skills recognized as integral to IPC. For the most part, these quantitative findings corresponded with the themes which emerged from the interviews. Definitions of IPC provided by participants in the first interview were consistent with the language used in the ICAR and did not change greatly after the self-assessments. Their descriptions of personal and team productivity, again, did not change significantly after assessing themselves, other than to illuminate the importance of collaboration to the team production process and to highlight barriers which existed in their practice settings. However, when individual scores were examined, some interesting patterns emerged.

Only two participants exclusively scored themselves in the *'well above expected'* level (scores of 8-9) on the ICAR survey. These individuals were from two different CHCs and represented different professions. In and of itself, this finding may not be remarkable for there are most likely many HCPs who envision themselves as highly collaborative. However, when coupled with the data that emerged from their interview transcripts, one participant's scores stood out. During the interview, this individual appeared to be perplexed at times with the concepts of interprofessionalism and struggled to answer the questions. The greater part of their definition of IPC involved phrases such as 'group think', 'talking a lot', 'not feeling alone' but with little specific examples provided. Of the exemplars given, many were in respect to *intra*professional collaboration (within their specific professional designation) rather than *inter*professional collaboration (among different professions) and/or were task oriented rather than descriptive of behaviours. Much of this participant's portrayal of IPC was concentrated on development of the paperwork (i.e.; medical directives) necessary to define the

confines of their role, which suggests that this individual's practice was circumscribed by another profession rather than by their own scope of practice, their standards of practice, or even their role within the CHC. As well, the language used by this participant to describe collaboration between professions, notably between nurses and doctors, was hierarchical in nature. For example, when asked to describe what IPC looked like this person used expressions such as "they know that you'll work within the confines of what you have told them you're going to do"; "the doctors let us give (*sic*) blood work but we had to define exactly what those would be"; "you're seeing their patient"; and, "the doctors basically let us...". This participant could not explain how IPC occurred within their team, instead describing it as "it just happened". When asked whether there were mitigating factors to IPC "just happening", such as education, this participant explained that HCPs just know how to work together because that is what they always do. Interestingly, this individual also denied that any conflict *ever* occurred within the team, yet scored themselves at an 8 to 9 for all BIs under the *conflict management* competency category. Clearly, there is discrepancy between what this participant says they do as opposed to the reality in which they work. What is of even greater importance is that this participant did not appear to notice these discrepancies possibly because she/he was unclear as to what IPC really was.

Four participants, while scoring the vast majority of BIs at or above the '*expected*' level, did score one to two at the '*below*' and/or '*well below*' levels. Three of these lower scoring BIs fell under the *roles and responsibility* competency category, while the other two came under the *conflict management* category; however, when coupled with their interview data, for the most part, these findings are unremarkable. For example, one

participant who scored themselves as *'below expected'* for the ability to explain their scope of practice and standards had never worked within an interprofessional team environment prior to joining the CHC. Therefore, it is plausible that this was a new experience for this person, for in the interview they had recalled how they needed to be reminded that others may not know of the many skills they bring to the team. This same person scored themselves as *'not observed'* for using strategies to communicate with individuals with impairments. Again, this is not a startling finding as this participant rarely had contact with anyone outside of their immediate uniprofessional team prior to this new role.

It is worth mentioning that two of the BIs that were scored below the expected level were done so by one participant, who scored themselves as *'well below expected'* and *'below expected'* for accepting responsibility for failure of collaborative goals and using appropriate conflict resolution strategies, respectively. This individual recounted a work culture very different from those of her/his team mates who participated in the study and described an environment that was hierarchical with poor management and little respect for the knowledge and skills of all team members. This participant was visibly angry, frustrated and weepy, almost sorrowful, during both interviews because she/he believed there was little to no respect for the knowledge and skills she/he had accumulated over many years of service. This individual told of the struggles they encountered when trying to address non-collaborative behaviour from other team members and little to no support from management when they tried to bring their concerns forward; therefore, the low scores related to these two BIs are not surprising at all.

One participant scored 20 of the total number of BIs on the ICAR (n=31) as 'N/O'. More specifically, entire competency categories were scored in this way, including *collaboration*, *patient/family-centered care*, and *roles and responsibilities*. The only competency category that did not have any BIs with an 'N/O' score was *conflict management*. Because this individual had little to no patient/family contact in their role, the 'N/O' response was reasonable for those related BIs/competency categories. Yet, the remainder of the BIs that were scored as 'N/O' are those which one would require to function collaboratively within a team. When these scores are coupled with this participant's interview data, the story becomes muddled. For the way in which this participant depicted their practice environment suggested that it was the epitome of collaboration and one in which this person was overjoyed to work. Indeed they described productivity within the team as "unicorns and daisies" because they were so collaborative. Why was it that this participant scored themselves in this way? Was it perhaps that they misread the Likert scale and selected the last box because they perceived this to be the highest score when in fact it was the 'N/O' category? The answer is unknown; what is known is that the data that this participant provided in both interviews suggested that they were highly collaborative and had a firm understanding of the knowledge and skills that were required to collaborate interprofessionally.

Of final note, is the level to which participants discussed the involvement of patients and families in the collaborative process. In the interviews, despite the majority of participants professing that personal and team productivity were realized when they were able to achieve or at least contribute to patient outcomes and when patients understood their roles in attaining/maintaining health, when discussing IPC very little

was said about the role of the patient or family within the team. This may imply that the act of collaboration was reserved for team members and that essentially patients and families were not believed to be team members. Instead, the patient or family may have been viewed only as the recipients of care and because of that they were fundamental to productivity.

Chapter Summary

In this chapter, both qualitative and quantitative findings were presented in the same sequence as data were collected and analyzed. As well, convergent and divergent findings were revealed.

Participant definitions of IPC used language that was comparable to that used in the field of IPE/C and were clustered under four major themes: 1) *Understanding, Valuing, and Using Team Expertise*, 2) *Communication is Key* (sub-theme *Being Available*), 3) *The Impact of Belongingness*, and, 4) *Hierarchy-Turf Protection*. After completion of the self-assessments, important changes in their definitions did not occur; however, participants acknowledged that the competencies were relevant to their practice. Participants also noticed that there was some heightened awareness and realization of the barriers to IPC within their work environments, with data subsumed within the following themes: 1) *Relevancy of Competencies*, 2) *Broadened Definition and Heightened Awareness*, 3) *I Already Knew What It Was But there's a Difference Between Knowing and Doing*, and 4) *The Medical Model Usurps IPC*.

When participants' perceptions of their own productivity were questioned, the themes that described their productivity from the first interview included: 1) *Achieving-Contributing to Patient Outcomes*, 2) *Completing the Checklist and Managing Shifting*

Priorities, and 3) *The Impact of Hierarchy and Bureaucracy*. The emergent themes regarding changes to their perceptions of personal productivity indicated that some participants were forced to look at productivity in a different way while others indicated no change due to stagnant practice environments. These findings are captured under two themes: 1) *A Status Quo Practice Environment Results in Status Quo Perceptions*, and 2) *Looking at Productivity Differently*.

Participants were also asked to elaborate on their team's productivity and revealed that they believed that collaboration by the team resulted in higher productivity provided that the patient was able to access the HCP that could best help them meet their health care needs. Themes from the first interview included: 1) *Right Person-Right Skills for Patient-Centered Care*, and 2) *Collaboration Leads to Higher Productivity*; whereas themes from the second interview were clustered under three themes: 1) *Being Proficient In and Modelling IPC Competencies Positively Impacts Productivity*, 2) *People Leave, It's Just Natural Selection*, and 3) *The Effects of the 'Powers That Be' on Productivity*.

Between interviews, participants were asked to assess themselves against the knowledge and skills attributed to IPC. In keeping with the interview data, results from the ICAR survey suggest that overall HCPs in this study believed that they demonstrated collaboration as they assessed themselves at the 'expected' to 'above expected' level for all knowledge and skills within each of the six competency categories. In general, there was little divergence of findings between the qualitative and quantitative data, with the exception of two participants. Those who scored themselves below the 'expected' level for any BI, by and large, corroborated these findings in their interviews.

CHAPTER 6 DISCUSSION, IMPLICATIONS, LIMITATIONS, AND CONCLUSIONS

HCPs' capacity to collaborate and the subsequent effects this may have had on perceived productivity were examined in this doctoral research study. The purpose of the study was three-fold: 1) to discover HCPs' understandings about IPC and their perceived level of efficiency and effectiveness when working with their team; 2) to determine the extent to which HCPs demonstrated the competencies that are related to IPC; and, 3) to explore whether assessment of the IPC competencies changed HCPs' sense of being efficient and effective. In essence, did it change HCPs' perceptions of being productive?

Prior to beginning this discussion chapter, and admittedly throughout the entire study, I often reflected upon my desire to explore why I was interested in knowing more about IPC and its effect on productivity. Why was this topic important? How did my experiences as a registered nurse and, more recently, as an interprofessional practice setting consultant influence my choice of study or my approach with participants? And most importantly, what do my findings reveal about HCPs' definitions of IPC, the extent to which they collaborate, and their perceptions of productivity?

Reflection has provided clarity and the freedom to set aside any preconceived beliefs I may have had in relation to IPC and team productivity so that the voices of the participants could emerge. Having been a registered nurse for over 30 years, I have worked on many teams; some highly collaborative and some not. Prior to immersing myself in the world of interprofessionalism, I am not sure that I would have had the language necessary to adequately describe the way in which collaboration was or was not accomplished. I would not have been able to identify or convey all of the knowledge and

skills that are essential for IPC, nor would I have been able to fully appreciate its connection to productivity. But my inability to convey this information did not mean that I was unaware of the intricacies of working in a team environment. For many years I experienced great unrest with how health care was being delivered and often questioned why there was such resistance to HCPs working to their optimal scope in partnership with one another. My disquiet led to an awakening that there could be a different way of working together that honored the efforts of everyone involved. This realization transformed my career and led to my topic of investigation.

As an interprofessional practice setting consultant, I have had the privilege of working with many HCPs on many teams that have had similar angst as I and who were striving to work in a more collaborative manner. In many of these encounters I have seen HCPs struggle with trying to understand what IPC *really* is so that they could put it into practice. I have witnessed many HCPs make great efforts to change the way in which they and their team work. And sadly, I have seen some of those same HCPs become frustrated, confused, and dejected when they could not apply what they had been taught. It is for these reasons that I so strongly believe that the relationship between IPC and productivity are important topics that needed to be explored.

This chapter presents a discussion of the findings within the context of discovering HCPs' understandings about IPC and productivity, their ability to collaborate, and whether self-assessment changed their insights. Relevant theory and the competency/serviced-based HHRP framework provide the foundation for the discussion. The implications for education, practice, research, and policy will be presented as will a discussion of study limitations. However, before delving into the discussion it is

important for the reader to understand the health care context in which this research study was situated. With a population of just over 920,000 people (Government of Nova Scotia, 2015), Nova Scotia has the highest percentage of seniors (17%), obesity (26%) and chronic diseases (39%) than in the rest of Canada (15%, 19%, 29%, respectively) (Vaughan, 2014). Health care spending is 8% higher in Nova Scotia than in all other Canadian provinces (46% vs. 38%) (Vaughan, 2014). Considering these realities, health care system transformation was inevitable.

With a vision of providing health care that is streamlined, accessible, efficient, and effective, and one that would create a foundation for better health and healthcare for future generations, on October 2, 2014, the Nova Scotia legislature passed the Health Authorities Act (Province of Nova Scotia, 2013a; 2013b; Vaughan, 2014). This Act established the foundation for consolidation of nine District Health Authorities (DHAs) and the IWK Health Centre into two entities: one provincial health authority and the IWK Health Centre. Prior to the passing of this Act much work transpired across the province.

In the spring of 2014, a Transition Lead was named, a Ministerial Advisory body struck, and a Transition and Design Team was chosen. Also during this time, the Boards of Directors of all nine DHAs were disbanded and an Administrator was appointed to provide overall leadership to the DHAs, while the Board for the IWK remained a separate entity. After the legislation was passed the tremendous work of consolidating these DHAs began in earnest. Between January and March 2015 a new Provincial Board was chosen and on April 1, 2015, the Nova Scotia Health Authority was established (Province of Nova Scotia, 2013a; 2013b). During this same time period (2014-2015), the Department of Health and Wellness instituted initiatives to build capacity in HHRP that

were focused on establishing a satisfactory number and mix of HCPs to meet the needs of the population. Initiatives included: an updated Nursing Strategy, a Nursing (RN) Education Review, a Diversity Strategy, Physician Resource Planning, and appointment of a Physician Recruitment and Retention Action Team (Nova Scotia Department of Health and Wellness, n.d.).

Notwithstanding the anticipated benefits of this health system transformation, such enormous change may have had an impact on this research study. Certainly, those HCPs who agreed to join the study initially expressed skepticism and were cynical of such changes as many had lived through health system transformations and amalgamations in the past. And although not expressed outright, it appeared as though participants thought that this study was connected in some way to the upcoming provincial changes as some participants were reticent to expose what was happening within their CHCs until I could assure them that I in no way had any connections to government or to the health system consolidation. Once participants were convinced that I was not involved and could be a confidante, they relaxed and were forthcoming. There was much uncertainty for these HCPs. Who was going to be their new employer? Would they be moved from their current workplace into another? Would they be forced into a union not of their choosing? Would they lose employment benefits or seniority? Was anyone willing to listen to their concerns? Many questions with few answers at the time of study enrollment and data collection, which I believe may have impacted HCPs' decision to participate. Fortunately, there were some HCPs who wanted a voice despite, or maybe because of, the great changes ahead, and who embraced the opportunity to tell their stories.

The Definition of IPC

Many HCPs believe that they are working collaboratively without the benefit of actually reflecting upon what IPC is or having little insight as to the level in which they may be collaborating (Orchard, King, Khalili, & Bezzina, 2012). Participants within this study were afforded the opportunity to address both of these issues. By asking them to share their definitions of IPC, HCPs were compelled to think about what collaboration meant to them and how they experienced and/or envisioned it happening within their practice setting. Having them evaluate their ability to collaborate required a level of discernment that many expressed was new and different for they had never been asked to assess themselves in relation to collaboration before. The act of doing so validated for some participants that they were integral to the work of their team, a similar finding to that of Evans, Henderson, and Johnson (2012) in their investigation of the impact of IPE on knowledge and attitudes of dentistry and dental technology students.

Others have suggested that HCPs require help in order to better understand IPC and to prepare and support them to work in collaborative teams (D'Amour, Goulet, Labadie, San Martin-Rodriquez, & Pineault, 2008; Thistlethwaite et al., 2014). Oftentimes this 'help' is in the form of IPE where learning opportunities are structured so that two or more health professional students or practitioners from different backgrounds can learn about, from, and with one another to improve collaboration and the quality of care (CAIPE, 2002; Evans et al., 2012; Thistlethwaite et al., 2012; World Health Organization, 2010). Positive outcomes associated with IPE have been established and include better attitudes about others, enhanced role understanding, improved communication, optimized clinical decision-making, establishment of mutual respect, and

improved team functioning (Baker, Egan-Lee, Martimianakis, & Reeves, 2011; Chong, Aslani, & Chen, 2013; Evans et al., 2012). Although a formal IPE offering was not a component of this study, it was hoped that by having participants explore their definitions of IPC, as well as exposing them to the essential knowledge and skills of IPC through the self-assessments, their comprehension of collaboration would grow. The idea that conceptual tools may actually help HCPs develop collaboration through enhanced awareness of the level of IPC that occurs in their teams is supported in the literature (D'Amour et al., 2008; Orchard et al., 2012). As the findings of the ICAR survey and interviews suggest, for the participants in this study these opportunities did provide some level of increased awareness of the knowledge and skills attributed to IPC in addition to their capacity to collaborate.

Before the ICAR Self-Assessment

Participants' definitions of IPC were rife with terms such as trust, mutual respect, partnership, valuing, open communication, coordination, shared power, and shared decision-making; language that is consistent with current definitions of IPC found in the literature (Accreditation of Interprofessional Health Education, 2011; Akeroyd, Oandasan, Alsaffar, Whitehead, & Lingard, 2009; Barrett, Dort, & White, 2006; Culver Clark & Greenawald, 2014; Dinh & Bounajm, 2013; Evans et al., 2012; McNeil, Mitchell, & Parker, 2015; Orchard et al., 2012; Tataw, 2012). The focal point of all participants' descriptions was centered not only on understanding roles and responsibilities (both their own and others) but in utilizing the most appropriate person with the necessary level of expertise to provide the most appropriate care required by patients and families. Participants expressed that they and members of their team must

learn to value the unique contributions of all and understand how their work contributes to outcomes and team objectives.

Some role ambiguity surfaced however, as a few participants appeared to equate tasks with roles within the CHCs (e.g.; describing their role as carrying out orders or following directives). These participants did not seem to recognize that roles are reflected by professional knowledge and that tasks represent the competent application of this knowledge within legislative, experiential, and contextual parameters (Akeroyd et al., 2009). These findings are similar to those of Hepp et al. (2015) in their examination of collaborative practice in acute care units where it was found that there was a lack of understanding between tasks and roles and team functioning. When participants spoke about any uncertainties they may have had, either about their own roles or those of others on their team, they also intimated that contributions to care might be diminished as a result of their ambiguity, a finding similar to that of Akeroyd et al. (2009) in their study of the perceptions of the role of RNs in family practice settings.

Comparable to results found by Chong et al. (2013) in their exploration of the perceptions of shared decision-making and IPC, communication emerged in this study as a critical component in participants' definitions of IPC. They depicted collaborative communication as a back-and-forth flow of information that was integral to the achievement of positive patient outcomes. The ability to be open and honest in a safe environment allowed for sharing of insights and information that resulted in the formation of new ideas (Choi & Pak, 2007). Participants' descriptions of communication is similar to its dictionary definition as "the imparting or exchanging of information by speaking, writing, or using some other medium" (Oxford Dictionaries, 2015, para 2).

The communication process in healthcare is complex and includes the “ability to listen, assimilate, interpret, discriminate, gather, and share information in constantly changing systems made up of many disciplines and hierarchies” (Manning, 2006, p. 268). The participants in this study focused predominantly on oral and written communication when describing its importance to IPC and team functioning and did not allude to the effects of non-verbal communication (e.g.; body posture, tone of voice, facial expressions) in their accounts; yet the importance of non-verbal communication should not be ignored as it often more accurately conveys meaning, constituting 93% of communication (Bunglowala & Bunglowala, 2015; Chkheidze, 2014).

Communication within the CHC teams was described as being both formal and informal in that it could occur in scheduled team meetings or in impromptu ways when the situation arose. Contradictory to findings by Culver Clark and Greenawald (2014) that supported face-to-face meetings over ‘drive-by’ conversations, neither method was viewed as superior to the other by participants in this study. As long as there was an opportunity to share important information, participants were satisfied and believed that they were collaborating. Nevertheless, the significance of regular team meetings should not be understated as they are often associated with greater and more effective team functioning and innovative thinking because they allow for not just the exchange of information but discussions regarding program delivery, care planning, and care coordination (Dinh, Stonebridge, & Thériault, 2014; Xyrichis & Lowton, 2007).

Although the effectiveness of team meetings was established in this study, a few participants noted that they often only occurred when difficult patient/family care situations were encountered. Likewise, in their review of the literature regarding barriers

and facilitators to teamwork in primary and community care, Xyrichis and Lowton (2007) also discovered that HCPs reported having team meetings only when complicated care situations needed to be discussed. And although it would be advantageous if teams met on a more regular basis, having them meet at least for those difficult cases is beneficial to the health care system as complex and chronic conditions may be prevented and/or managed particularly well by IPC teams (Dinh et al., 2014).

As Dinh et al. (2014) reveal, the way in which HCPs communicate also affects patient care experiences and outcomes. Of the various methods for communication described by participants in this study, some appeared to work well (e.g.; face-to-face meetings, care plans, paper-based charts), while others did not (e.g.; electronic methods, the use of numerous and varied modes of communication within a single setting). Of note is the discovery that the use of communication technology, such as electronic medical records (EMRs), is not uniform throughout the province. Participants reported that in some DHAs, all HCPs on the care team had access to patients' EMRs and could add information to the record; in other areas, all team members had access but only a select few could enter data; while in other DHAs, only physicians and nurses could access and/or enter data. There appears to be no consistency. Unfortunately, this finding is not surprising given the status of health information infrastructure in Canada. In a recent Organization for Economic Co-operation and Development (OECD) report (2013, as cited by Dinh et al., 2014), Canada lags behind other OECD countries, not only in the use of EMRs but also in the ability to link health records within the health system. This poor standing is attributed to outdated technological infrastructure that persists in hospital and primary care settings (Dinh et al., 2014). In fact, in Nova Scotia, EMR implementation

exists in only 40% of practice settings (Hutchinson Levesque, Strumpf, & Coyle, 2011). This situation is surprising given that in 2010 the Federal government made \$380 million available to support the implementation of EMRs by community-based HCPs (Hutchinson et al., 2011). As is also important to note, simply introducing EMRs without the requisite restructuring of care delivery potentially limits any benefits that may be realized (Porter & Lee, 2013), which may be a factor in this situation where care delivery models appear to vary in each locale throughout the province.

Because of the limitations imposed on their ability to communicate via technology, participants expressed concern that important information was being missed which could ultimately put patients' safety at risk. Their fears are well-founded as literature has shown that inadequate communication and collaboration have negative impacts on patient outcomes, such as medication errors, physical and/or psychological injury, or even death (Martin, Ummenhofer, Manser, & Spririg, 2010). Perhaps if these electronic methods of communication were made available for use by the entire team and a consistent approach to care delivery was established, the exchange of ideas would be enhanced and patient outcomes would be positively impacted. It has been discovered that HCPs want to use information technology to improve accessibility and communication among teams (Chong et al., 2013; Dinh et al., 2014), a finding that is consistent within this study.

Another area of concern raised was in relation to the withholding of information between HCPs on the same team. Despite all participants declaring that communication was fundamental to IPC, some individuals recounted times when they were excluded by other HCPs from patient care discussions and/or were not provided with the appropriate

information they needed to do their jobs. Some individuals questioned whether this happened because of power differentials or contradictory relationships within the team. Others suggested that they were excluded because members of their team did not appreciate that they should be included in the conversation, either because team members did not fully understand the HCP's role or because they were not aware that the information was worthwhile to another HCP's ability to plan and provide care. Culver Clark and Greenawald (2014), in their study of nurse-physician collaboration, also noted that limited role understanding was detrimental to the collaborative process. Similarly, Chong et al. (2013) found that reliability issues with the delivery of information between HCPs negatively affected IPC. The types of communication methods used, hierarchy within the team, and personal values related to power sharing have been shown to affect team process and prevent the attainment of the benefits of IPC (Choi & Pak, 2007; McNeil et al., 2015).

The availability of team members was a critical factor in their ability to communicate. Participants remarked that when team members were not mentally and/or physically present, collaboration suffered. Mental unavailability was depicted as team members being disconnected or disengaged, often remaining silent during care conferences/team meetings or refusing to acknowledge another HCPs' input; while physical unavailability was equated with geographic proximity of team members or the effects of extremely high workloads that negatively impacted HCPs' availability to communicate with team members. Some participants complained that the layout of their CHC, such as long corridors with offices alongside one another, posed challenges to communication and collaboration that were comparable to team members being co-

located in different buildings. The challenges to IPC by team member co-location is well documented in the literature (Choi & Pak, 2007; Culver Clark & Greenawald, 2014; Dinh et al., 2014; Goldman, Meuser, Rogers, Lawrie, & Reeves, 2010; McNeil et al., 2015; Sinclair, Lingard, & Mohabeer, 2009; Xyrichis & Lowton, 2007). Both Goldman et al. (2010) and Xyrichis and Lowton (2007) acknowledge that communication can be facilitated or hindered depending on the physical layout of the premises. If HCPs are not able to interact with ease, communication and team functioning suffers. In addition, the effects of decreased communication related to co-location across various buildings or sites can result in diminished integration within the team, limiting team effectiveness (Xyrichis & Lowton, 2007). To facilitate collaboration, the team must be brought together, either physically or virtually, to communicate (Choi & Pak, 2007).

Lastly, in their characterization of IPC, participants commented on the importance of a sense of belongingness within their team. Belongingness, considered one of the most basic human needs for psychological well-being, is an individual's perception of their relational value in the eyes of others; essentially, it is a sense of who they are and their social worth (Cockshaw, Shochet, & Obst, 2014; Colyer, 2008; Mohamed, Newton, & McKenna, 2014). Belongingness encompasses two central tenets: 1) the sense of being valued, needed, or accepted; and 2) the impression that one's uniqueness and attributes coalesce with the system or environment in which one interacts (Cockshaw et al., 2014; Mohamed et al., 2014). It is offered that working within collaborative teams enhances the degree of belongingness (Mohamed et al., 2014).

Participants in this study described belongingness as occurring when they were socialized into the CHC team, both formally (e.g.; team meetings, care consultations) and

informally (e.g.; eating meals together, going out after work). When they had opportunity to connect in these ways, they described feeling more in sync and understanding towards each other. Some participants observed that when they interacted with one another in a way that was not work related they experienced a deeper, more personal connection. Culver Clark and Greenawald (2014) also maintain that HCPs need to support each other outside of professional clinical associations and when they do, strong interpersonal relationships develop, which are critical to effective IPC.

Tataw (2012) offers that in an interprofessional environment, socialization should begin at the recruitment and selection phase where new hires would be chosen based upon their readiness or potential for IPC practice. In theory, this sounds like a magnificent idea; however, in the current reality of health human resources shortages and the state of IPE, it is unlikely at this time. With critical shortages in all HCP groups, the luxury of hiring only those with a demonstrated record of working in an interprofessional manner is unrealistic and impractical. There are far too many vacancies with too few IP practice ready HCPs to fill them. As well, despite the progress that has been made over the past decade to institute IPE as the preferred method of HCP preparation (Schmitt, Gilbert, Brandt, & Weinstein, 2013), guaranteeing a body of interprofessional practice ready HCPs to fill these critical shortages is also not reasonable as not all educational institutions have been able to fully adopt IPE given its complexity, diversity, and logistical difficulties (Thistlethwaite, 2012).

ICAR Competencies and Self-Assessment

Competency frameworks, upon which the ICAR tool was developed, provide consistent standards of interprofessional practice while facilitating understanding and

implementation of team based care (Reeves, 2012; Thistlethwaite et al., 2014). They define professional competence, establish consistent standards of practice, validate work that is considered important, and provide critical examples of required behaviours while revealing the complex relationship between knowledge, skills, and attitudes (Reeves, 2012). Even as the importance of IPC has been recognized (Zwarenstein, Goldman, & Reeves, 2009; Reeves, Fox, & Hodges, 2009; Reeves, 2012; Schmitt, 2001; Suter et al., 2009) and the need for conceptual frameworks to guide the development of IPC in the practice setting acknowledged, little clarity exists about how to determine whether the competencies are actually being implemented (Conway, Little, McMillan, & Fitzgerald, 2011; Hepp et al., 2015). Predominantly, the literature has focused on knowledge of and attitudes towards IPC, without considering how, or even if, IPC competencies are enacted in a practice setting (Hepp et al., 2015). It is hoped that use of the ICAR tool to assess IPC in CHC practice has rectified this dilemma to some extent.

Self-assessment is considered a transformative element in the learning process. When people assess themselves they are actually questioning their actions, judging themselves accordingly, and making decisions regarding the next best move (Boud, 2005). Essentially, they are trying to determine “what they know and what they can do” (Boud, 2005, p. 11) while identifying their strengths and weaknesses (Eva & Regehr, 2005). According to Boud (2005), there are three main assumptions on which self-assessments are based: 1) it is essential for life-long learning because learning can only take place when one considers what is known, what needs to be known, and how to bridge the gap between these two; 2) it is a skill that needs to be developed; and, 3) it is necessary for effective learning to take place for if a person is to learn they must be able

to proactively monitor how they learn and modify learning strategies accordingly. In particular, the ability to assess one's strengths and weaknesses builds capacity in daily practice by creating a "balance of confidence and caution, of persistence and flexibility, of experimentation and safety, and of independence and collaboration" (Eva & Regehr, 2005, p. S47).

All participants acknowledged the relevancy of the IPC competencies to their practice, regardless of their professional/occupational designations or their role within the CHCs. The language used by participants to describe IPC, for the most part, mirrored the terminology used in the competency categories and BIs of the ICAR tool (Curran et al., 2011). For example, participants talked about integrating information from team members into care plans, the importance of incorporating the roles and responsibilities of others with one's own, and communicating in a respectful manner, to name but a few. By using similar terminology to that of the ICAR and describing their work environments, these HCPs gave the impression that they were very familiar with IPC and practiced it to a high degree in their daily work; therefore, ICAR self-assessment scores at an '*above expected*' level for all competency categories was not entirely unexpected.

Nevertheless, four of the six competency categories were positively skewed (i.e.; *Communication, Collaboration, Patient/Family-Centered Approach, and Conflict Management*), suggesting that participants perceived themselves at the lower end of the '*above expected*' range. Despite the fact that this is still a high score, this finding is worthy of comment because the language that participants used in their interviews coupled with the way in which some described their work practices would suggest otherwise, perhaps scores at the highest level, as communication, collaboration, and the

ability to achieve patient goals was spoken of frequently and with much commitment. Conceivably the difficulties noted in relation to communication technology can directly explain the lower scores in the *Communication* competency category and certainly, given that participants rarely mentioned conflict in their descriptions of IPC, one could anticipate a lower score in this category as well. But these rationales do not explain the *Collaboration* and *Patient/Family-Centered Approach* competency scores as these were areas that participants particularly focused on in their descriptions of IPC. The remaining two competency categories in the ICAR tool, *Roles and Responsibilities* and *Team Functioning*, had a slight negative skew indicating that the majority of participants rated themselves in the highest range on the Likert scale. Findings from HCPs' definitions of IPC corroborate these scores as participants revealed that role understanding was integral to effective team functioning, which was endorsed by all participants.

Also noteworthy, were the 20 'Not Observed (N/O)' BI scores given by one participant. For eight of these 20 BIs that related specifically to patient care planning/provision, an 'N/O' score was reasonable as this person's role in the CHC did not encompass direct involvement with patients/families. However, the remaining BIs scored in this manner are perplexing as these are knowledge and skills attributable to successful team collaboration and should be attainable irrespective of a HCP's role. Considering this participant's powerful and articulate description of IPC and his/her account of working in a collaborative team environment, it appears that something is amiss. In the interviews, was this participant describing their reality or was it merely optimism or a desire for something better? Was she/he telling me what she/he thought I wanted to hear? Was she/he being self-deceptive? Or, did she/he realize after completing

the self-assessment that she/he was not as collaborative as she/he once thought? Answers to these questions are difficult to obtain. What is known is that assessment of competencies is challenging. Many of these core competencies are observable knowledge and skills and therefore should be straightforward to measure; however, others are attitudinal in nature, posing difficulties for clear-cut assessment (Martinez, Pfeifle, & Ballard, 2013). As well, one must consider response bias in self-report situations, such as faking good and social desirability (SoD) (King & Bruner, 2000; Martinez et al., 2013; Streiner & Norman, 2008). Some respondents deliberately try to deceive by creating false-positive responses, known as faking good or impression management; whereas others are not being intentional in giving false responses, they are presenting unconscious misperceptions of themselves that are relative to social norms and mores – known as the SoD response. SoD responses can be influenced by the individual, gender, cultural background, the particular question, and the context in which the question is asked (e.g.; face-to-face interviews versus surveys) (King & Bruner, 2000; Streiner & Norman, 2008). As it is unclear whether this respondent was faking good or exhibiting SoD, their results must be interpreted with caution. However, as both face-to-face interviews and online surveys were used in this study, perhaps this participant felt more comfortable being candid in the online context as opposed to the face-to-face interviews.

Getting the most out of a small sample size. The statistical analytical plan (Chapter Four, p. 165-168) was constructed so that a maximal amount of information could be gleaned from the small sample size (n=15). Multiple CHC sites and diverse HCP groups were invited to participate so that this broad representation would improve generalization of the quantitative findings. Through examination of the data set

demographics (e.g.; the distribution of participants by profession, gender, employment status), the findings are what one would expect in CHC practice. For example, there was diversity of professional/occupational designations, not only among those who participated in the study, but also among the teams in which participants reported working. These findings are similar to those from a report by the Conference Board of Canada (2012) that described CHC teams as being comprised of physicians, social workers, dieticians, and nurses, to name but a few. In relation to gender, according to the Canadian Institute for Health Information (CIHI) (2011), 78% of all health-related occupations are comprised of women, similar to the demographics in this study, where 87% of participants were women. The percentage of full-time versus part-time work in all health-related occupations in Canada is 77% and 23%, respectively (CIHI, 2011), figures that are comparable to those in this study, where 73% of participants worked full-time versus 27% who worked part-time or casual. Careful consideration of how representative the sample or setting is to the population improves the external validity of the study. As can be seen in this study, the demographic data were representative of primary care practice sites in Canada.

Examination of the descriptive statistics indicated that overall participants believed themselves to be demonstrating the knowledge and skills attributed to each ICAR competency category at the *'above expected'* level (> 6 on the nine-point Likert scale). The distribution of the variables show that the amount of variance of the competency categories and BIs were quite low. For example, the coefficient of variation was 22% or lower for the six competency categories and less than 27% for the 31 BIs, indicating data that have relatively little statistical noise (random error).

It was not possible to conduct multivariate analysis given the small data set; however, bivariate analysis could be performed. Non-parametric pointwise biserial correlation analyses were completed for the competency categories and BIs. A very high degree of correlation was evident among the competency categories and correlations of the BIs indicated a strong positive relationship to the competency categories as well as to the overall survey. Further to this, the internal consistency of the ICAR tool was well assessed by Cronbach's alpha suggesting that all competency categories are related and measure the same construct. Essentially, the ICAR measures what it purports to measure. These correlation analyses shed light on the content and construct validity of this limited data set, particularly when they are considered alongside the qualitative analyses. The trueness of the conclusions drawn from the quantitative observations is demonstrated by the consistency of the qualitative observations, in addition to what exists in the literature.

The prevalence of IPC competencies were estimated albeit at a greater assumed difference and at a lower level of confidence than originally anticipated. Through power analysis, the levels of statistical confidence in the prevalence estimates of IPC competencies were determined. Using the standard sample size formula for comparing two proportions, the confidence one would have with various effect sizes and levels of precision with the given sample size were calculated. Although a 95% level of confidence is typically used in research and provides a higher level of precision than the 80% or 90% level, when considering the context of this study – to determine whether self-assessment for IPC competencies changes an individual's perception of productivity – is a 95% confidence level actually more meaningful than an 80% or 90% confidence level? By accepting a lower level of confidence, one must accept a narrower confidence interval,

less precision, and therefore an increased level of risk and uncertainty. But, it is important to remember that the choice of confidence level used depends on the consequences of being wrong. For example, in pharmaceutical research, one would want a very high degree of certainty (i.e.; 99%) because to not have one could result in dire consequences such as severe injury or death. On the other hand, if only reasonable evidence is required and the cost of being wrong is not disastrous, an 80% level of confidence may be quite sufficient (Sauro, 2015). I offer that the consequences of being wrong in this study are not dire and that a meaningful difference between groups (i.e.; 30%) at a confidence level of 80% is ample when considering whether HCPs demonstrate the knowledge and skills attributed to IPC. The outcome of this analysis plan allowed for the estimation of the prevalence of IPC competencies given the limited level of confidence regarding these prevalence point estimates.

After the ICAR Self-Assessment

Self-assessment was viewed as a learning tool by the participants in this study. Assessment for the IPC competencies afforded them the opportunity to reflect upon their behaviour when working with their team, while at the same time providing the means for them to examine in close detail the knowledge, skills, and attitudes associated with IPC. When questioned as to whether these activities had modified their definitions of IPC, participants denied any great changes per se, instead acknowledging a greater appreciation for collaboration. Some participants proclaimed that their definition had expanded somewhat, for example, that they had not thought of including certain competency categories (e.g.; conflict management) as an essential component of IPC, a finding corroborated by Hepp et al. (2015) in their investigation of collaborative practice

in acute care. Other participants depicted the experience of self-assessment as heightening their awareness of IPC. For instance, some described mentally assessing themselves and others on their team for the IPC competencies well after they had completed the ICAR survey, a behaviour that they admitted they would not have done prior to the self-assessments. Moreover, participants suggested that they would like to use this type of tool to assess themselves on a recurrent basis, so that they could stay abreast of any regression of their collaborative behaviour. Other participants proposed introducing the tool to their team so that together they could evaluate the team's ability to collaborate. Research would support that the perceptions of team members regarding team functioning are important to understand (Schroder et al., 2011). When teams recognize their current strengths and weaknesses as they pertain to collaborative practice, they can decide collectively on priorities for learning (Schroder et al., 2011). When the competencies required for optimal performance are developed by team members, team effectiveness will be improved (Andreatta, 2010).

According to Eva and Regehr (2005), self-assessment should be executed in three forms: summatively, predictively, and concurrently. Summative self-assessment involves reflection on one's performance relative to what should be done, what peers may do, or to a gold-standard. In some cases, in a summative self-assessment people might question their confidence in the outcomes, for instance, could there have been a better way to achieve the results? Or they may draw general conclusions about their performance, such as, am I minimally competent or were there circumstances that may have impacted the outcomes (Eva & Regehr, 2005)? Participants in this study expressed all of the aforementioned summative questions about their ability to collaborate, even suggesting

that peer-assessments would have provided greater clarity to them about their performance. Unfortunately, given the low number of participants per CHC there were not enough HCPs enrolled in the study to conduct confidential peer-assessments.

Predictively, self-assessments can be used to determine one's ability to deal with new situations. Through predictive self-assessment, one can question whether goals are realistic, if additional training or preparation is needed, and/or what other resources might be necessary (Eva & Regehr, 2005). The beginning of predictive assessment was witnessed during the second interviews. Participants proposed using the ICAR tool in their practice to help them identify areas that need further development, such as conflict management skills or the ability to articulate their roles and responsibilities to others on their team. Some participants considered approaching their manager and/or team members, or those whom they perceived as more collaborative, to act as possible resources for further development of IPC.

The last type of self-assessment, concurrent, refers to self-evaluation during performance of a skill. In this type of self-assessment, questions arise as to whether one is getting the expected results, should anything be done differently, are additional resources required, or does the plan need to be adjusted (Eva & Regehr, 2005). In this study, participants were not asked to assess themselves in this manner nor did they express that they would use the knowledge gained about the IPC competencies in this way, therefore predictive self-assessment cannot be evaluated at this time.

Despite acknowledging a heightened awareness and/or a broadened definition of IPC, participants also cautioned and emphasized that there is a distinction to be made between knowing something and doing something. They revealed that due to barriers

within their workplaces and/or impact from the health care system there were times when they were unable to or prevented from collaborating. Once again, this is a noteworthy finding because the high ICAR scores would suggest otherwise. If these scores were reviewed in isolation, one would assume that collaboration is consistently taking place within these CHCs at levels that are higher than may be expected; yet when coupled with findings from the interviews, participants tell a very different story. These findings underscore the value and usefulness of using a mixed-method approach to uncover the full picture of IPC and productivity. In essence, these HCPs know what IPC is but they are not always able to enact it. The particular barriers to IPC will be discussed shortly in relation to productivity as many of the barriers are similar between the two concepts.

Participants have painted a vivid picture of IPC within their practice settings, with their ability to define and describe this concept using language that is consistent with current literature. Despite their capability to define such a complex concept, participants admitted that barriers prevented them from practicing in a fully collaborative way. This discovery leads one to ask: did the extent to which they were free to collaborate impact their productivity?

Perceptions of Productivity

As the reader will recall, participants were asked about their own and their team's productivity both prior to and following self-assessment for the IPC competencies. The study was structured in this way as it was hoped that participants would gain some insight as to how IPC may or may not affect their own and their team's productivity. Discussion of the findings related to both types of productivity, before and after the self-assessments, follows.

Perceptions of Personal Productivity: Before the ICAR Self-Assessment

Since productivity is a difficult concept to define and measure, especially so within the healthcare context (Moffatt, Martin, & Timmons, 2014), it would seem prudent to gather insight from the people who are actually providing care and on whom productivity is being measured. Yet there are few studies that consider HCP perceptions regarding productivity (Nayeri, Nazari, Salsali, Ahmadi, & Hajbaghery 2006), which is remarkable given the complexity of the topic. To make matters more challenging, there are multitudes of productivity definitions, each with its own economic equation, leading to disparate measurements (Nayeri et al., 2006). In the healthcare context, it has been argued that incongruencies arise because these measurements are most often based on economic theories of productivity (e.g.; cost versus revenue) rather than on outcomes of care (Nayeri et al., 2006). In fact, May (2012) contends that productivity in healthcare must be based upon “more than the number of hours worked or procedures performed”; it should be “informed by the outcomes achieved” (p. 14). Others would not necessarily agree. Tomblin Murphy, Birch, MacKenzie, et al. (2011) suggest that rather than focusing solely on outcomes, HHR planners should also consider the quantity of best-practice/evidence-based services provided.

Findings in this study tend to corroborate May’s statement above as the vast majority of participants equated personal productivity with their ability to achieve or contribute to positive patient outcomes. Similarly, in a study with Iranian nurses, Nayeri, Negarandeh, Vaismoradi, Ahmadi, and Faghihzadeh (2009) found a significant positive correlation between personal accomplishment and productivity, where personal accomplishment originated from intrinsic rewards that were linked to a sense of helping

others. Other research studies have defined productivity as occurring when one is professional, efficient, and effective in providing high-quality care (Nayeri et al., 2006; Nayeri, Bahabadi, & Kazemnejad, 2014), and conceivably, high-quality care will lead to better patient outcomes (May, 2012).

It is important to note that for the participants in this study improved patient outcomes did not necessarily equate to cure but rather was associated with patient satisfaction with the care they received. Essentially, participants believed that they were productive when they were able to unearth the *real* patient problem and/or when the patient appeared to be satisfied with their healthcare encounter. This is an important finding related to outcome measurement for it begs the question regarding what outcomes are important to measure when measuring productivity? Porter and Lee (2013) maintain that outcome measurement often leans toward indicators that are straightforward and non-controversial (e.g.; measuring practice guidelines), many of which are not helpful as they do not measure quality or the impact of care. They argue that these types of outcome measures fail to capture the things that really matter to patients such as health status (i.e.; functional status); the cycle of care and recovery (i.e.; level of discomfort, anxiety related to long wait times, length of time it takes to resume normal activity); and, sustainability of health (Porter & Lee, 2013). By measuring these types of outcomes and addressing deficiencies that are of primary concern to patients, Porter and Lee (2013) contend that one will be better able to meet patient needs while increasing productivity and in doing so decreasing health care costs.

It would seem that a majority of participants in this study would agree with this concept as they noted that when they had the time and were fully able to address patient

needs, as identified by patients themselves, they were ultimately able to prevent hospital admissions that they speculated benefitted the healthcare system monetarily. They also reported feeling highly productive in these situations. Yet participants also voiced concern that it was difficult to prove to their managers that they were productive when it took considerably longer than anticipated to address patient needs as there were no metrics that adequately monitored patient outcomes or captured the effort expended by HCPs to meet said needs. There was clearly a difference in opinion regarding productivity in these CHCs, with managers reportedly being focused on the number of patients seen per day and HCPs focused on improving patient outcomes irrespective of the time it took to do so.

Participants described managers as only being concerned with time and money and criticized that they had no appreciation of the clinical prowess it took to address patient needs. When speaking of these types of situations, participants openly displayed resentment that their efforts to prevent poor patient outcomes were not understood by those in leadership positions. Moffatt et al. (2014) substantiate this position in their suggestion that HCPs interpret managerial priorities such as efficiency, cost control, and accountability as “an intrusion into the sacrosanct ethical world of professional and caring values” (p. 687). However, in defense of a purely economic managerial focus, it must be acknowledged that implementation of efficient, cost-effective IPC teams is challenging because it is difficult to establish whether they “produce benefit at an extra cost that is acceptable to the payer or to society” (Dinh & Bounajm, 2013, p. 13) or even whether they generate a return-on-investment (ROI).

In order to estimate ROI, one would need to know how much it costs to deliver interprofessional care in addition to any projected health and economic benefits, metrics that are not readily available in Canada due to insufficient or zero reporting of the type of data required (Dinh & Bounajm, 2013). Making it more difficult, HHR planners do not know how much money the public is willing to spend on health care (Verhulst, Forrest, & McFadden, 2007). With such diverse views regarding productivity and its manifestation in the practice setting, a need to bring managers and HCPs together to clarify their perceptions of productivity and to establish methods to capture data that are meaningful to both parties is warranted.

A large number of participants also associated their own productivity with the ability to accomplish all items on a checklist or, if this was not possible, to modify and re-prioritize the checklist. Similarly, in a qualitative study of nurse perceptions of personal productivity, McNeese-Smith (2001) also found that nurses evaluated their productivity as the ability to work hard, finish all tasks, and provide excellent care. Besides being a way to organize daily responsibilities, perhaps the use of checklists for participants in this study is a means for them to track what they did with each patient so that there would be an account of activities should the manager inquire. Or perhaps it provided a sense of personal accomplishment. Whatever the reason behind their use, participants described the importance of using checklists to gauge their personal productivity. It appears that this is not an uncommon practice as checklists are increasingly being used in healthcare as a means to organize complex care, facilitate teamwork, and improve processes, efficiency, and safety (Herring, Caldwell, & Jackson, 2011).

A point that is worthy of note is that a few participants, from different professional backgrounds, believed they were not productive if they had to confer with or refer a patient to another HCP in the process of helping patients attain their health care goals. This is a very different finding to that in the literature where collaboration was often equated with referral and consultation (Fickel, Parker, Yano, & Kirchner, 2007) and is somewhat troublesome given that these same participants described their practice as collaborative yet perceived themselves as failures if they could not singularly meet all patient needs. It appears that these participants could not mentally forge a link between collaboration and their own productivity because they only equated personal productivity as occurring in isolation to others. In other words, if they single-handedly got the job done, they believed they were productive; if they did not, they were not. This type of thinking may have significant impact on the healthcare system because although there may be certain times when a single HCP can address patient needs, oftentimes it requires the efforts of many in order to prevent duplication of services, delays, and errors (Xyrichis & Lowton, 2007). Certainly, given the complexity and reach of PHC it seems reasonable to expect that these types of services require a combination of HCPs who work in collaboration with one another.

Perceptions of Team Productivity: Before the ICAR Self-Assessment

Contrary to participant views regarding personal productivity, when participants described team productivity, the majority invariably related it to IPC; essentially, without one there could not be the other. Participants described their team as productive when they were able to provide patient-centered care by means of working collaboratively while ensuring that the best-suited HCP was available in relation to patient needs.

Participants recognized that it was vital that they be able to differentiate when they require assistance from other HCPs, an opinion supported by Choi and Pak (2007) in their recommendation that HCPs have insight regarding their knowledge level and realize that a range of HCP expertise may be necessary.

Role understanding emerged as a fundamental concept to team productivity, for without it team members would not be able to identify the most appropriate care provider required to attend to patient's needs. Being familiar with the roles, responsibilities, and accountabilities of other team members is considered essential for HCPs working in collaborative teams as it allows for appropriate delegation of tasks based on inherent knowledge and skills (Barrett et al., 2006; McNeil et al., 2015). Improving quality of care, while at the same time achieving increased productivity and efficiency, can be realized when HCPs are appropriately assigned based on their education and expertise (May, 2012; Thompson & Stanowski, 2009). Less critical tasks should be matched with the least medically skilled worker so that HCPs with the requisite competencies can be assigned to the most essential needs. For example, rather than having those with higher levels of health education (i.e.; nurses, physiotherapists) make patient appointments or clean equipment, these tasks should more appropriately be assigned to those with lower or no health education (i.e.; desk clerks, aides, cleaning staff). Unfortunately, this was not the reality in some of the CHCs, as a number of participants in this study expressed concern that they were wasting valuable time completing these types of tasks which invariably and negatively affected their productivity. However, it must be acknowledged that the ability to identify the appropriate mix of HCPs to meet service requirements while staying within budget remains a challenge for many administrators as it requires

comprehension of HCP scope of practice and competencies in addition to being conscious of the evidence of efficiency and cost-effectiveness (Dinh et al., 2014). Regrettably, as was described earlier in this chapter, these types of data are neither readily available nor accessible.

Another key concept in participant's perceptions of team productivity was that of patient-centeredness, where the self-identified needs of patients and the ability to attend to these needs by the team are of primary importance. When able to practice in a patient-centered way, participants suggested that a team approach to care thrived. D'Amour et al. (2008) also commented that when HCPs focused on the needs of patients, collaboration flourished. Although there is no commonly agreed upon definition of patient-centeredness, despite the concept being in healthcare literature for over two decades, the description offered by participants somewhat resembles that presented by Kitson, Marshall, Bassett, and Zeitz (2012) in their narrative review and synthesis of the topic. Kitson et al. (2012) identified three main themes and sub-themes of patient-centered care: Theme 1) patient participation and involvement: patient involved as a respected and autonomous individual; care plan based on needs; and, physical/emotional needs addressed; Theme 2) relationship between patient and HCP: genuine relationships developed; open communication of knowledge and personal/clinical expertise; HCPs have appropriate knowledge and skills; and, a cohesive and cooperative team of HCPs is available; and Theme 3) the context where care is delivered: system issues such as access, barriers, and the organizational system are identified. Similar concepts to those identified by Kitson et al. (2012) were discussed by participants and include respecting patient needs as voiced by patients themselves, developing care plans based on patient

needs, recognition of appropriate knowledge and skill, and role recognition within team-based care. Notably however, participants did not mention the importance of patients as active members of the team, a theme that is prominent in the work of Kitson et al. (2012) and which is also key in the interprofessional literature (Canadian Interprofessional Health Collaborative, 2010; Chan et al., 2010; Dinh et al., 2014; Orchard et al., 2012; Saba, Villela, Chen, Hammer, & Bodenheimer, 2012; Suter et al., 2007; Thompson & Stanowski, 2009). Perhaps this is because they do not know how to actually begin this type of relationship (i.e.; patient as team member) as it is relatively new to the healthcare context. D'Amour et al. (2008) also noted that despite extensive literature on the necessity of patient participation in collaboration, there is no suggestion as to how to attain it. This is an interesting realization because patients often seek advice from different members of the healthcare team, yet may not be considered members of the team (Chong et al., 2013). Optimally, teams should work interdependently with the patient (Thompson & Stanowski, 2009) to achieve patient-centered care.

Lastly, in their discussion of their perceptions of team productivity, participants indicated that IPC resulted in higher productivity. Begun, White, and Mosser (2011) would agree, suggesting that IPC could be a promising approach to address cost control, value creation, maximization of productivity, and improved quality of care. Certainly, the Canadian government considers the implementation of highly functioning IPC teams in PHC as a way to improve the effectiveness and efficiency of the health care system (Dinh et al., 2014). In an analysis of the cost benefits of IPC in PHC, Dinh and Bounajm (2013) demonstrated that improved access to IPC resulted in a number of substantial benefits, including a “15 per cent reduction in Type 2 diabetes complications, an expanded labour

force of about 52,000 person-years among depression patients, and almost \$3 billion in direct and indirect cost savings” (p.1). Restructuring the way in which HCPs work together to deliver care is promising from both an economic and health perspective (Dinh & Bounajm, 2013). Effective IPC has been associated with greater innovation, improved quality of care, enhanced patient outcomes, lower healthcare costs, reduced wait times, reduced staff turnover rates, improved resource utilization, and a more productive workforce (Andreatta, 2010; Clements, Dault, & Priest, 2007; McNeil et al., 2015; Xyrichis & Lowton, 2007).

Perceptions of Personal and Team Productivity: After the ICAR Self-Assessment

It was hoped that through the process of self-assessment for the IPC competencies participants would reflect on the link between IPC and productivity. In relation to personal productivity, responses were mixed with some participants refuting any changes to their perceptions and others acknowledging that since the self-assessments they now regarded their productivity differently because they realized that they never really worked in isolation to others.

Those who experienced no change did so, not because they could not envision a link between the two concepts, but because they experienced challenging working conditions (e.g.; entrenched medical model, heavy workloads) and a lack of organizational change that persevered due to what they described as inadequate leadership. Participants reported wanting a leader who would support new practice models, but described their managers as lacking the skills necessary to foster change or to address challenges within these practice settings because they did not have the education necessary to comprehend the intricacies of IPC or to reframe their views of productivity

outside of the typical economic definitions. Likewise, in their final report of a research series that focused on improving primary care in Canada through collaboration, Dinh et al. (2014) reported that approximately 30 percent of their survey respondents identified a lack of governance and leadership as barriers to highly-functioning IPC teams in PHC. It is important to recognize that individual provider change can only be achieved if there is organizational level change that eliminates the barriers to IPC (Chong et al., 2013; D'Amour et al., 2008; Tataw, 2012). The importance of organizational leadership that focuses on cultivating change, learning, collaboration, shared values, and innovation cannot be understated as managers are integral for setting expectations, allocating time for collaboration, and for encouraging innovative practice models (Suter et al., 2007).

When the conversation shifted from personal to team productivity, participants again denied any great changes to their perceptions, which is not surprising given that in the pre-ICAR survey interviews they had already closely associated the two concepts. Nevertheless, even though participants did not experience any changes to their perceptions, they strongly identified with the need to be proficient in their abilities to collaborate so that they could role model this behaviour for others. By doing so they speculated that team collaboration would be fostered and as a result their team would be more efficient. They are not alone in their suppositions as Canadian decision-makers also endorse effective teamwork is a means to realize improved quality and productivity (Clements et al., 2007).

Role modelling IPC so that others can become proficient is an important concept to consider given the reported varying degrees of collaboration in the CHCs. A few participants acknowledged having some type of education that supported their ability to

collaborate; however, this was not universal for all participants or in all CHCs. In lieu of any formal IPE, participants speculated that role modelling might be a viable means to advance IPC. Literature recognizes that observation, imitation, and sharing of experiences may indeed propagate interprofessional best practice models (Bartel, Beaulieu, Phibbs, & Stone, 2013; Makowsky et al., 2009; Suter et al., 2007). Yet, some participants expressed concern that to their knowledge neither managers nor physicians had participated in any kind of IPE, which then made it difficult for participants to apply in practice what they had learned in their IPE experiences. Since physicians are considered to be team members and crucial to team functioning, it stands to reason that they should be expected to take part in IPE to advance a practice model that may allow for increased efficiency and productivity. Given the well-known power, authority, and status that physicians continue to possess within the health care system (Nugus, Greenfield, Travaglia, Westbrook, & Braithwaite, 2010), physician engagement is considered crucial to the success of instituting and advancing IPC; therefore, concern has been expressed regarding limited physician involvement in practice setting IPE offerings (Hollenberg et al., 2009). Furthermore, if managers are to support the cultural and organizational conditions for IPC to thrive, there is a clear need to include managers in IPE as well (Begun et al., 2011).

To facilitate continued proficiency in IPC, both at the individual and team level, participants recommended regular evaluation for the IPC competencies. They believed that doing so would bring the team closer together and allow for open, honest sharing and support. These participants are not alone in their thinking, for both Xyrichis and Lowton (2007) and Dinh et al. (2014) recommend recurrent and consistent evaluation of “cost

effectiveness, provider and organizational performance, and use of data linkage, and knowledge sharing across teams as a means to monitor team performance and productivity” (Dinh et al., 2014, p. 55). Xyrichis and Lowton (2007) found that when there was not regular evaluation of PHC teams, team members became frustrated. On the other hand, when team evaluation did occur it provided a foundation to improve team functioning.

In relation to team productivity, participants also discussed the negative effects when people joined their team who were not collaborative and/or when they themselves were not able to collaborate with others on their team. There seemed to be little tolerance for either scenario. For those participants who alleged to be working in a fully integrated IP team, they were unwavering in their declaration that they would not tolerate a new hire trying to change team function and process back to a model that supported hierarchy and control. They believed that it was their responsibility to familiarize the new hire with the tenets of collaboration through discussion and role-modelling; however, if the new person was unable or unwilling to adapt and chose to leave, participants stated that this was probably the best for everyone involved. Their beliefs are founded in the literature as Tataw (2012) also supports the necessity of socializing new hires into the interprofessional team and of providing education to help them understand the knowledge, skills and abilities (read: competencies) for IPC.

Of possibly more concern however is the fact that a few participants admitted to having thoughts of leaving their team because they have been prevented from collaborating. These individuals were clearly dissatisfied with their working conditions and were taking significant steps to rectify their situation by leaving. There is much

literature regarding the relationship between IPC, job satisfaction, and retention of high-quality HCPs (Gausvik, Lautar, Miller, Pallerla, & Schlaudecker, 2015; McNeil et al., 2015; Nayeri et al., 2009; Suter & Deutschlander, 2010; Thompson & Stanowski, 2009). Findings suggest that recruitment and retention are increased when high quality team work exists. It is logical to assume then that the ability to retain staff that are happy and fulfilled with their working conditions will ultimately result in positive effects to team productivity. The opposite is also true. In a study that estimated the productivity effects of team interruptions through departure of experienced nurses, addition of new hires, and use of temporary nurses, Bartel and colleagues (2013) found that these types of disruptions were associated with significant decreases in productivity.

Barriers to IPC and Productivity

Throughout all discussions of IPC and productivity, invariably the conversation turned to the factors that prevented successful attainment of each. There were strong similarities between each concept in relation to their identified barriers, which is not unanticipated given the close relationship between the two concepts. Participants acknowledged a well-entrenched medical model, hierarchy, turf protection, widespread bureaucracy, and HCP remuneration discrepancies as key barriers to IPC and productivity. A multitude of barriers to effective IPC have been well established within the literature and include: inadequate IPE and training; lack of strong governance and leadership; professional-interprofessional agenda conflicts; lack of collaborative work cultures; different program funding methods that constrain team composition; absence of supportive organizational or health system environments; differing professional cultures, value systems, and philosophical approaches to patient care; negative stereotypes

perpetuated from a lack of educational socialization; gender and social class differences; and, differing legislative regulation (Baker et al., 2011; Bihari Axelsson & Axelsson, 2008; Dinh et al., 2014; Gilbert, 2005; Hall, 2005; McNeil et al., 2015; Nayeri et al., 2006; Oandasan & Reeves, 2005; San Martin-Rodriguez, Beaulieu, D'Amour, & Ferrada-Videla, 2005; Suter et al., 2007; Tataw, 2012). Barriers such as these prevent HCPs from working collaboratively and have been related to increased health care costs and decreased productivity (Nayeri et al., 2014).

The dominance of the medical model and the resultant territoriality and hierarchical culture between physicians and other HCPs has been identified as one of the most important barriers to effective IPC (Bihari Axelsson & Axelsson, 2008; Clements et al., 2007; Dinh et al., 2014). The consequential power struggles inherent in these hierarchies interfere with the inclusion of all team members and sabotage team work (Chong et al., 2013; Clements et al., 2007; Orchard et al., 2012; McNeil et al., 2015; Xyrichis & Lowton, 2007). The medical model is a difficult one to eradicate as physicians have long enjoyed decision-making power and control at all levels of the system. Although the grounds for their dominance are multifaceted, one particular explanation relates to the establishment of Medicare in Canada and which has a distinct impact within the PHC setting.

To facilitate engagement in a universal and comprehensive national health insurance program, in the 1960s physicians in Canada were promised a cadre of incentives including continuance of fee-for-service remuneration, clinical autonomy, and complete jurisdiction over their practice; incentives that have lasted to this present day. In lieu of endangering physician loyalty to Medicare, it has been speculated that federal and

provincial policy-makers are now hesitant to challenge their power status by making any changes to these incentives (Hutchinson et al., 2011). As participants in this study noted, traditional fee-for-service remuneration for physicians reinforces the status quo and continues to be a significant barrier to IPC and productivity. Others would agree as research supports that in fee-for-service models there are few financial incentives to share service provision or even decision-making with other team members (Dinh, et al., 2014; Clements et al., 2007). Unfortunately, without changes to enticements such as these that perpetuate the medical model and the resulting hierarchy, IPC and improved productivity will be difficult to achieve.

It is important to also note that hierarchy and power struggles are not reserved just for interprofessional relationships for they are also known to occur intraprofessionally, most notably within the nursing profession (Almost, Doran, McGillis Hall, & Spence Laschinger, 2010; Huynh, Alderson, Nadon, & Kershaw-Rousseau, 2011). Participants in this study observed struggles between nursing professionals on their team and considered these situations as barriers to working collaboratively. It has been postulated that preservation of power and control in professional groups serves a purpose, mainly to protect its unique body of knowledge while overseeing entry into the profession so as to secure economic, social, and political gain (Baker et al., 2011). Within the nursing community (e.g.; licensed practical nurses, registered nurses, nurse practitioners, and registered psychiatric nurses), this differential status has resulted in poor nurse-to-nurse relationships and conflict. In fact, the most common and most stressful source of conflict for nurses was reported to be with their nursing managers and colleagues (Almost et al., 2010). Poor nurse-to-nurse relationships and conflicts have serious impacts including

poor work performance, reduced productivity, absenteeism, poor job retention, and negative patient outcomes (Almost et al., 2010; Weaver Moore, Leahy, Sublett, & Lanig, 2013). With such significant and grave consequences, it is imperative that the barriers to IPC and productivity be addressed both intra- and interprofessionally. In doing so, it is hoped that multiple benefits can be realized for patients, providers and the health care system.

Consideration of the Theoretical Framework

The Health System and Health Human Resources Planning Conceptual Framework (Tomblin Murphy & O'Brien-Pallas, 2006), Analytical Framework (Birch et al., 2007), Simulation Model (Tomblin Murphy et al., 2009), and the Service-based (formerly known as the Competency-based) Health Human Resources Planning Framework (Tomblin Murphy et al., 2012; Tomblin Murphy, MacKenzie, Rigby, et al., 2013) are reputable and reliable models for needs-based HHRP as is evidenced by the many research studies in which they have been used (Birch et al., 2007; Birch et al., 2009; Birch, Mason, Sutton, & Whittaker, 2013; Birch, O'Brien-Pallas, Alksnis, Tomblin Murphy, & Thomson 2003; O'Brien-Pallas et al., 2007; Ritchie et al., 2003; Tomblin Murphy, Alder, & MacKenzie, 2008; Tomblin Murphy, Birch, et al., 2009; Tomblin Murphy, Birch, MacKenzie, et al., 2011; Tomblin Murphy, Birch, O'Brien-Pallas, et al., 2011; Tomblin Murphy Consulting Inc, 2014; Tomblin Murphy, Kephart, et al., 2009; Tomblin Murphy et al., 2009; Tomblin Murphy, MacKenzie, Alder, et al., 2013; Tomblin Murphy, MacKenzie, Rigby, et al., 2013; Tomblin Murphy et al., 2003; Tomblin Murphy, O'Brien-Pallas, Birch, Kephart, & MacKenzie, 2004). Several of these studies have focused specifically on required numbers of RNs or physicians (Birch et al., 2013;

O'Brien-Pallas et al., 2007; Tomblin Murphy Consulting Inc, 2014; Tomblin Murphy et al., 2008; Tomblin Murphy, Birch, et al., 2009; Tomblin Murphy, Birch, MacKenzie, et al., 2011; Tomblin Murphy, Birch, O'Brien-Pallas, et al., 2011), while other explicit areas under examination include needs-based HHRP to address older age populations (Tomblin Murphy, Kephart, et al., 2009); long-term care (Tomblin Murphy, MacKenzie, Rigby, et al., 2013); and, pandemic planning (Tomblin Murphy, MacKenzie, Alder, et al., 2013).

The majority of these studies included partnerships with decision-makers, policy makers, and researchers throughout Canada. In all of these studies, the specific and cumulative effects of various potential policy scenarios on the 'gap' were simulated in an effort to either coordinate different mixes of HHR to address particular disease states (such as in the case of pandemic planning) or to identify future HHR requirements of a particular profession. These studies have advanced the evidence concerning the importance of understanding the interplay between the health needs of the population, levels of service delivery, and HCP productivity. What has been missing in the literature however is an examination of whether the *way* in which HCPs work together (i.e.; collaboratively) has an impact on their productivity. It is hoped that this study will provide some insight and advance understanding further. The following section relates study findings with relevant pieces of the conceptual and analytical frameworks and simulation model.

The Health System and Health Human Resources Planning Conceptual Framework

The reader will recall that the Health System and Health Human Resources Planning Conceptual Framework (Tomblin Murphy & O'Brien-Pallas, 2006) (Chapter 3, Figure 1) considers both direct and indirect factors that impact decision-making. These factors include population health needs, education and training of HCPs, the supply of

HCPs, and the organization of the work of HCPs (Advisory Committee on Health Delivery and Human Resources, 2005; Tomblin Murphy, 2007). Factors of the conceptual framework that specifically relate to study findings are discussed next.

Population Health Needs. For the purposes of this study, interprofessional collaborative care was considered to be the proxy for population health need; that is to say that the *need* was assumed to be care that is delivered in a coordinated, collaborative manner. This distinction is quite different than population health need as defined in other needs-based HHRP studies where the focus of need has been on the complexity of curative and/or preventative care (i.e.; morbidity, mortality, and self-assessed health care) (Advisory Committee on Health Delivery and Human Resources, 2005; Tomblin Murphy Consulting Inc, 2014; Tomblin Murphy, Kephart, et al., 2009; Tomblin Murphy et al., 2007). Although a departure from the typical definition of need in the HHRP sense, IPC as a need is a plausible concept because it can be assumed that all people would desire care that was delivered in a collaborative manner by the right person at the right time with the right skills regardless of the patient's preventative and/or curative health need.

System Design. Health care delivery models and their associated level of service, determined by policy makers and funders, are affected by inter-governmental commitments (Tomblin Murphy, 2007). The Nova Scotia government has invested considerable amounts of time, money, and energy on revitalizing the health care system to one that will be streamlined, accessible, efficient, and effective (Province of Nova Scotia, 2013a; 2013b; Vaughan, 2014).

One way to realize this commitment was in the recent amalgamation of nine DHAs into one provincial health authority as was described at the beginning of this

chapter. Another major investment in health system transformation began in 2008 with the design, plan, and implementation of a new collaborative care model (Province of Nova Scotia, 2013c). The Model of Care Initiative in Nova Scotia (MOCINS) considered patient need to determine the organization and delivery of care and was initially instituted on select acute care units throughout the former DHAs and the IWK Health Centre (Province of Nova Scotia, 2013c). A 2010 evaluation of the MOCINS on these acute care units showed some promising outcomes: the visions of having HCPs collaborate to deliver safe, high-quality, patient-centred care was being realized and patient care had improved (Tomblin Murphy et al., 2010). In general, the evaluation findings indicated that a coordinated, team-delivered care model resulted in improved productivity and job satisfaction; clear and simple provider roles; fewer medical errors; less occupational health and safety issues; and, improved patient outcomes (e.g.; lower lengths of stay, fewer readmissions, and fewer emergency room visits) (Tomblin Murphy, et al., 2010). Although not specifically evaluated, it was also reported that there was a potential for cost savings to the system as a result of improved processes and delivery systems (Province of Nova Scotia, 2013c).

Since its initial inception, other factions of the health delivery system purportedly have put MOCINS into operation (Province of Nova Scotia, 2013c), although no further evaluation of the initiative could be found past 2010 hence its success in these other areas is unknown. Additional approaches to health system renewal that have been implemented since the beginning of the MOCINS include the creation of standardized role descriptions for HCPs, the development of collaborative care guidelines, and provision of education to enhance IPC in PHC (Province of Nova Scotia, 2013c).

Notwithstanding these tremendous efforts to rejuvenate the health care system through enhanced collaboration and improved efficiency, some participants in this study paint a very different picture of collaboration in PHC. None of the participants referred to these standardized role descriptions despite discussing the importance of role understanding in their ability to collaborate. This begs the question of who has knowledge of or access to these role descriptions. Were they created as a means for clarity for managers so that they could staff their units to meet patient needs? It would seem so as they are described on the MOCINS website as being “a human resources tool that can be used for determining rate of pay, recruitment, performance management, orientation, career development, etc.” (Province of Nova Scotia, 2013c, “Standardized Role Descriptions”, para. 1). I would offer that these role descriptions may also be of benefit to HCPs working in interprofessional teams, at the very least as a tool to begin conversation regarding their roles and responsibilities and to assist in the appropriate coordination of patient/family care. Doing so would certainly be a step in the right direction towards realizing increased efficiency and effectiveness.

Collaborative care guidelines were not discussed by participants in this study either, which is not surprising considering that only two could be found on the MOCINS website, both of which have a nursing focus: one in relation to RNs, LPNs, and assistive personnel working in maternal and newborn care and the other specific to RNs and LPNs working in the field of perioperative nursing (Nova Scotia Department of Health and Wellness, 2012; 2013). This is not to suggest that there are not more in existence, only that they may not be readily accessible to a wide variety of HCPs working in diverse settings. At the very least, guidelines such as these should be made available to assist

HCP understanding of collaboration and, if no others exist, consideration should be given to further development of such guidelines for use in a wide range of service delivery areas (i.e.; PHC, long-term care, and community care) as they could be wonderful resources for an IP team to use since they provide direction regarding the effective utilization of HCPs by delineating assignments, decision-making, scope of practice, and accountabilities (Nova Scotia Department of Health and Wellness, 2012; 2013).

One point of caution should be raised however when using these types of resources in isolation to IPE as little actual interprofessional learning will occur if HCPs have no opportunities to learn about, from, and with one another (Chong et al., 2013; Dinh et al., 2014; Oandasan et al., 2006; World Health Organization, 2010; Xyrichis & Lowton, 2007). Simply reading a guideline does not constitute IPE nor will it facilitate IPC. While the MOCINS website does recommend the need for education to advance IPC and patient-centred care via continuing education workshops (Province of Nova Scotia, 2013d), it is unknown whether participants in this study took part in them. A few participants admitted that they had attended IPE sessions (although they did not specifically mention the workshops offered on the MOCINS website) but some had not, which in and of itself is concerning as IPE has been promoted as one of the most effective ways to advance IPC (Colyer, 2008; Hollenberg et al., 2009; World Health Organization, 2010).

Supply. Of the factors that impact the actual number, type, and geographic distribution of regulated and unregulated HCPs currently working in the health care system, production (specifically the educational characteristics of HCPs), HCP retention,

and governance (particularly, ability to enact scope of practice) are pertinent to the findings within this study.

Participant ages ranged from 31 to 64 years and 53% had 21 or more years of experience. These figures suggest that more than half of participants were most likely educated within a traditional uniprofessional siloed health education system and as a result they may not have been exposed to or taught the practices, expertise, responsibilities, skills, and/or theoretical perspectives of other disciplines (Andreatta, 2010; Conway et al., 2010; San Martin-Rodriguez et al., 2005). Moreover, those educated in uniprofessional programs may have had limited or no exposure to, and/or may be unable to consistently perform, the IPC competencies and consequently they would be less likely to realize the potential that can be achieved in care provision when working collaboratively with others. Certainly there were participants who acknowledged having a decreased sense of personal productivity when they had to include other HCPs in the provision of patient care. Perhaps these perceptions are a consequence of being educated in a uniprofessional program. The educational preparation of HCPs presumably would impact the competencies they attain which would influence how they work together, effectively impacting the numbers required in service delivery. Coupled with the concern that participants were educated in a siloed education system is the fact that some of these same participants reported not having attended any recent IPE sessions. Thus, there is a need to ensure that these practicing HCPs have the requisite knowledge, training, and tools to work collaboratively if it is expected that the health system is to become more efficient and effective. Continuing post-licensure IPE is a valuable way to do so as

findings from a number of systematic reviews have substantiated (Hollenberg et al., 2009).

The ability to work in a highly effective team is associated with increased job satisfaction and has been shown to positively impact retention rates and productivity (Gausvik et al., 2015; McNeil et al., 2015; Nayeri et al., 2009; Tataw, 2012). Moreover, being able to work to optimal scope of practice means that health human resources are being fully utilized which would facilitate IPC and productivity (Duckett, Bloom, & Robertson, 2012). The fact that some participants revealed that they were considering leaving their positions in the CHCs due to a lack of IPC and reported obstacles to their ability to work to optimal scope of practice has the potential to severely impact retention rates in PHC and should be of concern to policy makers and HHR planners.

Management, Organization, and Delivery. Care delivery and patient/provider/system outcomes across all health sectors are affected by these three key factors. The management and organization of care and the culture of the work environment are of particular significance to this study. As was previously discussed, at least three-quarters of participants recounted barriers such as hierarchy, turf protection, and limited scopes of practice as factors that negatively impacted their job satisfaction and their ability to be fully productive in the delivery of health care. Similar findings are prominent in the literature (Chong et al., 2013; D'Amour et al., 2008; Dinh et al., 2014; Orchard et al., 2012; Suter et al., 2007; Tataw, 2012; Xyrichis & Lowton, 2007). The medical model was described as the predominant workplace culture in some of the CHCs and was reported to be an inhibitory factor to IPC and productivity, a finding that is also corroborated in the literature (Chong et al., 2013; McNeil et al., 2015). For example, in

their qualitative exploration of barriers and facilitators to IPC, Chong et al. (2013) reported that HCPs perceived that IPC was less than satisfactory due to dominance of a medical model. Without a change in culture from the predominant medical model, the Nova Scotian health system runs the risk of continued limited IPC and diminished productivity. It is noteworthy that despite being able to ‘*talk the talk*’ of IPC (i.e., using language that was similar to that in the ICAR competencies and BIs), some participants reported that they were unable to ‘*walk the walk*’ due to the many barriers that exist within their practice settings. If a collaborative culture is to be realized, organizational cultures must be aligned with provincial mandates to support the transition (Barrett et al., 2006). There is consensus that in doing so timely access to care, reduced duplication of services, increased integration of care, and improved communication amongst HCPs can be realized (Barrett et al., 2006); benefits that are closely aligned with the provincial mandate in Nova Scotia.

A number of participants conveyed that they needed guidance and support from their managers in order to change the culture of the workplace from one that is rife with medical dominance to one that is holistic, inclusionary, and collaborative. Managers have a critical role in the promotion of IPC and have a responsibility to ensure that service delivery is efficient, effective, interprofessional, and collaborative (Dinh et al., 2014). Managers can champion a collaborative culture by fostering role understanding and respect, eliminating barriers, and acting as IP role models (Begun et al., 2011; Dinh et al., 2014; McNeil et al., 2015; Suter et al., 2007); yet it is reported that they have little guidance regarding how to do so (Suter et al., 2007). However, Suter et al. (2007) identify multiple themes and offer suggested strategies for each that indeed may help

managers appreciate their role in the implementation and development of productive IP practice cultures. A few key suggestions that relate to this study in particular include promoting formal structures for IPC (i.e.; demonstrating an openness for change, supporting shared learning); role-modelling and facilitating IPC (i.e.; making IPC part of the culture, setting expectations, supporting innovation and new models of care, investing in team-building); and, providing opportunities for informal learning (i.e.; encouraging new ways for staff to work together) (Suter et al., 2007). Similar strategies that support an IP work culture have been documented by others (Dinh et al., 2014; Tataw, 2012). All of the abovementioned strategies were raised by participants in this study, both by those who worked in collaborative environments (as examples of how IPC occurred) and by those who did not (as examples of what they wished would occur). Integral to the success of managers championing IPC is their participation in IPE (Begun et al., 2011); unfortunately, as communicated by participants, manager involvement in IPE is allegedly low in some CHCs. Nonetheless, it is imperative that managers and HCPs attend IPE to allow for reciprocal learning that will create opportunity for shared understanding and reveal ways in which to support one another in the realization of a new collaborative and productive work culture.

Much of what has been presented above is actually about changing the culture of the healthcare system – the *whole* healthcare system – and that is no easy feat. Ideally, healthcare would be safe, effective, patient-centred, timely, efficient, and equitable (Institute for Healthcare Improvement (IHI), 2016). And despite the many catalysts for change (i.e.; patient safety, clinical quality improvement, technology, changing patient demography, workforce shortages, financial challenges, and the desire for excellence),

there remains significant barriers to the attainment of the ideal (Pexon, 2016).

Fundamentally, improvements are necessary across the board, from the patient experience up to “policy, payment, regulation, accreditation, litigation, and professional training” (IHI, 2016, para 6).

The current social structure of the healthcare system is based on status and power and therefore will require significant policy work to reshape the hierarchy that is rampant within. There are plethoras of change models in existence, for example Lewin’s Change Management Model, McKinsey 7-S Model, Kotter’s 8-Step Model (Normandin, 2012) and the Model for Improvement currently endorsed by the IHI (2016). Whatever model is used, as Ginsberg and Tregunno (2005) advise, radical change models that use considerable and prolonged mechanisms that challenge the status quo are required if systemic change is to be realized. Addressing barriers to IPC and IPE that are supported by prevailing views and societal norms will require targeted efforts in conjunction with the coercive enabling forces of accrediting and regulatory bodies (Ginsberg & Tregunno, 2005). Supportive policies and processes, structured information systems, and professional accountabilities will need to be adjusted to adapt to a change in practice model to one that supports collaboration (Heske et al., 2011). With change this vast it will require the involvement of all who work in and for healthcare, from the highest levels of government to individual healthcare settings.

Resource Deployment and Utilization. As the name implies, this element reflects the amount, nature, and type of resources deployed and utilized to provide health services to meet the needs of the population. The efficient and effective distribution and use of HCPs also speaks to the degree of productivity that could be achieved (Advisory

Committee on Health Delivery and Human Resources, 2005). Yet, limited scopes of practice, turf protection, and/or unfamiliarity of collaborative competencies will restrict HCPs' ability to collaborate and in turn will affect their individual and team productivity. Although there was no specific discussion in the interviews regarding how participants were deployed, there was in relation to how they were utilized. A few participants admitted that they were not working to their optimal scope because of turf protection and a sense that there was lack of trust in their skills and abilities by members of their team. Despite all participants scoring themselves at the *'above expected'* range for the ICAR competencies, intimating that they were highly collaborative, the themes that emerged from the qualitative analysis suggest a different picture in some cases. Approximately three-quarters of participants disclosed that despite being aware of the knowledge and skills of IPC they were not always able to practice in this manner. As well, they divulged that there was variability in team members IPC skills. Furthermore, participants disclosed that they were not as productive as they could be because others on their team either did not include them in care planning or in the provision of care because they were not familiar with their profession-specific knowledge and skills. Keeping this information in mind then requires one to question whether HCPs are effectively being utilized in the delivery of care, which leads to the final element of the needs-based conceptual framework that is relevant to this study.

Efficient Mix of Resources. The number and type of human and non-human resources that are required to achieve the greatest outcomes for patients, providers, and systems is an important consideration in needs-based HHRP (O'Brien-Pallas, 2002, as cited in Tomblin Murphy, 2007). Of equal importance is determining the productivity

that is associated with these human resources. Productivity in the needs-based HHRP framework is defined as the number and type of services that HCPs can be expected to safely perform, at a basic standard of quality, over a defined period of time (Tomblin Murphy Consulting Inc., 2014). In order to enhance productivity, it has been posited that HCPs must be able to work smarter rather than harder, which to do so requires ample support staff, equipment, technology, and well planned services (Tomblin Murphy Consulting Inc., 2014). Consequently, despite participant declaration that their teams were productive, in reality team productivity may have been somewhat negatively impacted due to reported insufficient numbers of support staff, particularly in terms of administrative assistance, and inadequate communication technology (i.e.; lack of access to EMRs). The structure of the team has been shown to be an important factor for effective collaboration (Xyrichis & Lowton, 2007).

Furthermore, well planned services require the efficient mix of knowledge and skill within the team. The question then becomes how does one negotiate an efficient mix when the service required is the ability to collaborate, rather than a preventative and/or curative health need? I believe the answer lies in determining whether HCPs actually collaborate, but this is where difficulty may also arise if measurement of IPC and productivity is strictly quantitative as the findings of this study suggest. To explain, the ICAR survey results imply that HCPs in this study are collaborating to a very high degree, yet the interview findings suggest otherwise; that in fact, IPC was hindered in many cases due to the significant barriers that exist. Clearly, reliance on self-reported ability to collaborate may not be sufficient when undertaking needs-based HHRP and warrants other information gathering techniques as it is imperative to accurately

determine *if* IPC is taking place, the degree to which it is occurring, and how this then will impact the skill mix required (Dinh et al., 2014).

Analytical Framework and Simulation Model

The conceptual framework provides the foundation for the analytical framework and simulation model, therefore similar lines of inquiry and relevant discussion points arise in relation to IPC and productivity. The analytical framework consists of two independent components: *Provider Supply* (i.e.; how many HCPs are potentially available to deliver health care services to the population?) and *Provider Requirements* (i.e.; how many HCPs are required to ensure sufficient ‘flow’ of health care services to meet the needs of the population?) (Birch et al., 2007; Tomblin Murphy, MacKenzie, et al., 2009). In order to answer the questions regarding supply and requirement, one needs to consider the stock of HCPs and the flow of services from that stock (*Provider Supply*) as well as the number and mix of HCPs required to meet population health needs (*Provider Requirements*) (Birch et al., 2009; Tomblin Murphy et al., 2009).

The dynamics-based simulation model (Chapter 3, Figure 2) informs the analytical framework by estimating and comparing provider supply to provider requirements, where provider supply (from the analytical framework) is derived from the simulation model’s *Training* and *Supply* modules; while provider requirements (from the analytical framework) are derived from the simulation model’s *Need* and *Work and Productivity* modules. The difference between supply and requirements is calculated as the HCP gap (i.e., shortage or surplus) (Birch et al., 2007; Tomblin Murphy et al., 2008; Tomblin Murphy et al., 2009). Because the analytical framework and simulation model

are inextricably linked so too are their discussion points, thus they will be integrated below.

In relation to *Provider Supply*, the flow of services (and the related *Training* and *Supply* modules) is of particular interest to the findings in this research study because flow is concerned with whether the HCPs who are responsible for providing services have the requisite competencies to do so. As expected, the same issues that were raised under the *Supply* and *Resource Deployment and Utilization* elements of the conceptual framework apply here in relation to the supports necessary for the activity (IPC) to be demonstrated. As previously discussed, these supports would include whether participants have been involved in IPE (either in pre-licensure or continuing post-licensure education) and thus possess the requisite competencies to collaborate; whether they are supported to work collaboratively and to an optimal scope of practice; and, whether they will stay in their positions if they are prevented from working optimally and collaboratively. In light of the survey and interview findings the answer to the supply question is somewhat uncertain as there appears to be discrepancy between what some participants say they do and what they actually do in relation to IPC. Rationalization for this discrepancy may reside in an explanation by Thistlethwaite et al. (2014), who postulate that assessment for the attainment of IPC competencies should not just focus on an individual's ability to work collaboratively in teams but should also examine the team's performance as a whole because there is no guarantee that a competent IP team will result just because individuals proficient in IPC come together (Thistlethwaite et al., 2014). This is an interesting concept that warrants further exploration as participants also

suspected that there would be value in reviewing the IPC competencies as a team to determine areas for team improvement.

The level of services and productivity elements under the *Provider Requirements* section of the analytical framework also deserve attention. Level of services coincides with the amount of services required to attend to health needs (based on demography and epidemiology) in a given population (Tomblin Murphy et al., 2008) and directly relates to the *Needs* module of the simulation model (Tomblin Murphy, Birch, & MacKenzie, 2007; Tomblin Murphy et al., 2009). Determination of how to address the amount of services required would depend on what resources HCPs would use (i.e.; each other, IPC competencies, technologies) when delivering team-based care and the context in which they work (i.e.; a multiprofessional vs. interprofessional team or independent vs. interdependent work practices). Again, the discussion above that applies to participants' ability or inability to collaborate is appropriate here and for sake of brevity will not be repeated.

The productivity element of *Provider Requirements* pertains to the amount of services produced per unit of time per HCP (and directly relate to the *Work and Productivity* module of the simulation model). Productivity in this sense does not mean that HCPs work more hours but that they produce more services within the hours they do work (O'Brien Pallas et al., 2007). This element considers the intensity of the work, how the work is organized, technological inputs, and inputs from other HCPs (Tomblin Murphy, Birch, & MacKenzie, 2007). There is a direct link to the issues discussed in the *Management, Organization and Delivery* and the *Resource Deployment and Utilization* elements of the conceptual framework. Significant questions are raised concerning what

HCPs are actually *‘doing’* within a specific unit of time and what constitutes *‘input’* from other HCPs. Some of the critical questions that must be explored are: Are HCPs aware of the competencies related to IPC? How is their work organized? Is the right provider actually seeing the patient? How is the team structured? Are they supported to work collaboratively with others? What is their level of productivity? As the findings of this study have shown, participants are familiar with the knowledge and skills related to IPC albeit they are not always able to enact it. As well, despite the inability to associate personal productivity with the capacity to collaborate with others, participants did believe that for the most part their team was productive irrespective of the identification of many significant barriers.

Birch and colleagues (2007) demonstrated that HHRP occurs within, not external to, overall healthcare planning and that healthcare planning occurs within, not external to, public policy planning. As Birch et al. (2009) remind us, “the requirements for providers are endogenously determined through the political or social choices that underlie the healthcare system...” (p. S57). At a fundamental level in needs-based HHRP, it is hypothesized that changes or improvements in policy that increase HCP productivity (defined as increased services produced per full-time equivalent per unit of time) yields a lower number of HCPs required to deliver those services (Tomblin Murphy Consulting Inc, 2014). But it is also important to consider that needs-based HHRP is strongly influenced (some would even say manipulated) by policy and politics (Kuhlmann, Batenburg, Groenewegen, & Larsen, 2013; Wranick, 2008). For example, let’s imagine that there was a political desire to change policy so that IPC was established and supported throughout the entire health care system (e.g.; through mandatory IPE for all

HCPs or changes in remuneration models from fee-for-service to alternative funding plans). If this were to take place, it is easy to postulate that the ability to work collaboratively would be enhanced, there would be less duplication of services, and productivity would increase. As a result, the number of HCPs required to deliver health care services would be lower. Presumably, there may also be improved recruitment and retention of HCPs due to increased job satisfaction. This scenario appears to be quite positive with resultant improved system outcomes. But in actual fact these major policy changes might be construed as an open threat to professional autonomy and as such could negatively impact attempts to improve productivity (Moffatt et al., 2014). Given that medical dominance is reported to exist within some of these CHCs, it is plausible that policy changes such as those offered above would create chaos within the system. Nevertheless, without some form of policy change, one cannot expect IPC to flourish or productivity to improve significantly. As can be seen there is a delicate line between policy and productivity and regrettably there seems to be no easy or straightforward answers.

The Service-based Health Human Resources Planning Framework

The Service-based Health Human Resources Planning (SB-HHRP) Framework (Tomblin Murphy, MacKenzie, Rigby, et al., 2013), formerly known as the Competency-based HHRP framework (Chapter 3, Figure 3), was designed to determine the number and type of services (and the associated competencies) required to address health need; a departure from determining how many HCPs are required to address health need (Tomblin Murphy, MacKenzie, Alder, et al., 2013; Tomblin Murphy, MacKenzie, Rigby, et al., 2013). This approach shifts HHRP away from profession-centred strategies toward

identification of the specific competencies that are required to meet healthcare needs and therefore offers more flexibility when there are scarce resources, when population needs are not well understood, or when HCP roles are not well delineated (Tomblin Murphy, MacKenzie, Alder, et al., 2013). A thorough description of the framework is provided in Chapter 3.

Because the SB-HHRP framework arises from the needs-based conceptual framework, analytical framework, and simulation model, the service requirements for care are also based on demography, epidemiology, and level of service. When these three elements are combined, the number of competencies required for the delivery of care is determined. This calculation is then compared with the supply of services (and the inherent competencies) that is available to meet patient's needs (Tomblin Murphy, MacKenzie, Alder, et al., 2013; Tomblin Murphy, MacKenzie, Rigby, et al., 2013). Supply of services relates to the amount and diversity of competencies that are available to meet identified needs and depends on the stock of providers, participation rate, activity rate, productivity, and competency prevalence. When these five elements are combined, the number of competencies that can be supplied is determined. The difference between the services (and competencies) required by patients and the number that can be provided by HCPs is calculated as the service (competency) gap, which ultimately leads to identification of the HHR gap (Tomblin Murphy, MacKenzie, Alder, et al., 2013; Tomblin Murphy, MacKenzie, Rigby, et al., 2013; Tomblin Murphy et al., 2012). By using this SB-HHRP approach, different models of service delivery that encompass different mixes of HCPs can be considered by policy-makers when determining how best to address health needs (Tomblin Murphy Consulting Inc., 2014).

Again, because the analytical framework and simulation model serve as the basis for the SB-HHRP framework the line of discussion offered earlier applies here as well in relation to IPE, scope of practice, retention, managerial support, organizational culture, and barriers to both IPC and productivity. Fundamentally, there is more at issue than calculating rate and time when determining health care productivity. It is imperative to also discover what HCPs are doing, how they are doing it, and who they are doing it with when considering their productivity and their ability to provide services to meet an established need. One cannot assume that competencies are inherent in the role without specifically asking what is required and what competencies HCPs actually possess and, more importantly, consistently perform. As demonstrated in studies by Tomblin Murphy, MacKenzie, Alder, et al. (2013) and Tomblin Murphy, MacKenzie, Rigby, et al. (2013), the significance of considering the competencies that are owned by the workforce and applied to their job cannot be overemphasized – it is of utmost importance that planners match health care need (requirements) with available HCP competencies (supply) if we are to get it right.

The findings of the study suggest that for the most part these HCPs are aware of the requisite knowledge and skills for IPC to take place as they had no difficulty identifying the essential components of IPC in their initial interviews. And, according to their ICAR survey results, they believe that they are in fact performing these competencies at a high level. Therefore from a self-assessed perspective there would appear to be no gap between the service requirements (that is, care that is delivered collaboratively) and the services supplied (the IPC competencies). Clearly, they expressed benefit in working collaboratively, both from a scope of practice and

productivity perspective, yet these same HCPs identified many barriers that prevented them from IPC practice and had the potential to negatively impact their productivity.

Limitations

As in all research, limitations should be considered when interpreting the findings of a study. Limitations that pertain to this study have been identified and will be discussed in relation to study location, self-selection sampling, response bias, and sample size.

Because the study was conducted in one type of practice setting (i.e.; PHC), in only one province in Atlantic Canada, with a small sample size, the quantitative findings cannot be generalized to other practice settings or to other provinces as self-assessments by HCPs in other locations may be significantly different from those represented in this study. Given that the quantitative strand was in actuality an intervention in a qualitatively-driven embedded mixed-methods design, its purpose for use is tied to, but different from, the primary purpose (Creswell & Plano Clark, 2011). As such, the intent of the quantitative strand was not meant to stand alone nor to be generalized but instead was meant to provide further insight into the qualitative findings, that is whether HCPs were doing what they said they were doing in relation to IPC and productivity.

Self-selection sampling, a form of non-probability sampling, was used in this study since HCPs working in CHCs in Nova Scotia were invited by advertisement to participate and thus were free to choose whether or not to take part (Lund Research, 2012). As a result this approach may have yielded a sample that was not representative of the general population of HCPs working in PHC. Although there are advantages to self-selection sampling (e.g.; increased ability to meet selection criteria and/or a greater

commitment to participate), there are also disadvantages, such as self-selection bias and unrepresentativeness of samples (Lund Research, 2012). Because those individuals who chose to take part most likely had strong opinions about or interest in the subject under investigation, self-selection bias is a concern; however, given the qualitative priority of the embedded mixed methods study, it was hoped that participants who had experienced or wished to experience IPC would choose to participate so that a robust depiction of IPC and productivity could be captured.

Response bias is another limitation to consider in this study as self-report was used in both the ICAR surveys and the interviews. Participants may not have wanted to score or depict themselves as non-collaborative for fear of not conforming to their perceived norm of how IP teams should perform. Certainly, SoD response bias may have occurred because participants might have responded to questions based upon the most prevailing social values rather than speaking their personal truth. Without doubt, IPC is a hot topic in health care and these participants would have been exposed to the drive towards establishing IP teams in this province.

Another concern involves the considerable amount of time that passed between participant completion of the ICAR survey and their second interview, again creating a potential for response bias. At the outset of this study it was proposed that participants would assess themselves and two randomly selected team members for the IPC competencies. As HCPs joined the study, they took part in the first interview and were then sent the ICAR survey for self-assessment. Peer assessments required that participants be randomly assigned to other HCPs on their team and as such they could not occur until numerous HCPs from the same CHC joined the study. Despite strategies to

increase study recruitment, this was not accomplished and therefore peer-assessment had to be abandoned. However, in order to make this decision, significant time had passed for those who enrolled early in the study. As a result, for some participants upwards of six months had passed between the self-assessment and second interview. In many cases, at the beginning of the second interview the ICAR survey had to be reviewed with participants as most could not remember the specifics of the competencies and/or BIs. Consequently, their responses in relation to the IPC competencies may have been negatively affected.

Researcher subjectivity is also a concern in qualitative research as it may permeate the data collection and analysis phases of the study furthering response bias. For example, during the interview the researcher's expectations may be unintentionally conveyed through non-verbal behaviour or with language that is leading, directing participants to respond based on the researcher's behaviour. During data analysis, conclusions may be drawn that are distorted by the researcher's expectations or experiences (Polit & Tatano Beck, 2012). In order to mitigate the effects of this subjectivity, the researcher tries to remain detached as well as open-minded so that they can critically examine how they might influence the quality of data (Norris, 2007). Strategies were used to help lessen the possibility of this type of bias such as personal reflection and introspection by the researcher before and after the interviews and during data analysis to ensure that my values and beliefs regarding IPC and productivity were held in check. Once the analysis was completed and themes emerged participants were invited to confirm the findings. More than half of participants responded and all

corroborated that what emerged was exactly what they had hoped would be brought to light.

In an effort to minimize threats to data collection in an embedded study, it is recommended to use large sample sizes for the quantitative strand and small sample sizes for the qualitative strand. However, a large sample size for the quantitative strand was not achieved despite numerous strategies employed to do so. Because the sample size was small, inferential statistics could not be conducted and the ability to detect significant relationships in the data was not possible (Sacred Heart University Library, 2015). A sample size of 15 generated low response rates to the ICAR, which may have resulted in feedback that was either excessively positive or negative thus inaccurately reflecting the views of the general population of HCPs working in PHC (Creswell, 2012). Nevertheless, notwithstanding the small sample size, valuable information was obtained. The sample was representative of HCPs working in PHC in Canada; construct validity and reliability of the ICAR tool was established; the CV values of both the competency categories and BIs indicated little random error; and, a meaningful difference between groups (30%) was detected at an 80% confidence level with a power of 80%. Although it is acknowledged that accepting a lower confidence level such as 80% increases the level of risk and uncertainty, in this context the consequences of being wrong were not dire. Moreover, the use of a mixed-methods approach allowed for integration of the quantitative and qualitative findings, yielding a robust, rich, and diverse understanding of IPC and its effect on productivity.

Implications

Notwithstanding the limitations outlined above, this study has provided valuable insights in relation to IPC and productivity. And even though this study has an interprofessional focus, it was completed as one of the requirements for a Doctorate of Philosophy in Nursing; as such, it behooves me, the researcher, to offer suggestions and discuss implications specific to the nursing community as well as generally for the education, practice, research, and policy communities. Implications for each will be presented next.

Nursing

With over 380,000 regulated nurses (RNs, LPNs, NPs, and registered psychiatric nurses) working in a variety of health care settings across Canada, nurses are the largest regulated health profession comprising one-third of the healthcare workforce (Canadian Federation of Nurses Unions, 2013; 2015; Canadian Institute for Health Information, 2013). With numbers this high, nurses could have significant influence and impact on interprofessional practice, productivity, HHRP, and ultimately improved patient and family-centered outcomes; yet, studies have found that nurses are reluctant to participate in IPC for a multitude of reasons (Akeroyd et al., 2009; Chang, Ma, Chiu, Lin, & Lee, 2009; Heale, Dickieson, Carter, & Wenghofer, 2014), some of which have been discussed throughout the manuscript. Despite their reticence, it is imperative that nurses become engaged as it will be impossible to advance IPC if they are not fundamental elements of practice change.

Strong leadership will be integral to this process. It must become an expectation and nursing staff must be encouraged and supported to play a role in IPC practice as it

offers the opportunity to demonstrate how nursing contributes to the delivery of health services. At the same time, nurses must learn how to articulate their contributions to the interprofessional team while being able to distinguish between the tasks associated with their individual scope of practice and the scope of practice of their profession. Nurses must also recognize that a scope of practice is not totally unique to any one profession and that there will be overlap with others' scope (College of Registered Nurses of Nova Scotia, 2015); accordingly, with an understanding that there is no threat to their identity, turf protection will become less important.

Nursing science will play a significant role in the evolution of nurses in IPC practice and productivity. Some suggested areas for further nursing research related specifically to IPC includes the examination of: emerging roles of nursing in the IP team; the effects of power and hierarchy within and between nursing on the desire to collaborate; factors that affect nurses' engagement in IPC; and, the effectiveness of continuing IPE for nurse engagement in IPC. Suggested nursing productivity research includes examination/identification of: outcomes of care (rather than outputs) based on services provided; supports necessary to advance nursing productivity; development of metrics to measure outcomes; and, measurement of nursing effort expended to meet health service needs. Of additional interest would be studies related to the cost of IP care and determination of how much people are willing to spend for IP care.

Pre- and Continuing Post-Licensure Education

Pre-licensure education and training institutions are instrumental in preparing the future health work force to function interprofessionally, collaboratively, and safely and as a result must respond to the need to change the way HCPs are educated (Borduas et al.,

2006). Within the pre-licensure education setting, some basic elements must be addressed if IPE is to flourish. Implementing experiential, problem-based learning opportunities where learners can experience *about, from* and *with* (the essence of IPE) is required. So too is increasing the use of reflective practice as it is essential to contemplate questions that are of utmost importance to care delivery and ultimately productivity, such as “How does my work affect other HCPs?”, “How does their work affect me?”, and, “How does our work affect the patient/family?”. Introduction of the knowledge, skills, and attitudes of IPC is essential during this period so that students will be in a better position to collaborate when they enter the clinical setting as practicing HCPs (Martinez et al., 2013).

Teaching and learning approaches that are founded on current interprofessional research are necessary to embed the philosophical standpoint of interprofessionalism throughout the entire educational experience, rather than offering IPE within an isolated course. Curricular revision should be undertaken in an open forum that includes community agencies and faculty from other health professional schools so that the difficult decisions regarding essential interprofessional content can be made with an open mind. A central coordinating body, outside of the faculty, should be established so that this body remains neutral to any single health professional program. And, it is important to recognize that the skills required to facilitate an IPE initiative are different than those required in a uniprofessional milieu; as such, faculty require development in IP facilitation skills. Finally, it is vital that senior administration in the academic organization support the move towards an interprofessional approach to health professional education and lobby for equitable, adequate, and ongoing funding

mechanisms that are allocated over and above the normal operating budget so that IPE can exist and flourish (Colyer, 2008; Goldberg et al., 2010; Lackie & Banfield, 2009; Tourse et al., 2008).

Practice

Implications for the practice setting are multifaceted. Partnerships should be formed between health and educational institutions so that a reciprocal relationship can be developed which would serve to increase capacity for IPE and IPC in both settings (Canadian Nurses Association, 2012; MacMillan, 2013). Without such linkages, the ability to foster a collaborative learning environment for staff and students is reduced and hopes of establishing different models of care is thus threatened.

If needs-based care is to be delivered by the right HCP at the right time in a cost-effective manner, hierarchical structures and antiquated leadership models must be re-examined so that an organization's mission, vision, values, and policies come into alignment with the philosophical underpinnings of IPC and needs-based HHRP. An organizational philosophy that values patience, participation, fairness, freedom of expression, interdependence, and trust is essential to promote IPC and more productive work practices (Colyer, 2008; Lackie & Banfield, 2009; Oandasan & Reeves, 2005; Suter et al., 2007).

Those in the highest echelons of an organization must support middle management so that they can foster innovation amongst their staff and encourage experimentation with new interprofessional models of care. There is an element of risk-taking in establishing these new ways of working together that needs to be supported. IPE for managers is crucial if they are to act as role models and facilitate IPC (Begun et al.,

2011). Opportunities for HCPs to experience IPE are essential too; without them, IPC will not become a reality. Through IPE, team members will learn to trust and value the unique contributions of many and understand how their work contributes to patient outcomes and team objectives. It is essential that HCPs are introduced to the competencies that are required for them to work collaboratively.

Both formal and informal leaders need to advocate for, and role model, IPC, with the expectation of creating an organization that embeds this new model of care. There is a need for enhanced communication through technology, standards, policies, and interprofessional protocols; standardized and shared documentation tools; and, forums or formal meetings that involve all team members. Cooperation from government, accreditation, and regulatory bodies is also critical if IPC is to be realized (Colyer, 2008; D'Amour et al., 2008; Lackie & Banfield, 2009; Oandasan & Reeves, 2005; Suter et al., 2007; Tataw, 2012).

Research

The needs-based HHRP approach by Tomblin Murphy and colleagues has been adapted over the past decade to address the importance of planning for the health workforce within the context of services required to meet needs rather than in the context of the number of HCPs required to meet needs. In most cases '*need*' has been defined as the complex curative and/or preventative grounds for which patients and families seek help. However, research such as the present study has added to this body of HHRP knowledge by shifting the focus of '*need*' from the predominantly curative and/or preventative context to one that is more attitudinal in nature; for instance, the need for care that is provided collaboratively by IP teams. It is certainly not an easy feat to plan

for HHR in this way as the subjective data that arises does not fit into a mathematical model but it does provide insight into the circumstances that surround implementation of policy scenarios that are informed by the analytical framework and simulation model.

More research that explores the impact of IPC on productivity health is warranted in different practice settings and in different provinces and/or countries so that this body of knowledge can be expanded and thus serve HHR planners and policy decision-makers. As well, different methods for assessing the attainment and performance of the IPC competencies, other than self-assessment, are required as self-reports provide limited evidence (Reeves, 2012). Ethnographic studies that explore organizational culture and its effect on attainment of the IPC competencies or participant observation using the ICAR instrument to observe and measure actual performance of HCPs and their teams are plausible approaches.

The broad assumption that most people want health care that is delivered by an interprofessional team of collaborating HCPs may not be correct. As such, there is a need to understand the interests of patients and families in relation to their definition of ‘*need*’ from an IP team. As well, the place in which patients and families exist within the team and the process of IPC needs to be explored further as one cannot assume that patients want to be team members with all of the responsibilities that go along with that role; they may only want to reside as recipients of patient-centred care that is delivered by an IP team.

At a system level, more research is required that focuses on the effectiveness of IPE and IPC, ROI of IPC, the most effective team models, the impact of IPC on

population health, and the factors that are necessary for sustainable change (Lutfiyya, Brandt, Delaney, Pechacek, & Cerra, 2016).

Finally, there is a need for consultation with those who apply the results of HHRP research so that support can be provided in relation to changes in clinical practice, assistance with knowledge transfer initiatives, creation of opportunities to generate health research, facilitation of collaborative partnerships, and support for communication endeavours.

Policy

The high quality care that is necessary to achieve the best possible outcomes for providers, patients, and the system cannot be at a cost that is prohibitive or even crippling to the health care system. In order to ensure that it is not, the focus must be service-driven, not supply-driven. As such, the identification of population health need, health services planning, budgeting, and HR management should be conducted by a leadership team that is separate from the care delivery team so as to avoid conflicts of interest that may arise when HCPs, for example physicians, have administrative power as well as clinical power (Dinh et al., 2014). This is not to suggest that HHRP should occur in isolation from HCPs, on the contrary, for there must be consultation with those who are actually delivering services. The suggestion however is that it should occur in a transparent manner that avoids any suggestion of impropriety resulting from conflicts of interest and manipulation of power.

Funding and remuneration structures are required that support the delivery of accessible, high-quality, cost-effective, patient-centred care by IP teams (Dinh et al., 2014). Support is required from national health policy-makers to enable and sustain

implementation of IPE and IPC, such as implementation of electronic health records. Support may also include persuading leaders in education institutions, other government departments, and practice settings to share their commitment to IPE and IPC. Mandated and accredited IPE for all HCPs (both those in training and those in practice) is required to support the attainment and mastery of IPC competencies. Policy must support such transition to address individual, practice, and system-level barriers (Dinh et al., 2014).

Conclusion

Little has been known about the impact of IPC on HCP and team productivity; this study sought to provide insight. An embedded mixed methods research design was used because it provided quantitative and qualitative understanding regarding how IPC affects HCP productivity in the PHC setting. The purpose of this study was three-fold: 1) to discover HCPs' understandings about IPC and their perceived level of productivity when working with their team; 2) to determine the extent to which HCPs demonstrated the competencies that are related to IPC; and, 3) to explore whether self-assessment for the IPC competencies changed HCPs' sense of being productive.

Participants were highly articulate in their definitions of IPC, using terminology that was consistent with IP literatures. When describing how they actualized IPC, they emphasized role understanding and the importance of using each other's expertise to address patient need. Communication and the availability of team members were also identified as being integral to the collaborative process. Participants valued the connection that they made with members of their team; forging a sense of belongingness was believed to be foundational.

The results of the ICAR self-assessments intimated that these were a highly collaborative assemblage of HCPs as all competencies were scored near the highest end of the Likert scale. Indeed, after the assessments, all participants acknowledged that the IP competencies were relevant to their practice and that the act of self-assessment afforded them a deeper understanding of the concept and heightened their awareness as to their own and their teams' ability to collaborate. But it also highlighted for some that despite knowing about and understanding the process of IPC, they were prevented from actually working in this manner. Participants described many barriers to IPC, including persistence of an entrenched medical model, hierarchy, turf protection within and between professions, inconsistent funding and remuneration, and an inability to work to optimal scope of practice. Participants expressed frustration that despite knowing that IPC was beneficial for patients, providers, and the system they were limited in their ability to establish it within their team. Interestingly, despite acknowledging the barriers to IPC, most participants believed that their team was still collaborative, at least to the level that they could be given the obstacles that existed.

Their ability to contribute to or achieve positive patient outcomes was the hallmark of personal productivity. It was important for these participants to be able to manage their work on any given day, which was depicted as either having the ability to complete everything on their to-do list or, if that was impossible due to unexpected occurrences, to at least have the ability to manage the changing priorities. Remarkably, despite describing and endorsing IPC, some did not believe that they were personally productive if they could not manage the patient's care need by themselves. After the self-assessments however, some of these same participants had an epiphany – they did not

have to meet the patient's need by themselves for there was an entire team that had the knowledge and skills to accomplish the task with them! There was a realization that the importance of meeting need did not have to be provider-centric but instead it should be patient-centric as well as team-centric; that it really does not matter who helps the patient as long as the patient is helped. Others' perceptions did not change after the self-assessments for they believed that their productivity was stagnant because their practice environment was stagnant. These participants reported status quo work environments that did not support working to optimal scope or collaboratively; therefore, they could see no way that their productivity could change unless their practice setting changed. To facilitate this required change participants revealed that they needed support from their managers.

Participants portrayed team productivity as having the right person with the right skills to address the patient's need, a description very similar to the definition of needs-based HHRP. Participants believed that when the team was able to provide patient-centred care they were productive; without collaboration, the team could not be as productive. It was important to participants that they remain proficient in their ability to collaborate so that they could role model this behaviour for others.

When participants were prevented from collaborating and therefore could not practice to their maximum knowledge and skill level, they expressed frustration and a desire to leave their team. Participants who currently practiced in a highly collaborative team also observed that they were not willing to accommodate someone on their team who was non-collaborative; however, they were open to helping that person build capacity for IPC should they wish to remain on the team. As in their portrayal of IPC,

participants also acknowledged a great many barriers to productivity, which not surprisingly were similar to those of IPC.

The usefulness of a mixed-methods approach in this study cannot be overemphasized for it has provided a richer understanding of whether HCPs do what they say they do in relation to IPC and productivity. To illustrate, if data gleaned from RQ1 were considered in isolation to the other research questions, one could presume that the HCPs in this study had a comprehensive understanding of IPC and had actualized it to a high degree in their practice settings thereby enhancing productivity, despite the significant barriers reported. Similarly, if the quantitative data from RQ 2 were examined independently from the qualitative data, again, one would presume that these same HCPs were demonstrating the IPC competencies at an above expected level. But, when the qualitative and quantitative data are integrated a deeper appreciation of the relationship between IPC and productivity emerges – one where, despite knowing, HCPs were unable to collaborate fully and as a result reported that they were not as productive either personally or as part of their team.

Having HCPs examine their own capacity to collaborate and providing opportunity for them to discuss their views and experiences has offered valuable information to the HHRP community. HCPs bring different mixes of skills, knowledge, and judgment to the work place and therefore focusing on the competencies or services provided by HCPs, rather than on the numbers alone, ensures a more realistic calculation to narrow the gap between supply and demand. The significance of considering the competencies that are owned by the workforce and applied to their job cannot be

overstated – it is of utmost importance that planners match health care need (requirements) with available HCP competencies (supply) if we are to get it right.

REFERENCES

- Accreditation of Interprofessional Health Education (AIPHE) Steering Committee. (2009). *Principles and practices for integrating interprofessional education into the accreditation standards for six health professions in Canada*. Ottawa, Ont: Health Canada
- Accreditation of Interprofessional Health Education (AIPHE). (2011). *AIPHE Interprofessional health education accreditation standards guide. Phase 2*.
- Aday, L.A. & Cornelius, L.J. (2006). *Designing and conducting health surveys. A comprehensive guide* (3rd ed.). San Francisco, California: Jossey-Bass.
- Advisory Committee on Health Delivery and Human Resources. (2005). *A framework for collaborative pan-Canadian health human resources planning* (Revised March 2007). Ottawa, Ontario: Health Canada. Retrieved December 11, 2009, from http://www.hc-sc.gc.ca/hcs-sss/alt_formats/hpb-dgps/pdf/pubs/hhr/2007-frame-cadre/2007-frame-cadre-eng.pdf.
- Agor, W.H. (1997). The measurement, use and development of intellectual capital to increase public sector productivity. *Public Personal Management*, 26 (2), 175-186.
- Akeroyd, J., Oandasan, I., Alsaffar, A., Whitehead, C., & Lingard, L. (2009). Perceptions of the role of the registered nurse in an urban interprofessional academic family practice setting. *Nursing Leadership*, 22 (2), 73-84.
- AL-Ma'ani, A.I. & Jaradat, N. (2010). Impact of human capital on organization performance. *Interdisciplinary Journal of Contemporary Research in Business*, 2 (4), 63-73.
- Almost, J., Doran, D.M., McGillis Hall, L., & Spence Laschinger, H.K. (2010). Antecedents and consequences of intra-group conflict among nurses. *Journal of Nursing Management*, 18, 981-992.
- Alvesson, M. (2003). Beyond neopositivists, romantics and localists: A reflexive approach to interviews in organizational research. *Academy of Management Review*, 28 (1), 13-33.
- Anderson, J. (1991). Current directions in nursing research: Toward a poststructuralist and feminist epistemology. *The Canadian Journal of Nursing Research*, 23 (3), 1-3.
- Andreatta, P.B. (2010). A typology for health care teams. *Healthcare Management Review* (October-December), 345-354.

- Association of American Medical Colleges. (2011). *Core Competencies for Interprofessional Collaborative Practice. Pre-publication recommendations from the IPEC Expert Panel*. Washington, DC: Author.
- Aston, J., Shi, E., Bullôt, H., Galway, R., & Crisp, J. (2005). Qualitative evaluation of regular morning meetings aimed at improving interdisciplinary communication and patient outcomes. *International Journal of Nursing Practice, 11*, 206-213.
- Bainbridge, L., Nasmith, L., Orchard, C., & Wood, V. (2010). Competencies for interprofessional collaboration. *Journal of Physical Therapy Education, 24*, (1), 6-11.
- Baker, C., Wuest, J, & Stern, P.N. (1992). Method slurring: The grounded theory/phenomenology example. *Journal of Advanced Nursing, 17*, 1355-1360.
- Baker, L., Egan-Lee, E., Martimianakis, M.A., & Reeves, S. (2011). Relationships of power: Implications for interprofessional education. *Journal of Interprofessional Care, 25* (2), 98-104.
- Banfield, V. & Lackie, K. (2009). Performance-based competencies for culturally responsive interprofessional collaborative practice. *Journal of Interprofessional Care, 23*(6), 611-620.
- Barr, H. (1998). Competent to collaborate: Towards a competency-based model for interprofessional education. *Journal of Interprofessional Care, 12* (2), 181-187.
- Barr, H. (2005). *Interprofessional education. Today, yesterday and tomorrow. A review*. UK Centre for the Advancement of Interprofessional Education. Oxford, UK: Blackwell Publishing Ltd.
- Barrett, J., Dort, N., & White, H. (2006). Collaboration and scope of practice. In *Guiding Facilitation in the Canadian Context: Enhancing Primary Health Care. Multi-jurisdictional Collaboration* (pp.76-83). St. John's Newfoundland: Department of Health and Community Services, Government of Newfoundland and Labrador.
- Bartel, A.P., Beaulieu, N., Phibbs, C.S. & Stone, P.W. (2013). Human capital and productivity in a team environment: Evidence from the healthcare sector. *American Economic Journal: Applied Economics, 6* (2), 1-48.
- Bazeley, P. (2009). Editorial: integrating data analyses in mixed methods research. *Journal of Mixed Methods Research, 3* (3), 203-207.
- Begun, J.W., White, K.R., & Mosser, G. (2011). Interprofessional care teams: The role of the healthcare administrator. *Journal of Interprofessional Care, 25*, 119-123.

- Benner, P. (1982). From novice to expert. *The American Journal of Nursing* (82), 3 p. 402-407.
- Berwick, D.M., Nolan, T.W., & Whittington, J. (2008). The Triple Aim: Care, health and cost. *Health Affairs*, 27 (3), 759-769.
- Beyers, M. (1998). About productivity indicators. *Nursing Management*, 29 (9), 88.
- Bihari Axelsson, S. & Axelsson, R. (2008). From territoriality to altruism in interprofessional collaboration and leadership. *Journal of Interprofessional Care*, 23 (4), 320-330.
- Birch, S., Kephart, G., Tomblin Murphy, G., O'Brien-Pallas, L., Alder, R., & MacKenzie, A. (2007). Human resources planning and the production of health: A needs-based analytical framework. *Canadian Public Policy*, 33 (Suppl), S1-16.
- Birch, S., Kephart, G., Tomblin Murphy, G., O'Brien-Pallas, L., Alder, R., & MacKenzie, A. (2009). Health human resources planning and the production of health: Development of an extended analytical framework for needs-based health human resources planning. *Journal of Public Health Management Practice*, November (Suppl), S56–S61.
- Birch, S., Mason, T., Sutton, M., & Whittaker, W. (2013). Not enough doctors or not enough needs? Refocusing health workforce planning from providers and services to populations and needs. *Journal of Health Services Research & Policy*, 18 (2), 107–113.
- Birch, S., O'Brien-Pallas, L., Alksnis, C., Tomblin Murphy, G., & Thomson, D. (2003). Beyond demographic change in human resources planning: an extended framework and application to nursing. *Journal of Health Services Research & Policy*, 8 (4), 225-229.
- Björkgren, M.A., Fries, B.E., Häkkinen, U., & Brommels, M. (2004). Case-mix adjustment and efficiency measurement. *Scandinavian Journal of Public Health*, 32, 464-471.
- Bloom, J., Duckett, S. & Robertson, A. (2012). Development of an interactive model for planning the care workforce for Alberta: case study. *Human Resources for Health*, 10 (22), 1-10.
- Bloor, K. & Maynard, A. (2001). Workforce productivity and incentive structures in the UK National Health Service. *Journal of Health Services Research & Policy*, 6 (2), 105-113.
- Bloor, K & Maynard, A. (2013). Using evidence to meet population health care needs: A UK perspective. Commentary. *Healthcare Papers*, 13 (2), 42-45.

- Boone, H.N., Jr., & Boone, D.A. (2012). *Analyzing Likert data*. Retrieved from <http://www.joe.org/joe/2012april/tt2.php>.
- Borduas, F., Frank, B., Hall, P., Handfield-Jones, R., Hardwick, D., Ho, K., ... Wright, B. (2006). *Facilitating the integration of interprofessional education into quality health care. Strategic roles of academic institutions*. Ottawa: Health Canada
- Bosch, M., Dijkstra, R., Wensing, M., van der Weijden, T., & Grol, R. (2008). Organizational culture, team climate, and diabetes care in small office-based practices. *BMC Health Services Research*, 8, 180-188.
- Boston University School of Public Health. (n.d.). *Confidence intervals*. Retrieved April 21, 2015 from http://sphweb.bumc.bu.edu/otlt/MPH-Modules/BS/BS704_Confidence_Intervals/BS704_Confidence_Intervals_print.html.
- Boud, D. (2005). *Enhanced Learning Through Self-Assessment*. New York: Routledge Falmer. Retrieved from <https://books.google.ca/books?hl=en&lr=&id=fWOAQAAQBAJ&oi=fnd&pg=PP1&dq=self+assessment+as+a+learning+tool&ots=pMcB75Hw2O&sig=T5b-s0Lg2N2zla9rng4U47wHR8g#v=onepage&q=self%20assessment%20as%20a%20learning%20tool&f=true>.
- Boudreau, J.W. & Ramstad, P.M. (1997). Measuring intellectual capital: Learning from financial history. *Human Resource Management*, 36 (3), 343-356.
- Bourgeault, I.L. (2013). The importance of evaluating new models of care to better meet patient needs. *Healthcare Papers*, 13 (2), 32-35.
- Brady, A-M., Byrne, G., Horan, P., Macgregor, C., & Begley, C. (2008). Reliability and validity of the CCNCS: a dependency workload measurement system. *Journal of Clinical Nursing*, 17, 1351-1360.
- Bronstein, L. (2003). A model for interdisciplinary collaboration. *Social Work*, 48(3), 297-306.
- Brown, J.D. (2001). Statistics corner: Questions and answers about language testing statistics. Point-biserial correlation coefficients. *JLT Testing & Evaluation SIG Newsletter*, 5 (3), 13-17.
- Bryman, A. (2006). Integrating quantitative and qualitative research: How is it done? *Qualitative Research*, 6 (1), 97-113.
- Bungay, V. & Keddy, B.C. (1996). Experiential analysis as a feminist methodology for health professionals. *Qualitative Health Research*, 6 (3), 442-452.

- Bunglowala, A. & Bunglowala, A. (2015). Nonverbal communication: An integral part of teaching learning process. *International Journal of Research in Advent Technology (E-ISSN: 2321-9637)*, 371-375.
- Burns, N. & Grove, S.K. (2009). Review of relevant literature. In N. Burns & S.K. Grove (Eds.), *The practice of nursing research. Appraisal, synthesis and generation of evidence*. (6th ed). St. Louis, Missouri: Saunders Elsevier.
- Burton, W.N., Chen, C-Y., Schultz, A.B., Conti, D.J., Pransky, G., & Edington, D.W. (2006). Worker productivity loss associated with arthritis. *Disease Management*, 9 (3), 131-143.
- Canadian Alliance of Community Health Centre Associations. (2011). *Community health centre locations – Nova Scotia*. Retrieved April 3, 2012 from <http://www.cachca.ca/locations/ns.html>.
- Canadian Association of Community Health Centres. (2012a). *By-laws of the Canadian Association of Community Health Centres. Section 2: Community Health Centre*. Retrieved April 3, 2012 from http://www.cachc.ca/?page_id=369.
- Canadian Association of Community Health Centres. (2012b). *Find a community health centre*. Retrieved April 3, 2012 from http://www.cachc.ca/?page_id=369.
- Canadian Association of Community Health Centres. (2013). *CACHC bylaws*. Retrieved April 2, 2015 from <http://www.cachc.ca/cachc-bylaws/>.
- Canadian Federation of Nurses Unions. (2013). *The nursing workforce. Canadian Federation of Nurses Unions backgrounder*. Ottawa: Author.
- Canadian Federation of Nurses Unions. (2015). *The nursing workforce*. Retrieved February 21, 2016 from https://nursesunions.ca/sites/default/files/2015._backgrounder._nursing_workforce.pdf.
- Canadian Interprofessional Health Collaborative. (2010). *A national interprofessional competency framework*. Vancouver, BC: Author.
- Canadian Institute for Health Information. (2011). *Canada's health care providers, 2000-2009 – A reference guide*. Retrieved November 13, 2015 from https://secure.cihi.ca/free_products/CanadasHealthCareProviders2000to2009ARefrenceGuide_EN.pdf.
- Canadian Institute for Health Information. (2013). *Nurses numbers still rising*. Retrieved February 21, 2016 from <https://www.cihi.ca/en/spending-and-health-workforce/health-workforce/nursing-numbers-still-rising>.

- Canadian Nurses Association. (2011). *Certification*. Retrieved from <http://www.nurseone.ca/Default.aspx?portlet=StaticHtmlViewerPortlet&plang=1&ptdi=153>.
- Canadian Nurses Association. (2012). *A nursing call to action: The health of our nation, the future of our health system*. Retrieved February 21, 2014 from http://www.cna-aiic.ca/~media/cna/files/en/nec_report_e.pdf.
- Canadian Patient Safety Institute. (2009). *The safety competencies. Enhancing patient safety across the health professions*. Retrieved from <http://www.patientsafetyinstitute.ca/English/toolsResources/safetyCompetencies/Pages/default.aspx>.
- Castro, F.G., Kellison, J.G., Boyd, S.J. & Kopak, A. (2010). A methodology for conducting integrative mixed methods research and data analysis. *Journal of Mixed Methods Research*, 4 (4), 342-360.
- Ceci, C. (2000). Not innocent: Relationships between knowers and knowledge. *Canadian Journal of Nursing Research*, 32(2), 57-73.
- Centre for the Advancement of Interprofessional Education (CAIPE) (2002). *Interprofessional education – A definition*. London: Centre for the Advancement of Interprofessional Education.
- Chan, B.C., Perkins, D., Wan, Q., Zwar, N., Daniel, C., Crookes, P., & Harris, M.F. (2010). Finding common ground? Evaluating an intervention to improve teamwork among primary health-care professionals. *International Journal for Quality in Health Care*, 22 (6), 519-524.
- Chang, W-Y., Ma, J-C., Chiu, H-T., Lin, K-C., & Lee, P-H. (2009). Job satisfaction and perceptions of quality of patient care, collaboration and teamwork in acute care hospitals. *Journal of Advanced Nursing*, 65 (9), 1946-1955.
- Chilcutt, A.S. (2009). Exploring leadership and team communication within the organizational environment of a dental practice. *The Journal of the American Dental Association*, 140, 1252-1258.
- Chkheidze, A. (2014). Types of communication. *Georgian Technical University: Multilingual Reviewing International Scientific Magazine*, 21. Retrieved November 3, 2015 from [http://www.odageorgia.ge/downloads2/sruli%20versia%201\(21\)-201462118.pdf#page=74](http://www.odageorgia.ge/downloads2/sruli%20versia%201(21)-201462118.pdf#page=74).

- Choi, B.C.K. & Pak, A.W.P. (2007). Multidisciplinarity, interdisciplinarity, and transdisciplinarity in health research, services, education and policy: 2. Promoters, barriers, and strategies of enhancement. *Clinical and Investigative Medicine*, 30 (6), E224-E232.
- Chong, W.W., Aslani, P., & Chen, T.F. (2013). Shared decision-making and interprofessional collaboration mental healthcare: A qualitative study exploring perceptions of barriers and facilitators. *Journal of Interprofessional Care*, 27 (5), 373-379.
- Clements, D., Dault, M., & Priest, A. (2007). Effective teamwork in healthcare: research and reality. *Healthcare Papers, 7Spec*, 26-34.
- Cockshaw, W.D., Shochet, I.M, & Obst, P.L. (2014). Depression and belongingness in general and workplace contexts: A cross-lagged longitudinal investigation. *Journal of Social and Clinical Psychology*, 33 (5), 448-462.
- Cohen, M.Z., & Cameron, C. (2009). Introduction to qualitative research. In C. Cameron & Singh, M.D. (Eds.), *Nursing research in Canada. Methods and critical appraisal for evidenced-based practice*. (2nd ed). Toronto: Elsevier Canada. Retrieved from https://evolve.elsevier.com/staticPages/i_select.html.
- College of Registered Nurses of Nova Scotia. (2015). *Interpreting and modifying the scope of practice of the registered nurse*. Halifax: Author.
- Colyer, H.M. (2008). Embedding interprofessional learning in pre-registration education in health and social care: evidence of cultural lag. *Learning in Health and Social Care*, 7 (3), 126-133.
- Conference Board of Canada. (2007). *Achieving public protection through collaborative self-regulation. Reflections for a new paradigm*. Ottawa, Ontario: Author.
- Conference Board of Canada. (2012). *Improving primary health care through collaboration. Briefing 1 – Current knowledge about interprofessional teams in Canada*. Ottawa, Ontario: Author.
- Considine, J. & Thomas, S. (2005). Design, format, validity and reliability of multiple choice questions for use in nursing research and education. *Collegian: The Australian Journal of Nursing Practice, Scholarship & Research*, 12 (1), 19-24.
- Conway, J.F., Little, P., McMillan, & Fitzgerald, M. (2011). Determining frameworks for interprofessional education and core competencies through collaborative practice: The CARE experience. *Contemporary Nurse*, 38 (1-2), 160-170.
- Cooney, A. (1999). Reflection demystified: answering some common questions. *British Journal of Nursing*, 8(22), 1530-1534.

- Creswell, J. (2012). *Educational research. Planning, conducting and evaluating quantitative and qualitative research* (4th ed.). Boston, Massachusetts: Pearson.
- Creswell, J.W., & Plano Clark, V.L. (2011). *Designing and conducting mixed methods research*. (2nd ed.). Los Angeles, CA: Sage.
- Culver Clark, R. & Greenawald, M. (2014). Nurse-physician leadership: Insights into interprofessional collaboration. *The Journal of Nursing Administration*, 43 (12), 653-659.
- Curran, V.R., Casimiro, L., Banfield, V., Hall, P., Lackie, K., Simmons, B., Tremblay, M., Wagner, S.J., & Oandasan, I. (2011). Development and validation of the Interprofessional Collaborator Assessment Rubric (ICAR). *Journal of Interprofessional Care*, 25 (5), 339-344.
- Curtin, L.L. (1995). Nursing productivity. From data to definition. *Nursing Management*, 26 (4), 25-36.
- D'Amour, D., Goulet, L., Labadie, J-F., San Martin-Rodriquez, L., & Pineault, R. (2008). A model and typology of collaboration between professionals in healthcare organizations. *BMC Health Services Research*, 8, 188-202.
- Dinh, T. & Bounajm, F. (2013). *Improving Primary Health Care through Collaboration: Briefing 3—Measuring the Missed Opportunity*. Ottawa: The Conference Board of Canada.
- Dinh, T., Stonebridge, C., & Thériault, L. (2014). *Getting the Most Out of Health Care Teams: Recommendations for Action*. Ottawa: The Conference Board of Canada.
- Doherty, L. & Doult, B. (2009). DH rules out NHS job cuts but staff will have to work 'smarter'. *Nursing Standard*, 24 (1), 6.
- Dossey, B.M. (2008). Theory of integral nursing. *Advances in Nursing Science*, 31(1), p. E52-73
- Duckett, S., Bloom, J., & Robertson, A. (2012). Planning to meet the care need challenge in Alberta, Canada. *The International Journal of Health Planning and Management*, 27, p. e186–e196.
- Dutcher, L., Oke, B., Sutherland Boal, A., Shamray, D., Melchior, L., Frederick, L.,...& Vandavelde-Coke, S. (2005). *Building the future: An integrated strategy for nursing human resources in Canada. Phase I Final Report*. Ottawa: Author.
- Dzurec, L.C. (1995). Poststructuralist science. In A. Omery, C. Kasper, & G.G. Page (Eds.), *In search of nursing science* (pp. 233-244). Thousand Oaks, CA: Sage.

- Estabrooks, C.A. (1998). Will evidence-based nursing practice make practice perfect? *Canadian Journal of Nursing Research*, 30 (10), 15-36.
- Eva, K.W. & Regehr, G. (2005). Self-assessment in the health professions: A reformulation and research agenda. *Academic Medicine*, 80 (10) (October 2005 Supplement), S46-S54.
- Evans, J.L, Henderson, A., & Johnson, N.W. (2012). Interprofessional learning enhances knowledge of roles but is less able to shift attitudes: A case study from dental education. *European Journal of Dental Education*, 16, (4), 239-245.
- Evans, R.G., Schneider, G., & Barer, M. (2010). *Health human resources productivity: what is it, how is it measured, why (how you measure) it matters, and whose thinking about it*. Ottawa: Canadian Health Services Research Foundation and the Michael Smith Foundation for Health Research.
- Fereday, J. & Muir-Cochrane, E. (2006). Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development. *International Journal of Qualitative Methods*, 5 (1), 1-11.
- Fickel, J.J., Parker, L.E., Yano, E.M., & Kirchner, J.E. (2007). Primary care-mental health collaboration: An example of assessing usual practice and potential barriers. *Journal of Interprofessional Care*, 21 (2), 207-216.
- French, P. (1999). The development of evidence-based nursing. *Journal of Advanced Nursing*, 29 (1), 72-78.
- Fulton, L.V., Lasdon, L.S., McDaniel, R.R., & Coppola, N. (2008). Including quality, access, and efficiency in healthcare cost models. *Hospital Topics: Research And Perspectives on Healthcare*, 86 (4), 3-16.
- Gage, N. L. (1989). The paradigm wars and their aftermath: A “historical” sketch of research on teaching since 1989. *Educational Researcher*, 18(7), 4–10.
- Garavan, T.N. & McGuire, D. (2001). Competencies and workplace learning: some reflections on the rhetoric and the reality. *Journal of Workplace Learning*, 13, 4, 144 – 164.
- Gausvik, C., Lautar, A., Miller, L., Pallerla, H., & Schlaudecker, J. (2015). Structured nursing communication on interdisciplinary acute care teams improves perceptions of safety, efficiency, understanding of care plan and teamwork as well as job satisfaction. *Journal of Multidisciplinary Healthcare*, 8, 33-37.
- Giddings, L.S. & Grant, B.M. (2007). A Trojan horse for positivism? A critique of mixed methods research. *Advances in Nursing Science*, 1 (23), 52-60.

- Gilbert, J. (2005). Interprofessional learning and higher education structural barriers. *Journal of Interprofessional Care, (Suppl 1)*, 87-106.
- Gilbert, T. (2006). Mixed methods and mixed methodologies. The practical, the technical and the political. *Journal of Research in Nursing, 11* (3), 205-217.
- Ginsberg, L. & Tregunno, D. (2005). New approaches to interprofessional education and collaborative practice: Lessons from the organizational change literature. *Journal of Interprofessional Care, (Supp 1)*, 177-187.
- Goldberg, L.R., Scott Koontz, J., Downs, D., Uhlig, P., Kumar, N.G., Shah, S., Clark, P.E., Coiner, C., & Crumrine, D. (2010). Infusing an inter-professional and inter-university perspective into healthcare education. *Higher Education Research & Development, 29* (4), 421-431.
- Goldman, J., Meuser, J., Rogers, J., Lawrie, L., & Reeves, S. (2010). Interprofessional collaboration in family health teams. An Ontario-based study. *Canadian Family Medicine, 56*, e368-e374.
- Gotlib Conn, L.G., Lingard, L., Reeves, S., Miller, K., Russell, A., & Zwarenstein, M. (2009). Communication channels in general internal medicine: A description of baseline patterns for improved interprofessional collaboration. *Qualitative Health Research, 19* (7), 943-953.
- Goudreau, J., Pepin, J., Dubois, S., Boyer, L., Larue, C., & Legault, A. (2009). A second generation of the competency-based approach to nursing education. *International Journal of Nursing Education Scholarship, 6* (1), 1-15.
- Government of Nova Scotia. (2010). *Better care sooner. The plan to improve emergency care*. Halifax, Nova Scotia: Author.
- Government of Nova Scotia. (2013). *Primary health care. Collaborative teams*. Retrieved July 31, 2013 from http://www.gov.ns.ca/health/primaryhealthcare/collaborative_teams.asp.
- Government of Nova Scotia. (2015). *Nova Scotia Health Profile 2015*. Retrieved November 11, 2015 from <http://novascotia.ca/dhw/publichealth/documents/Population-Health-Profile-Nova-Scotia.pdf>.
- Grace, S., & Higgs, J. (2010). Interprofessional collaborations in integrative medicine. *The Journal of Alternative and Complementary Medicine, 16* (11), 1185-1190.
- Greene, J.C., & Caracelli, V.J. (Eds.). (1997). *Advances in mixed-method evaluation: The challenges and benefits of integrating diverse paradigms. New directions for evaluation*. San Francisco: Jossey-Bass.

- Greene, J.C, Caracelli, V.J., & Graham, W.F. (1989). Toward a conceptual framework for mixed-method evaluation designs. *Educational Evaluation and Policy Analysis, 11* (3), 255-274.
- Grif Alspach, J. (1996). *Designing competency assessment programs: A handbook for nursing and health-related professions*. Pensacola, Florida: National Nursing Staff Development Organization.
- Guest, G., MacQueen, K.M., & Namey, E.E. (2012). *Applied thematic analysis*. California: SAGE Publications.
- Hall, P. (2005). Interprofessional teamwork: Professional cultures as barriers. *Journal of Interprofessional Care, (Suppl 1)*, 188-196.
- Hall, P., & Weaver, L. (2001). Interdisciplinary education and teamwork: a long and winding road. *Medical Education, 35*, 867-875.
- Harp, S. (2004). The measurement of performance in a physical therapy clinical program, An ROI approach. *The Health Care Manager, 23* (2), 110-119.
- Hayward, M.F., Curran, V., Curtis, B., Schulz, H. & Murphy, S. (2014). Reliability of the Interprofessional Collaborator Assessment Rubric (ICAR) in Multi Source Feedback (MSF) with post-graduate medical residents. *BMC Medical Education, 14*, 1049-1058, DOI 10.1186/s12909-014-0279-9.
- Heale, R., Dickieson, P., Carter, L., & Wenghofer, E. (2014). Nurse practitioners' perceptions of interprofessional team functioning with implications for nurse managers. *Journal of Nursing Management, 22* (7), 924-930.
- Health Canada. (2007). *Science and research. Guiding principles*. Retrieved from <http://www.hc-sc.gc.ca/sr-sr/advice-avis/reb-cer/pol/princip-eng.php>.
- Heermann, J.A., Craft, B.J., & Singh, M.D. (2009). Critiquing quantitative research. In C. Cameron & M.D. Singh (Eds.), *Nursing research in Canada. Methods and critical appraisal for evidenced-based practice*. (2nd ed). Toronto: Elsevier Canada. Retrieved from https://evolve.elsevier.com/staticPages/i_select.html.
- Hepp, S.L., Suter, E., Jackson, K., Deutschlander, S., Makwarimba, E., Jennings, J. & Birmingham, L. (2015). Using an interprofessional competency framework to examine collaborative practice. *Journal of Interprofessional Care, 29* (2), 131-137.
- Herring, R., Caldwell, G., & Jackson, S. (2011). Implementation of a considerative checklist to improve productivity and team working on medical ward rounds. *Clinical Governance: An International Journal, 16* (2), 129 – 136.

- Heshka, L., Jeannot, G., McPhee, L., Radloff, J., Schommer, K., Weir, L., & Wollham, M. (2011). *Leading collaboration among the providers of primary health care*. Saskatchewan: Saskatchewan Institute of Health Leadership.
- Holcomb, B.R., Hoffart, N., & Fox, M.H. (2002). Defining and measuring nursing productivity: a concept analysis and pilot study. *Journal of Advanced Nursing* 38(4), 378–386.
- Hollenberg, E., Reeves, S., Beduz, M.A., Jeffs, L., Kwan, D., Lee, J., Lowe, M., Merkley, J., Sinclair, L., Tassone, M., Oandasan, I. (2009). “Mainstreaming” interprofessional education within hospital settings: Findings from a multiple case study. *Journal of Research in Interprofessional Practice and Education*, 1.1, 10-23.
- Horsch, K. (1997). Indicators: Definition and use in a results-based accountability system. *Harvard Family Research Project. Harvard Graduate School of Education*. Retrieved March 25, 20102 from: <http://www.hfrp.org/publications-resources/browse-our-publications/indicators-definition-and-use-in-a-results-based-accountability-system>.
- Hutchison, B., Levesque, J-F., Strumpf, E., & Coyle, N. (2011). Primary health care in Canada: Systems in motion. *The Millbank Quarterly*, 89 (2), 256-288.
- Huynh, T., Alderson, M., Nadon, M., & Kershaw-Rousseau, S. (2011). Voices that care: Licensed practical nurses and the emotional labour underpinning their collaborative interactions with registered nurses. *Nursing Research and Practice*, Article ID 501790, doi:10.1155/2011/501790.
- Institute for Digital Research and Education UCLA (IDRE). (2015). *What is the coefficient of variation?* Retrieved April 17, 2015 from http://www.ats.ucla.edu/stat/mult_pkg/faq/general/coefficient_of_variation.htm.
- Institute for Healthcare Improvement. (2016). *Across the chasm: Six aims for changing the healthcare system*. Retrieved February 22, 2016 from <http://www.ihl.org/resources/pages/improvementstories/acrossthechasmsixaimsforchangingthehealthcaresystem.aspx>.
- Interprofessional Education Collaborative Expert Panel. (2011). *Core competencies for interprofessional collaborative practice: Report of an expert panel*. Washington, D.C.: Interprofessional Education Collaborative.
- Johnson, I. (2006, September). *The role of community health centres in public health care*. Panel 4 - Sculpting Health Care Policy: The Social Economy and Mutual Self-Help presented at the meeting of APPSA, Halifax.

- Johnson, R.B., Onwuegbuzie, A.J. & Turner, L.A. (2007). Toward a definition of mixed methods research. *Journal of Mixed Methods Research*, 1 (2), 112-133.
- Johnstone, P.L. (2004). Mixed methods, mixed methodology health services research in practice. *Qualitative Health Research*, 14 (2), 259-271.
- Kelle, U. (2006). Combining qualitative and quantitative methods in research practice: purposes and advantages. *Qualitative Research in Psychology*, 3, 293-311.
- Kiessling, T. & Harvey, M. (2005). Strategic global human resource management research in the twenty-first century: an endorsement of the mixed-method research methodology. *The International Journal of Human Resource Management*, 16 (1), 22-45.
- King, M.F., & Bruner, G.C. (2000). Social desirability bias: A neglected aspect of validity testing. *Psychology & Marketing*, 17 (2), 79-103.
- Kirby, J.L., & LeBreton, M., for The Standing Senate Committee on Social Affairs, Science and Technology. (2002). *Final Report on the state of the health care system in Canada. The Health of Canadians - the Federal Role. Volume Six: Recommendations for Reform*. Ottawa, Ont: Government Printing Offices.
- Kitson, A., Marshall, A., Bassett, K. & Zeitz, K. (2012). What are the core elements of patient-centered care? A narrative review and synthesis of the literature from health policy, medicine and nursing. *Journal of Advanced Nursing*, 69 (1), 4-15.
- Kocakülâh, M.C. & Harris, D. (2002). Measuring human capital cost through benchmarking in health care environment. *Journal of Healthcare Finance*, 29 (2), 27-37.
- Koch, T. (1998). Story telling: Is it really research? *Journal of Advanced Nursing*, 28 (6), 1182-1190.
- Korner, M. (2010). Interprofessional teamwork in medical rehabilitation: a comparison of multidisciplinary and interdisciplinary team approach. *Clinical Rehabilitation*, 24, 745-755.
- Krainovich-Miller, B. & Cameron, C. (2009). Literature review. In C. Cameron & M.D. Singh (Eds.), *Nursing research in Canada. Methods and critical appraisal for evidenced-based practice*. (2nd ed). Toronto: Elsevier Canada. Retrieved from https://evolve.elsevier.com/staticPages/i_select.html.
- Kuhlmann, E., Batenburg, R., Groenewegen, P.P., & Larsen, C. (2013). Bringing a European perspective to the health human resources debate: A scoping review. *Health Policy*, 110, 6-13.

- Kvarnstrom, S. & Cederlund, E. (2006). Discursive patterns in multiprofessional healthcare teams. *Journal of Advanced Nursing*, 244-252.
- Lackie, K. & Banfield, V. (2009). *Action strategy: Leading organizational approaches to sustain IPE in the post-secondary education sector*. Canadian Interprofessional Health Collaborative. Retrieved July 16, 2015 from http://tools.hhr-rhs.ca/index.php?option=com_mtree&task=viewlink&link_id=6485&Itemid=109&lang=en.
- Lake, S. (1998). Applying performance measurement to a nursing service. *The Journal of Nursing Administration*, 28 (3), 3, 12.
- Lane, D.S. & Ross, V. (1998). Defining competencies and performance indicators for physicians in medical management. *American Journal of Preventative Medicine*, 14 (3), 229-236.
- Leahy, E. (2007). Convergence and confidentiality? Limits to the implementation of mixed methodology. *Social Science Research*, 36, 149-158.
- Leech, N.L. & Onwuegbuzie, A.J. (2009). A typology of mixed methods research designs. *Journal of Mixed Methods Research*, 43, 265-275.
- Leedy, P.D. & Ormrod, J.E. (2005). *Practical research. Planning and design* (8th ed.). Upper Saddle River, New Jersey: Prentice Hall.
- Leight, S.B. (2002). Starry night: Using story to inform aesthetic knowing in women's health nursing. *Journal of Advanced Nursing*, 37(1), 108-114.
- Letts, L., Wilkins, S., Law, M., Stewart, D., Bosch, J., & Westmoreland, M. (2007). *Critical Review Forms – Qualitative Studies (Version 2.0)*. McMaster University: Authors.
- Letvak, S. & Buck, R. (2008). Factors influencing work productivity and intent to stay in nursing. *Nursing Economic*, 26 (3), 159-165.
- Leung, W-C. (2002). Competency based medical training: review. *British Medical Journal*, 325, 693-696.
- Liehr, P.R., LoBiondo-Wood, G. & Cameron, C. (2009). Qualitative approaches to research. In C. Cameron & Singh, M.D. (Eds.), *Nursing research in Canada. Methods and critical appraisal for evidenced-based practice*. (2nd ed). Toronto: Elsevier Canada. Retrieved from https://evolve.elsevier.com/staticPages/i_select.html.

- Liehr, P.R., Smith, M.J., & Cameron, C. (2009). Theoretical framework. In C. Cameron & Singh, M.D. (Eds.), *Nursing research in Canada. Methods and critical appraisal for evidenced-based practice*. (2nd ed). Toronto: Elsevier Canada. Retrieved from https://evolve.elsevier.com/staticPages/i_select.html.
- Lincoln, Y.S. & Guba, E.G. (1985). *Naturalistic Inquiry*. Beverly Hills: Sage Publications.
- LoBiondo-Wood, G. & Haber, J. (2010). *Nursing research. Methods and critical appraisal for evidence-based practice* (7th ed.). St. Louis, Missouri: Mosby Elsevier.
- Lofland, J.H., Pizzi, L., & Frick, K.D. (2004). A review of health-related workplace productivity loss instruments. *Pharmacoeconomics*, 22 (3), 165-184.
- Lund Research Ltd. (2012). *Laerd Dissertation. Self-selection sampling*. Retrieved July 15, 2015 from <http://dissertation.laerd.com/self-selection-sampling.php#first>.
- Lutfiyya, M.N., Brandt, B., Delaney, C., Pechacek, J., & Cerra, F. (2016). Setting a research agenda for interprofessional education and collaborative practice in the context of United States health system reform. *Journal of Interprofessional Care*, 30 (1), 7-14.
- MacMillan, K. (Ed.). (2013). *Proceedings of a think tank on the future of undergraduate nursing education in Canada*. Halifax: Dalhousie University School of Nursing.
- Makowsky, M.J., Schindel, T.J., Rosenthal, M., Campbell, K., Tsuyuki, R.T., & Madill, H.M. (2009). Collaboration between pharmacists, physicians and nurse practitioners: A qualitative investigation of working relationships in the inpatient medical setting. *Journal of Interprofessional Care*, 23 (2), 169-184.
- Manning, M.L. (2006). Improving clinical communication through structured conversation. *Nursing Economic\$* 24 (5), 268-271.
- Martin, J.S., Ummenhofer, W., Manser, T., & Spririg, R. (2010). Interprofessional collaboration among nurses and physicians: making a difference in patient outcome. *Swiss Medical Weekly*, 140, w13062. doi:10.4414/smw.2010.13062.
- Martinez, I.L., Pfeifle, A.L. & Ballard, J.A. (2013). Framing competency-based assessment for interprofessional education. *Medical Science Educator*, 23, (3S), 562-565.
- May, E.L. (2012). Boosting clinical productivity. *Healthcare Executive*, 27 (4), 8-15.
- McGillis Hall, L. (2003). Nursing intellectual capital: A theoretical approach for analyzing nursing productivity. *Nursing Economic\$*, 21 (1), 14-19.

- McGrail, K.A., Morse, D.S., Glessner, T., & Gardner, K. (2008). "What is found there": Qualitative analysis of physician-nurse collaboration stories. *Journal of General Internal Medicine, 24* (2), 198-204.
- McNeese-Smith, D.K. (2001). Staff nurse views of their productivity and non-productivity. *Healthcare Management Review, 26* (2), 7-19.
- McNeil, K., Mitchell, R., & Parker, V. (2015). The paradoxical effects of workforce shortages on rural interprofessional practice. *Scandinavian Journal of Caring Sciences, 29* (1), 73-82.
- Mickan, S.M. & Rodger, S.A. (2005). Effective health care teams: A model of six characteristics developed from shared perceptions. *Journal of Interprofessional Care, 19* (4), 358-370.
- Miller, J. (2004). Level of RN educational preparation: Its impact on collaboration and the relationship between collaboration and professional identity. *Canadian Journal of Nursing Research, 36* (2), 132-147.
- Miller, K.L., Reeves, S., Zwarenstein, M., Beales, J.D., Kenaszchuk, C., & Gotlib Conn, L. (2008). Nursing emotion work and interprofessional collaboration in general internal medicine wards: a qualitative study. *Journal of Advanced Nursing, 64* (4), 332-343.
- Moffatt, F., Martin, P., & Timmons, S. (2014). Constructing notions of healthcare productivity: the call for a new professionalism? *Sociology of Health & Illness, 36* (5), 686-702.
- Mohamed, Z., Newton, J.M., & McKenna, L. (2014). Belongingness in the workplace: A study of Malaysian nurses' experience. *International Nursing Review, 61*, 124-130.
- Morgan, D.L. (1998). Practical strategies for combining qualitative and quantitative methods: Applications to health research. *Qualitative Health Research, 8* (3), 362-376.
- Morris, E. & Burkett, K. (2011). Mixed methodologies: A new research paradigm or enhanced quantitative paradigm. *The Online Journal of Cultural Competence in Nursing and Healthcare 1*(1), 27-36.
- Morse, J.M. (1991). Approaches to qualitative-quantitative methodological triangulation. *Nursing Research, 40*, 120-123.
- Morse, J.M. & Field, P.A. (1995). *Qualitative research methods for health professionals*. (2nd ed.). Thousand Oaks: Sage.

- Nayeri, N.D., Bahabadi, A.H., & Kazemnejad, A. (2014). Investigating the productivity model for clinical nurses. *Acta Medica Iranica*, 52 (10), 757-763.
- Nayeri, N.D., Nazari, A.A., Salsali, M., Ahmadi, F., & Hajbaghery, M.A. (2006). Iranian staff nurses' views of their productivity and management factors improving and impeding it: A qualitative study. *Nursing and Health Sciences*, 8, 51-56.
- Nayeri, N.D., Negarandeh, R., Vaismoradi, M., Ahmadi, F., & Faghihzadeh, S. (2009). Burnout and productivity among Iranian nurses. *Nursing and Health Sciences*, 11 (3), 263-270.
- Nayeri, N. D., Salehi, T. & Noghabi, A.A.A. (2011). Quality of work life and productivity among Iranian nurses. *Contemporary Nurse*, 39(1), 106–118.
- Newcastle University, School of Mathematics & Statistics. (n.d.). *Analysis of covariance*. Retrieved from <http://www.mas.ncl.ac.uk/~njnsm/medfac/docs/ancova.pdf>.
- Normandin, B. (2012). *Three types of change management models*. Retrieved February 23, 2016 from <http://quickbase.intuit.com/blog/three-types-of-change-management-models>.
- Norris, N. (2007). Error, bias and validity in qualitative research. *Educational Action Research*, 5 (1), 172-176
- Nova Scotia Advisory Committee on Primary Health Care Renewal. (2003). *Primary health care renewal: Action for healthier Nova Scotians*. Retrieved November 28, 2012 from www.gov.ns.ca/health/reports/pubs/Primary_Health_Care_Renewal_Report_May_2003.pdf.
- Nova Scotia Department of Health and Wellness (n.d.). *Annual statement of mandate for the fiscal year 2014-2015*. Halifax: Author. Retrieved May 20, 2015 from http://novascotia.ca/dhw/corporate-reports/documents/DHW_Statement_of_Mandate_for_2014-2015.pdf.
- Nova Scotia Department of Health and Wellness. (2012). *Collaborative care guidelines for RNs, LPNs, and assistive personnel providing maternal & newborn care*. Nova Scotia: Author.
- Nova Scotia Department of Health and Wellness. (2013). *Collaborative care guidelines for perioperative nurses. RN & LPN*. Nova Scotia: Author.
- Nugus, P., Greenfield, D., Travaglia, J., Westbrook, J., & Braithwaite, J. (2010). How and where clinicians exercise power: Interprofessional relations in healthcare. *Social Science & Medicine*, 71, 898-909.

- Oandasan, I & Reeves, S. (2005). Key elements for interprofessional education. Part 1: The learner, the educator and the learning context. *Journal of Interprofessional Care, (Suppl 1)*, 21-38.
- Oandasan, I., D'Amour, D., Zwarenstein, M., Barker, K., Purden, M., Beaulieu, M-D., ...Tregunno, D. (2004). *Interdisciplinary education for collaborative, patient-centred practice. Research and findings report*. Ottawa: Health Canada.
- Oandasan, I., Ross Baker, G., Barker, K., Bosco, C., D'Amour, D., Jones, L., ... Way, D. (2006). *Teamwork in healthcare: Promoting effective teamwork in healthcare in Canada. Policy synthesis and recommendations*. Ottawa, Ontario: Canadian Health Services Research Foundation.
- O'Brien-Pallas, L., Tomblin Murphy, G., Birch, S., Kephart, G., Meyer, R., Eisler, K., Lethbridge, L., & Cook, A. (2007). *Health human resources modelling: Challenging the past, creating the future*. Ottawa, Ontario: Canadian Health Services Research Foundation.
- Ødegård, A. & Strype, J. (2009). Perceptions of interprofessional collaboration within child mental health care in Norway. *Journal of Interprofessional Care, 23* (3), 286-296.
- Onwuegbuzie, A.J. & Johnson, R.B. (2006). The validity issue in mixed research. *Research in the Schools, 13* (1), 48-63.
- Orchard, C.A., Curran, V., & Kabene, S. (2005). Creating a culture for interdisciplinary collaborative professional practice. *Medical Education Online, 10* (11), 1-13.
- Orchard, C.A., King, G.A., Khalili, H., & Bezzina, M.B. (2012). Assessment of interprofessional team collaboration scale (AITCS): Development and testing of the instrument. *Journal of Continuing Education in the Health Professions, 32* (1), 58-67.
- Organization for Economic Co-operation and Development (OECD). (2013). Strengthening health information infrastructure matters. In OECD, *Strengthening Health Information Infrastructure for Health Care Quality Governance: Good Practices, New Opportunities and Data Privacy Protection Challenges*, OECD Publishing, Paris.
DOI: <http://dx.doi.org/10.1787/9789264193505-5-en>
- Orr, D.E. (2010). Characteristics of positive working relationships between nursing and support service employees. *The Journal of Nursing Administration, 40* (3), 129-134.

- Oxford Dictionaries. (2015). Oxford dictionaries language matters: Communication. Oxford University Press. Retrieved November 3, 2015 from <http://www.oxforddictionaries.com/definition/english/communication>.
- Paley, J., Cheyne, H., Dalgleish, L., Duncan, E.A., & Niven, C.A. (2007). Nursing's ways of knowing and dual process theories of cognition. *Journal of Advanced Nursing*, 60(6), 692-701.
- Patton, M.Q. (1990). *Qualitative evaluation and research methods* (2nd ed.). Newbury Park, CA: Sage.
- Pearson, A., O'Brien Pallas, L., Thomson, D., Doucette, E., Tucker, D., Wiechula, R., Long, L., Porritt, K., & Jordan, Z. (2006). Systematic review of evidence on the impact of nursing workload and staffing on establishing healthy work environments. *International Journal of Evidence-Based Healthcare*, 4, 337–384.
- Pexton, C. (2016). *Overcoming the barriers to change in healthcare system*. Retrieved February 22, 2016 from <http://www.isixsigma.com/implementation/change-management-implementation/overcoming-barriers-change-healthcare-system/>.
- Polit, D.F. & Tatano Beck, C. (2012). *Nursing research. Generating and assessing evidence for nursing practice* (9th ed.). Philadelphia, Pennsylvania: Wolters Kluwer Health/Lippincott Williams & Wilkins.
- Porter, S. (2010). Fundamental patterns of knowing in nursing: the challenge of evidence-based practice. *Advances in Nursing Science*, 33(1), 3-14.
- Porter, M.E. & Lee, T.H. (2013). The strategy that will fix health care. *Harvard Business Review*, October Issue, Retrieved may 26, 2015 from <http://leadershipnc.org/wp-content/uploads/2014/07/XXII-HHS-The-Strategy-That-Will-Fix-Health-Care-HBR.pdf>.
- Poses, R. M., & Isen, A. M. (1998). Qualitative research in medicine and health care. *Journal of General Internal Medicine*, 13 (1), 32-38.
- Province of Nova Scotia (2013a). *District Health Authority Consolidation: About*. Retrieved May 19, 2015 from <http://novascotia.ca/dhw/PeopleCentredHealthCare/about.asp>.
- Province of Nova Scotia (2013b). *District Health Authority Consolidation: People-centred Health Care*. Retrieved May 18, 2015 from <http://novascotia.ca/dhw/peoplecentredhealthcare/>.
- Province of Nova Scotia. (2013c). *Model of Care Initiative in Nova Scotia*. Halifax, Nova Scotia: Author. Retrieved July 10, 2015 from <http://novascotia.ca/dhw/mocins/>.

- Province of Nova Scotia. (2013d). *Primary health care. Resources for health care providers*. Halifax, Nova Scotia: Author. Retrieved July 12, 2015 from <http://novascotia.ca/dhw/primaryhealthcare/resources.asp>.
- Quinn, J.B., Anderson, P., & Finkelstein, S. (1996). Leveraging intellect. *Academy of Management Executive*, 10 (3), 7-27.
- Ray, M.A. (1994). The richness of phenomenology: Philosophic, theoretic, and methodologic concerns. In J.M. Morse (Ed.), *Critical issues in qualitative research methods* (pp. 117-133). Thousand Oaks: Sage.
- Ready Ratios (2011-2015). *Coefficient of variation*. Retrieved April 20, 2015 from http://www.readyratios.com/reference/analysis/coefficient_of_variation.html.
- Reese, S.M. (2010). Using labor metrics to achieve value-driven health care. *Healthcare Financial Management*, 90-94.
- Reeves, S. (2012). The rise and rise of interprofessional competence. *Journal of Interprofessional Care*, 26, 253-255.
- Reeves, S., Fox., A., & Hodges, B. (2009). The competency movement in the health professions: Ensuring consistent standards or reproducing conventional domains of practice. *Advances in Health Sciences Education*, 14, 451–453.
- Reeves, S., Rice, K., Gotlib, L., Lee-Miller, K., Kenaszchuk, C., & Zwarenstein, M. (2009). Interprofessional interaction, negotiation and non-negotiation on general internal medicine wards: An ethnographic study. *Journal of Interprofessional Care*, 23, 1–13.
- Rice, K., Zwarenstein, M., Gotlib Conn, L., Kenaszchuk, C., Russell, A., & Reeves, S. (2010). An intervention to improve interprofessional collaboration and communications: A comparative qualitative study. *Journal of Interprofessional Care*, 24(4), 350–361.
- Richardson, S.W., Wilson, M.C., Nishikawa, J., & Hayward, R.S.A. (1995). The well-built clinical question: The key to evidence-based decisions. *ACP Journal Club*, 123 (3), A12-A13.
- Ritchie, J., Power, C., Hughes, J., Baker, C., Coady, R., Cormier- Daigle, M., Critchley, K., Hughes Power, M., Macdonald, M., MacNutt, G., McInnis Perry, G., Oke, B., Orchard, C., Pennock, M., Spencer, M., Tarjan, R., Tomblin Murphy, G., Veugelers, P., & Ward, T. (2003). *Using Individual Patients' Needs for Nursing Human Resources Planning*. Canadian Health Services Research Foundation.

- Romanow, R. (2002). *Commission on the future of health care in Canada. Building on values. The future of health care in Canada - Final report* (Cat. No. CP32-85/2002E-IN). Retrieved from <http://publications.gc.ca/pub?id=237274&sl=0>
- Saba, G.W., Villela, T.J., Chen, E., Hammer, H., & Bodenheimer, T. (2012). The myth of the lone physician: Toward a collaborative alternative. *Annals of Family Medicine, 10* (2), 169-173.
- Sacred Heart University Library. (2015). *Organizing academic research papers: Limitations of the study*. Retrieved July 16, 2015 from <http://libguides.sacredheart.edu/c.php?g=29803&p=185934>.
- Sale, J.E., Lohfeld, L.H., & Brazil, K. (2002). Revisiting the quantitative-qualitative debate: Implications for mixed-methods research. *Quality & Quantity, 36*, 43-53.
- San Martin-Rodriguez, L., Beaulieu, M, D'Amour, D., & Ferrada-Videla, M. (2005). The determinants of successful collaboration: A review of theoretical and empirical studies. *Journal of Interprofessional Care, (Suppl 1)*, 132-147.
- Sandelowski, M. (2000). Combining qualitative and quantitative sampling, data collection, and analysis techniques in mixed-methods studies. *Research in Nursing & Health, 23*, 246-255.
- Sauro, J. (2015). *How confident do you need to be in your research?* Retrieved April 25, 2015 from <http://www.measuringu.com/blog/confidence-levels.php>.
- Schmitt, M. (2001). Collaboration improves the quality of care: Methodological challenges and evidence from US health care research. *Journal of Interprofessional Care, 15*, 47-66.
- Schmitt, M.H., Gilbert, J.H.V., Brandt, B.F., & Weinstein, R.S. (2013). The coming of age for interprofessional education and practice. *The American Journal of Medicine, 126*, 284-288.
- Schroder, C., Medves, J., Paterson, M., Byrnes, V., Chapman, C., O'Riordan, A....Kelly, C. (2011). Development and pilot testing of the collaborative practice assessment tool. *Journal of Interprofessional Care, 25*, 189-195.
- Scruggs Garber, J., Madigan, E.A., Click, E.R., & Fitzpatrick, J.J. (2009). Attitudes toward collaboration and servant leadership among nurses, physicians and residents. *Journal of Interprofessional Care, 23* (4), 331-340.
- Seren, S. & Baykal, U. (2007). Relationships between change and organizational culture in hospitals. *Journal of Nursing Scholarship, 39* (2), 191-197.

- Sharpe, A., Bradley, C., & Messinger, H. (2007). *The Measurement of Output and Productivity in the Health Care Sector in Canada: An Overview. Report prepared for the Canadian Medical Association (CMA)*. Ottawa: Centre for the Study of Living Standards
- Sim, J. & Wright, C. (2000). *Research in health care. Concepts, designs and methods*. Cheltenham, UK: Nelson Thornes Ltd.
- Sinclair, L.B., Lingard, L.A., & Mohabeer, R.N. (2009). What's so great about rehabilitation teams? An ethnographic study of interprofessional collaboration in a rehabilitation unit. *Archives of Physical Medicine and Rehabilitation*, 90, 1196-1201.
- Skela Savič, B., Pagon, M., & Robida, A. (2007). Predictors of the level of personal involvement in an organization: A study of Slovene hospitals. *Health Care Management Review*, 32 (3), 271-283.
- Smith, P. (2010). Measuring productivity in health services. *Journal of Health Services Research & Policy*, 15 (1), 1-2.
- Statistics Norway (2010). *Women and men in Norway. What the figures say*. Retrieved August 5, 2015 from <https://www.ssb.no/en/befolkning/artikler-og-publikasjoner/attachment/39581?ts=132b433a8c8>.
- Steinert, Y. (2005). Learning together to teach together: Interprofessional education and faculty development. *Journal of Interprofessional Care*, (Suppl 1), 60-75.
- Stekler, A., McLeroy, K.R., Goodman, R.M., Bird, S.T., & McCormick, L. (1992). Toward integrating qualitative and quantitative methods: An introduction. *Health Education Quarterly*, 19 (1), 1-8.
- Streiner, D.L. & Norman, G.R. (2008). *Health measurement scales. A practical guide to their development and use* (4th ed.). New York: Oxford University Press
- Streubert, H.J. & Carpenter, D.R. (1999). *Qualitative research in nursing. Advancing the humanistic imperative* (2nd ed.). Philadelphia: Lippincott.
- Suter, E. & Deutschlander, S. (2010). *Can interprofessional collaboration provide health human resources solutions? A knowledge synthesis*. Alberta: Western Canadian Interprofessional Health Collaborative.
- Suter, E., Arndt, J., Arthur, N., Parboosingh, J., Taylor, E., & Deutschlander, S. (2009). Role understanding and effective communication as core competencies for collaborative practice. *Journal of Interprofessional Care*, 23, 41–51.

- Suter, E., Arndt, J., Lait, J., Jackson, K., Kipp, J., Taylor, E., & Arthur, N. (2007). How can frontline managers demonstrate leadership in enabling interprofessional practice? *Healthcare Management Forum*, 20 (4), 38-43.
- Talbot, M. (2004). Monkey see, monkey do: a critique of the competency model in graduate medical education. *Medical Education*, 38, 587-592.
- Tashakkori, A., & Teddlie, C. (1998). *Mixed methodology: Combining qualitative and quantitative approaches*. Thousand Oaks, CA: Sage.
- Tashakkori, A. & Teddlie, C. (2010). Putting the human back in "human research methodology": The researcher in mixed methods research. *Journal of Mixed Methods Research*, 4 (4): 271-277.
- Tataw, D. (2012). Toward human resource management in inter-professional health practice: Linking organizational culture, group identity and individual autonomy. *The International Journal of Health Planning and Management*, 27 (2), 130-149.
- Tavakol, M. & Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education*, 2, 53-55.
- Teddlie, C. & Yu, F. (2007). Mixed methods sampling: A typology with examples. *Journal of Mixed Methods Research*, 1 (1), 77-100.
- The Royal College of Physicians and Surgeons of Canada. (2005). *The CanMeds 2005 Physician Competency Framework*. Retrieved from: http://www.royalcollege.ca/portal/page/portal/rc/common/documents/canmeds/resources/publications/framework_full_e.pdf.
- Thistlethwaite, J.E. (2012). Interprofessional education: A review of context, learning and the research agenda. *Medical Education*, 46 (1), 58-70.
- Thistlethwaite, J.E., Forman, D., Matthews, L.R., Rogers, G.D., Steketee, C & Yassine, T. (2014). Competencies and frameworks in interprofessional education: A comparative analysis. *Academic Medicine*, 89 (6), 1-7.
- Thomas, E.J., Sexton, J.B., & Helmreich, R.L. (2003). Discrepant attitudes about teamwork among critical care nurses and physicians. *Critical Care Medicine*, 31 (3), 956-959.
- Thompson, P. & Stanowski, A. (2009). Maximizing nursing productivity. The benefits of improved collaboration between nursing and support services. *Healthcare Financial Management*, 63 (1), 76-85.
- Thurmond, V.A. (2001). The point of triangulation. *Journal of Nursing Scholarship*, 33 (3), 253-258.

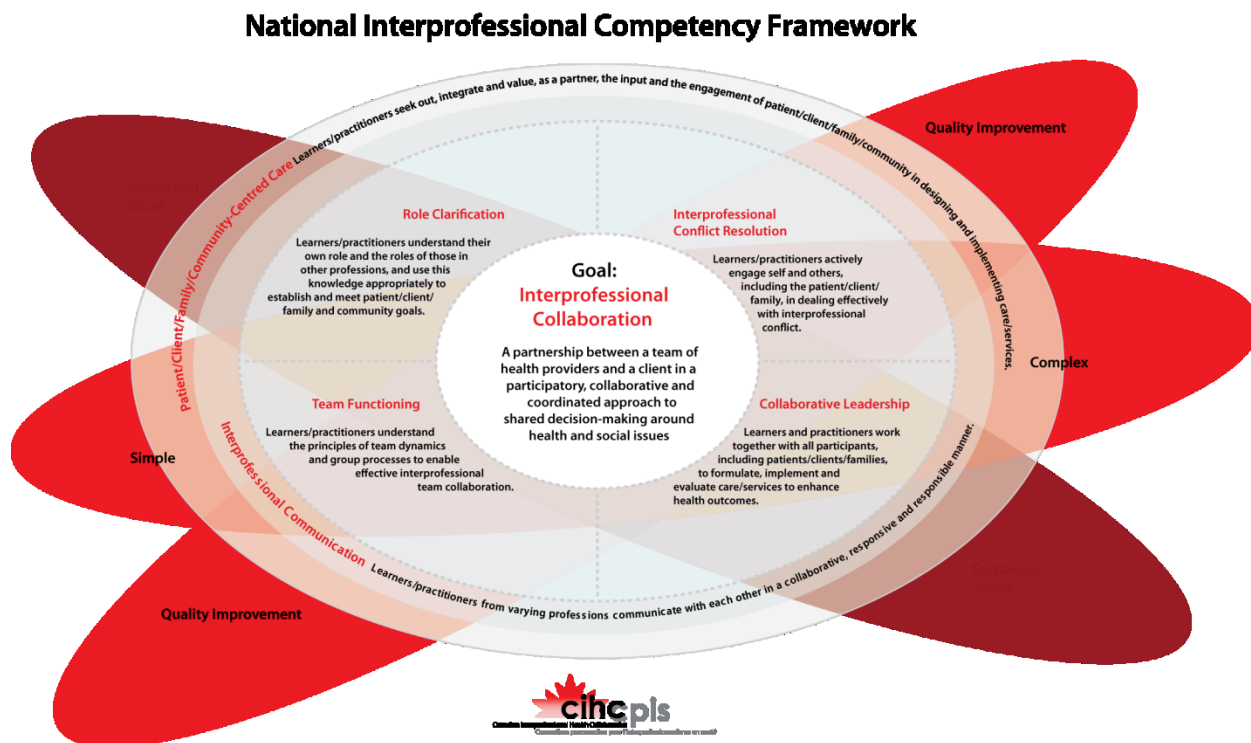
- Tomblin Murphy Consulting Inc. (2014). *Policy options to inform Nova Scotia's Provincial Nursing Strategy*. Halifax, NS: Author.
- Tomblin Murphy, G. (2007). *A framework for collaborative Pan-Canadian health human resources planning. Appendix: Example of a conceptual model for HHR planning*. Retrieved January 2010 from <http://www.hc-sc.gc.ca/hcs-sss/pubs/hhrhs/2007-frame-cadre/app-ann-eng.php>.
- Tomblin Murphy, G. (2010). *Model of Care Initiative in Nova Scotia (MOCINS): Final evaluation report*. Halifax, NS: Dalhousie University/World Health Organization Collaborating Centre on Health Workforce Planning & Research. Retrieved from <http://novascotia.ca/dhw/mocins/docs/MOCINS-evaluation-report.pdf>.
- Tomblin Murphy, G. & de Campos, F.E. (2006). *Building Equitable and Sustainable Health Systems in the Americas through Innovative Needs-Based Approaches for Health Human Resources Planning*. Teasdale Corti: Authors.
- Tomblin Murphy, G. & MacKenzie, A. (2013). Using evidence to meet population health care needs: Successes and challenges. Invited Essay. *Healthcare Papers*, 13 (2), 9-21.
- Tomblin Murphy, G. & O'Brien-Pallas, L. (2002). Discussion paper no. 30. How do health human resources policies and practices inhibit change? A plan for the future. In *Building on Values: The Future of Health Care in Canada - Final Report*. Ottawa: Canada Government Printing Office.
- Tomblin Murphy, G. & O'Brien-Pallas, L. (2006). Appendix: Example of a Conceptual Model for HHR Planning in: *A Framework for Collaborative Pan-Canadian Health Human Resources Planning*. (pp. 29-36). Ottawa: Federal/Provincial/Territorial Advisory Committee on Health Delivery and Human Resources (ACHDHR).
- Tomblin Murphy, G., Alder, R., & MacKenzie, A. (2008). *Innovative Needs-based Approach to Family Physician Planning – Canada*. International Medical Workforce Collaborative Conference, 1-15.
- Tomblin Murphy, G., Birch, S., & MacKenzie, A. (2007). *Needs-based health human resources planning: The challenge of linking needs to provider requirements*. Ottawa, Ont: Canadian Nurses Association/Canadian Medical Association.
- Tomblin Murphy, G., Birch, S., Alder, R., MacKenzie, A., Lethbridge, L., Little, L., & Cook, A. (2009). *Tested solutions for eliminating Canada's registered nurse shortage*. Ottawa, Ont: CNA

- Tomblin Murphy, G., Birch, S., MacKenzie, A., Alder, R., Lethbridge, L., & Little, L. (2011). Eliminating the shortage of registered nurses in Canada: An exercise in applied needs-based planning. *Health Policy*, doi:10.1016/j.healthpol.2011.11.009
- Tomblin Murphy, G., Birch, S., O'Brien-Pallas, L., Kephart, G., & MacKenzie, A. (2011). Nursing inputs and outcomes of hospital care: an empirical analysis of Ontario's acute-care hospitals. *Canadian Journal of Nursing Research*, 43(1), 126-146.
- Tomblin Murphy, G., Kephart, G., Lethbridge, L., O'Brien-Pallas, L., & Birch, S. (2009). Planning for what? Challenging the assumptions of health human resources planning. *Health Policy*, 92, 225–233.
- Tomblin Murphy, G., MacKenzie, A., Alder, R., Birch, S., Kephart, G., & O'Brien-Pallas, L. (2009). An applied simulation model for estimating the supply of and requirements for registered nurses based on population health needs. *Policy, Politics, & Nursing Practice*, 10(4), 240-251.
- Tomblin Murphy, G., MacKenzie, A., Alder, R., Langley, J., Hickey, M. & Cook, A. (2013). Pilot-testing an applied competency-based approach to health human resources planning. *Health Policy and Planning*, 28 (7), 739-749.
- Tomblin Murphy, G., MacKenzie, A., Rigby, J., Alder, R., Gough, A. & Hickey, M. (2012). *Competency-Based Health Human Resources Planning for Aging Canadians. Final Report.* (Health Canada Contribution Agreement # 6804-15-2009/7130076). Halifax, NS: Author.
- Tomblin Murphy, G., MacKenzie, A., Rigby, J., Rockwood, K., Gough, A., Greeley, G., Montpetit, F., Dill, D., Alder, R., & Lackie, K. (2013). Service-Based Health Human Resources Planning for Older Adults. *Journal of the American Medical Directors Association*, 14, 611-615.
- Tomblin Murphy, G., O'Brien-Pallas, L., Alksnis, C., Birch, S., Kephart, G., Pennock, M., Pringle, D., Rootman, I., & Wang, S. (2003). *Health human resources planning: an examination of relationships among nursing service utilization, an estimate of population health and overall health status outcomes in the province of Ontario.* Ottawa: Canadian Health Services Research Foundation.
- Tomblin Murphy, G., O'Brien-Pallas, L., Birch, S., Kephart, G., & MacKenzie, A. (2004). *Hospital service utilization: Implications for nursing human resource planning.* (pp. 1-35). Office of Nursing Policy, Health Canada.
- Tourse, R.W.C., Mooney, J.F., Shindul-Rothschild, J., Prince, J., Pulchini, J.A., Platt, S., & Savransky, H. (2008). The university/community partnership: Transdisciplinary course development. *Journal of Interprofessional Care*, 22 (5), 461-474.

- Tranmer, J.E., Guerriere, D.N., Ungar, W.J., & Coyte, P.C. (2005). Valuing patient and caregiver time. A review of the literature. *Pharmacoeconomics*, 23 (5), 449-459.
- Trochim, W.M.K. (2006). *The research methods knowledge base*. (2nd ed). Retrieved from <http://www.socialresearchmethods.net/kb/index.php>.
- Van Hecke, T. (n.d.). *How students can understand sampling within finite populations in statistics*. Retrieved from http://www.pixel-online.net/science/common/download/Paper_pdf/45-SEP15-FP-Van%20Hecke-NPSE2012.pdf.
- Varma, S. (2006). *Preliminary item statistics using point-biserial correlation and p-values*. Morgan Hill, CA: Educational Data Systems, Inc. Retrieved from http://www.eddata.com/resources/publications/eds_point_biserial.pdf.
- Vaughan, P. (2014). *What does a province want to know?* Health Data Users Day. Retrieved May 18, 2015 from http://www.cihiconferences.ca/usersday/downloads/presentations/Session_2_-_DM_Vaughan_CIHI_Health_Data_Users_Day_Tues_Nov_18_2014_-_What_Does_a_Province_Want_to_Know_%28NS%29.pdf.
- Verhulst, L., Forrest, C.B., & McFadden, M. (2007). To count heads or to count services? Comparing population-to-physician methods with utilization-based methods for physician workforce planning: A case study in a remote rural administrative region of British Columbia. *Healthcare Policy*, 2 (4), 1-15.
- Way, D., Jones, L., & Busing, N. (2000). *Implementation Strategies: "Collaboration in Primary Care – Family Doctors & Nurse Practitioners Delivering Shared Care"*. Discussion Paper Written for the Ontario College of Family Physicians. Author: Ottawa, Ont.
- Weaver Moore, L., Leahy, C., Sublett, C. & Lanig, H. (2013). Understanding nurse-to-nurse relationships and their impact on work environments. *MedSurg Nursing*, 22 (3), 172-179.
- Whitcomb, M.E. (2007). Redirecting the assessment of clinical competence. *Academic Medicine*, 82 (6), 527-528.
- Wiggins, B.J. (2011). Confronting the dilemma of mixed methods. *Journal of Theoretical and Philosophical Psychology*, 31 (1), 44-60.
- Wilson-Thomas, L. (1995). Applying critical social theory in nursing education to bridge the gap between theory, research and practice. *Journal of Advanced Nursing*, 21, 568-575.

- Wood, V., Flavell, A., Vanstolk, D., Bainbridge, L., & Nasmith, L. (2009). The road to collaboration: developing an interprofessional competency framework. *Journal of Interprofessional Care, 23*(6), 621–629.
- World Health Organization. (2008a). *Spotlight on statistics. A fact file on health workforce statistics. Global efforts for strengthening the information and evidence base on human resources for health*. Geneva: Authors.
- World Health Organization. (2008b). *Spotlight on statistics. A fact file on health workforce statistics. Gender and health workforce statistics*. Geneva, Switzerland: Author.
- World Health Organization. (2010). *Framework for action on interprofessional education & collaborative practice*. Geneva, Switzerland: Author.
- Wranik, D. (2008). Health human resource planning in Canada: A typology and its application. *Health Policy, 86*, 27-41.
- Xyrichis, A. & Lowton, K. (2007). What fosters or prevents interprofessional teamworking in primary and community care? A literature review. *International Journal of Nursing Studies, 45*, 140-153.
- Yeager, S. (2005). Interdisciplinary collaboration: The heart and soul of health care. *Critical Care Nurses Clinical of North America, 17*, 143-148.
- Zwarenstein, M., Goldman, J., & Reeves, S. (2009). Interprofessional collaboration: Effects of practice-based interventions on professional practice and healthcare outcomes (Review). *The Cochrane Library, 4*, 1–29.

APPENDIX A CIHC National Interprofessional Competency Framework (2010)



The overall goal of the National Interprofessional Competency Framework is to achieve interprofessional collaboration, where there is a “partnership between a team of health providers and a client in a participatory, collaborative and coordinated approach to shared decision-making around health and social issues” (CIHC, 2010, p. 11). Below, each competency domain is defined and followed by its associated descriptors.

Patient/client/family/community-centred care: “Learners/practitioners seek out, integrate and value, as a partner, the input and the engagement of the patient/client/family/community in designing and implementing care/services” (CIHC, 2010, p. 13).

- support participation of patients, clients, families, and community representatives as integral partners in the provision of care, service planning, implementation, and evaluation
- share information in a way that is clear and respectful, that encourages conversation and enhances contributions in decision-making
- ensure that appropriate education and support is provided
- listen respectfully to the expressed needs of all parties to help shape and deliver care and services (CIHC, 2010).

Interprofessional communication: “Learners/practitioners from different professions communicate with each other in a collaborative, responsive and responsible manner” (CIHC, 2010, p. 16).

- co-create principles for team communication
- actively listen
- ensure common understanding of care decisions
- develop trusting relationships
- use information and communication technology to improve IP care (i.e.; supports sharing goals, care plans, decision-making, and responsibilities) (CIHC, 2010).

Role clarification: “Learners/practitioners understand their own role and the roles of those in other professions, and use this knowledge appropriately to establish and achieve patient/client/family and community goals” (CIHC, 2010, p. 12).

- describe one’s role and that of others
- recognize and respect the diversity of roles, responsibilities, and competencies
- perform in a culturally respectful way
- communicate roles, knowledge, skills, and attitudes using appropriate language
- access others’ skills and knowledge through consultation
- consider roles of others in determining own professional and IP roles
- integrate competencies/roles into models of service delivery (CIHC, 2010).

Team functioning: “Learners/practitioners understand the principles of team work dynamics and group/team processes to enable effective interprofessional collaboration” (CIHC 2010, p. 14).

- understand the team development process
- respect team members’ ethical values
- facilitate discussions and interactions within the team
- participate in and be respectful of all members’ participation in decision-making
- regularly reflect on own functioning within the team
- establish and maintain healthy working relationships, regardless of whether a formalized team exists
- respect team ethics (CIHC, 2010).

Collaborative leadership: “Learners/practitioners understand and can apply leadership principles that support a collaborative practice model” (CIHC, 2010, p. 15).

- work with others to reach effective patient/client outcomes
- advance interdependent working relationships
- facilitate efficient team processes
- facilitate effective decision making
- establish a climate for collaborative practice
- co-create the conditions for shared leadership
- apply collaborative decision-making principles
- integrate continuous quality improvement principles (CIHC, 2010).

Interprofessional conflict resolution: “Learners/practitioners actively engage self and others, including the patient/client/family, in dealing effectively with interprofessional conflict” (CIHC, 2010, p. 11).

- value the promising positive nature of conflict
- recognize potential sources of conflict and take constructive steps to address it

- identify common situations (i.e.; role ambiguity, power gradients, differing goals) that are likely to lead to conflicts
- adopt conflict resolution strategies
- set guidelines to help address disagreements
- work to resolve disagreements
- create a safe environment where diverse opinions can be expressed
- facilitate team members to share differing viewpoints and develop a level of consensus (CIHC, 2010).

APPENDIX B Core Competencies for Interprofessional Collaborative Practice

Values/ethics for interprofessional practice: “Work with individuals of other professions to maintain a climate of mutual respect and shared values” (IPEC Expert Panel, 2011, p. 19).

- Provide IP care that is patient and population-centered
- Respect patient privacy, dignity and confidentiality while delivering team-based care
- Support patients’, populations’, and health care teams’ cultural diversity and individual differences
- Respect unique cultures, values, roles/responsibilities, and expertise of other health professions
- Provide care in a cooperative manner with recipients, providers and contributors/supporters of prevention and health services
- Develop a trusting relationship with patients, families, and other team members (CIHC, 2010 as cited in IPEC Expert Panel, 2011)
- Practice with high standards of ethical conduct and quality of care that contribute to team-based care
- Manage IP patient/population centered care ethical dilemmas
- Base relationships with patients, families, and other team members on honesty and integrity
- Maintain professional competence appropriate to scope of practice (IPEC Expert Panel, 2011).

Roles and responsibilities: “Use the knowledge of one’s own role and those of other professions to appropriately assess and address the healthcare needs of the patients and populations served” (IPEC Expert Panel, 2011, p. 21).

- Communicate clear roles and responsibilities to patients, families, and other professionals
- Recognize limitations in own skills, knowledge, and abilities

- Develop care strategies specific to patient needs by engaging other HCPs and resources that complement own expertise
- Describe roles and responsibilities of other HCPs and team-based care
- Provide safe, timely, efficient and equitable care by utilizing the full range of the teams' knowledge, skills and abilities
- Clarify each team member's responsibility in carrying out components of a treatment plan or public health intervention
- Build interdependent relationships with other HCPs to improve care and advance learning
- Participate in ongoing professional and interprofessional development to enhance team performance
- Use the unique and complementary competencies of all team members to optimize patient care (IPEC Expert Panel, 2011).

Interprofessional communication: “Communicate with patients, families, communities, and other health professionals in a responsive and responsible manner that supports a team approach to the maintenance of health and the treatment of disease” (IPEC Expert Panel, 2011, p. 23).

- Select communication tools and techniques (including information/communication systems and technologies) to facilitate team discussions and interactions
- Coordinate and communicate jargon-free information with patients, families, and healthcare team members
- Communicate in a confident, respectful and clear manner with team members involved in patient care
- Encourage sharing of ideas and opinions of other team members while actively listening
- Give, and respond to, timely, sensitive, respectful, instructive feedback about team performance
- Use respectful language appropriate for a crucial conversation or interprofessional conflict

- Recognize how own uniqueness (experience level, expertise, culture, power, and hierarchy) plays a part in effective communication, conflict resolution, and positive IP working relationships
- Consistently share the importance of teamwork in patient-centered and community-focused care (IPEC Expert Panel, 2011).

Teams and teamwork: “Apply relationship-building values and the principles of team dynamics to perform effectively in different team roles to plan and deliver patient-/population-centered care that is safe, timely, efficient, effective, and equitable” (IPEC Expert Panel, 2011, p. 25).

- Describe team development processes and the roles/practices of effective teams
- Develop consensus on the ethical principles to guide all aspects of patient care and team work.
- Engage other HCPs as appropriate in shared patient-centered problem-solving
- Incorporate HCPs knowledge and experience to advise in care decisions, while respecting patient priorities/preferences and/or community values
- Utilize leadership skills that support collaborative practice and team effectiveness
- Constructively manage conflict that occurs with HCPs, patients and families
- Share accountability for prevention and health care outcomes with other professions, patients, and communities
- Reflect on individual and team performance improvement
- Use process improvement strategies to improve effectiveness of IP teamwork and team-based care
- Incorporate evidence to inform effective teamwork and team-based practices
- Perform effectively in team-based care in a variety of settings (IPEC Expert Panel, 2011).

APPENDIX C Email to Chief Executive Officers

Dear [Name of Chief Executive Officer]

I am a PhD candidate at Dalhousie University School of Nursing, Halifax, Nova Scotia. As a requirement of the PhD Nursing program, I am conducting a research study, entitled *“Examination of the effects of interprofessional collaboration on health care provider and team productivity in primary health care: An important consideration in health human resources planning”*. Research ethics approval has been granted from each District Health Authority Research Ethics Board in Nova Scotia.

I have chosen Community Health Centers (CHCs) in Nova Scotia as the setting for my study. As the Chief Executive Officer of the [name of DHA], I understand that the [name(s) of CHC] falls within your governance. It is for this reason that I write to you today. I would like an opportunity to speak with you to provide a richer description of my study and to solicit your support and permission to conduct this research study in the CHC. If you are willing to do so, please indicate a date and time that you would be available for a one-half hour telephone meeting.

Thank you in advance for consideration of my request. Should you have any questions, please do not hesitate to contact me at klackie@dal.ca or at 902-473-1457.

Kind regards,

Kelly Lackie BScN MN PhD(c) RN

APPENDIX D Script for CEOs: Explanation of Study

I am a PhD candidate at Dalhousie University School of Nursing, Halifax, Nova Scotia. As a requirement of the PhD Nursing program, I am conducting a research study, entitled “Examination of the effects of interprofessional collaboration on health care provider and team productivity in primary health care: An important consideration in health human resources planning”. Research ethics approval has been granted from each District Health Authority Research Ethics Board in Nova Scotia. I am calling you today in follow-up to my introductory email to solicit your support and permission to conduct this research study in your facility.

I am interested in learning about how health care providers work with each other in the primary health care setting. Specifically, the purpose of the study is to learn about: 1) how health care providers define collaboration and how they would describe personal and team efficiency; 2) the extent to which health care providers demonstrate the knowledge, skills and attitudes (i.e.; competencies) that are linked to collaboration; and, 3) whether self- and peer-assessment of the IPC competencies changes their perceptions of being efficient. To discover the answers to these questions I am asking regulated and unregulated core team members (those who have an ongoing relationship with each other), who work with at least one other provider group, to participate in two interviews. As well, I would like these same participants to use the Interprofessional Collaborator Assessment Rubric to assess themselves and two other core team members for the knowledge, skills and attitudes related to collaboration.

I will follow up our discussion today with a Letter of Introduction. If you are willing to grant permission for me to contact the core team members in your facility, I

will ask you to sign a permission form and return it to me. Once I receive the form, I will make telephone contact with the managers of each of the CHC sites to explain the research study. I will forward Letters of Introduction to be distributed to staff and physicians as well as information posters that can be placed in common areas of the facility.

If you are interested in having me conduct my research in your health care setting, I would also like you to consider how you would like to receive the findings. Would you only like to receive the findings that are specific to your center or would you be interested in the findings reported as an aggregate of all community health centers? The choice is yours. I will ask you to please indicate your choice on the permission form.

Thank you for consideration of my request. I welcome any questions that you may have.

APPENDIX E CEO Letter of Introduction

Dear [insert name],

My name is Kelly Lackie and I am a PhD candidate at Dalhousie University School of Nursing, Halifax, Nova Scotia. This letter is in follow-up to our telephone conversation, in which I explained my proposed research study, entitled “*Examination of the effects of interprofessional collaboration on health care provider and team productivity in primary health care: An important consideration in health human resources planning*”. This research study is a requirement of the PhD Nursing program. Research ethics approval has been granted from the Research Ethics Boards of each District Health Authority in Nova Scotia. I am writing to solicit your support and permission to conduct this research study in your facility.

As a registered nurse who has worked in the field of interprofessional education for collaborative patient-centred practice for over six years, I am interested in learning about how health care providers work with others in the primary health care setting. Specifically, I am interested in how health care providers define collaboration and how they would describe how efficient they and their team members are; whether health care providers demonstrate the knowledge, skills and attitudes (i.e.; competencies) that are linked to collaboration; and, whether self- and peer-assessment of the competencies changes their sense of being efficient?

To discover the answers to these questions I am asking core team members (those who have an ongoing relationship with each other), who work with at least one other provider group, to participate in two interviews. As well, I would like these same individuals to use the Interprofessional Collaborator Assessment Rubric to assess

themselves and anonymously assess two other members of their team for the knowledge, skills and attitudes related to collaboration.

If you are willing to grant permission for me to contact the core team members in your facility, please sign the attached permission form and return to me. If you are interested in having me conduct my research in your health care setting, I would also like you to consider how you would like to receive the study findings. Would you only like to receive the findings that are specific to your center or would you be interested in the findings reported as an aggregate of all primary health care centers? The choice is yours. Please indicate your choice on the attached permission form.

Once I receive the permission form, I will make telephone contact with the managers of each of the CHC sites to explain the research study. I will forward Letters of Introduction to be distributed to staff and physicians as well as information posters that can be placed in common areas of the facility.

Thank you for consideration of my request. I look forward to hearing from you. If you would like to learn more about the study, please contact me either by email: Klackie@dal.ca or by telephone at (902) 473-1457.

Sincerely,

Kelly Lackie BScN MN PhD(c) RN

APPENDIX F Permission to Conduct Research Form

I confirm that _____ [insert name of community health centre] fully supports the research study, entitled ***“Examination of the effects of interprofessional collaboration on health care provider and team productivity in primary health care: An important consideration in health human resources planning”***, being conducted in our facility. I give permission for the distribution of the Letter of Introduction to health care providers and for the placement of Information Posters at our facility.

I would like to receive the findings of this study [please check one]:

_____ Only those specific to our primary health care center

_____ Aggregate findings from all primary health care centers

Signature: _____ Date: _____

Name (print): _____

Position: _____

APPENDIX G Health Care Provider Letter of Introduction

Dear health care provider,

Hello, my name is Kelly Lackie. I am a PhD candidate at Dalhousie University School of Nursing, Halifax, Nova Scotia. As a requirement of the PhD Nursing program, I am conducting a research study, entitled: *“Examination of the effects of interprofessional collaboration on health care provider and team productivity in primary health care: An important consideration in health human resources planning”*. This study has received ethics approval from the Research Ethics Boards in each District Health Authority in Nova Scotia. I am writing to invite you to participate in this study.

As a registered nurse who has worked in the field of interprofessional education for collaborative patient-centred practice for six years, I am interested in learning about how health care providers work with each other in the primary health care setting. Specifically, I am interested in how health care providers define collaboration and how they would describe how efficient they and their team members are; whether health care providers demonstrate the knowledge, skills and attitudes (i.e.; competencies) that are linked to collaboration; and, whether self- and peer-assessment of these competencies changes your sense of being efficient.

To explore the answers to these questions I am asking core team members (those who have an ongoing relationship with each other) who work with at least one other health care provider to participate in two interviews. These one-on-one interviews can be face-to-face or via telephone and will occur at a time and place convenient to you. As well, I would like participants to use an instrument, the Interprofessional Collaborator

Assessment Rubric, to assess themselves and anonymously assess two other members of the team for the knowledge, skills and attitudes related to collaboration.

Your participation in this study is completely voluntary. I am not in a position of authority; therefore, if you decide not to participate it will not affect future working relationships with me, the researcher. Participation is not a condition of your employment or of performance evaluation/appraisal. Your decision to participate or not to participate will not be shared with anyone other than me, the researcher. The knowledge acquired may shed light on how teams in primary health care work together as well as provide an opportunity for you to share your experience and insight. If you decide to participate, you may withdraw at any time. You may also decide not to answer individual questions during the interview. Confidentiality will be maintained at all times and your identity will not be revealed either orally or in writing. Any personal information that will be collected will be securely stored in a locked filing cabinet and on an encrypted laptop in my locked office.

If you would like to participate in my study or learn more about it, I ask that you contact me at (902) 473-1457 or at Klackie@dal.ca. At that time I will provide you with a more detailed explanation of the study. If you decide to participate, you will be asked to sign a consent form and a confidentiality form. If you would like, you will receive a copy of the results of this study. I look forward to hearing from you. Thank you for your consideration to participate in this important study.

Sincerely,

Kelly Lackie BScN MN PhD(c) RN

APPENDIX H Advertisement**Are you interested in exploring how your primary healthcare team works together?****Study Description**

If you currently work in a Community Health Centre in Nova Scotia with at least one other healthcare provider who is from a different provider group, you may be eligible to participate in a study that explores how your team works and how the way you work affects your teams' efficiency.

Each participant will be required to participate in two one-hour interviews. In addition, participants will be asked to assess themselves and, if willing, anonymously assess two team members for demonstration of the behaviours associated with interprofessional collaboration.

If you are interested and want more information please contact **Kelly Lackie** at **902-473-1457** or via e-mail at **klackie@dal.ca**.

APPENDIX I Script for Study Participants: Explanation of Study

I am a PhD candidate at Dalhousie University School of Nursing, Halifax, Nova Scotia. As a requirement of the PhD Nursing program, I am conducting a research study, entitled “Examination of the effects of interprofessional collaboration on health care provider and team productivity in primary health care: An important consideration in health human resources planning”. Research ethics approval has been granted from the Research Ethics Boards in each of the District Health Authorities in Nova Scotia.

I am interested in learning about how health care providers work with each other in the primary health care setting. Specifically, I am interested in how you define collaboration and how you would describe your, and your teams’ level of efficiency; to what extent you, and other team members, demonstrate the knowledge, skills and attitudes that are linked to collaboration; and, whether self- and peer-assessment of the competencies changes your sense of being efficient. To discover the answers to these questions I am asking you to participate in two interviews. These one-on-one interviews will occur either face-to-face or via telephone at a time and place convenient to you. As well, I would like you to use an instrument, the Interprofessional Collaborator Assessment Rubric, to assess yourself and anonymously assess two other members of your team for the knowledge, skills and attitudes related to collaboration.

Your participation in this study is completely voluntary. I am not in a position of authority; therefore, if you decide not to participate it will not affect future working relationships with me, the researcher. Participation is not a condition of your employment or of performance evaluation/appraisal. Your decision to participate or not to participate will not be shared with anyone other than me, the researcher. The knowledge acquired

may shed light on how teams in primary health care work together as well as provide an opportunity for you to share your experience and insight. If you decide to participate, you may withdraw at any time. You may also decide not to answer individual questions during the interview. Confidentiality will be maintained at all times and your identity will not be revealed either orally or in writing. Any personal information that will be collected will be secured in a locked filing cabinet and on an encrypted laptop in my locked office.

Thank you for your consideration to participate in this study. I would be pleased to answer any questions that you may have in relation to the study.

APPENDIX J Confidentialty Agreement

Research study: *Examination of the effects of interprofessional collaboration on health care provider and team productivity in primary health care: An important consideration in health human resources planning*

As a participant in this research study, I agree to:

1. Keep all the research information (names of team members I assess and any and all assessment findings) confidential by not discussing or sharing the research information in any form or format (e.g., disks, tapes, transcripts) with anyone other than the Researcher.
2. Keep all research information (names of team members I assess and the assessment findings) in any form or format (e.g., disks, tapes, transcripts) secure while it is in my possession.
3. Return all research information in any form or format (e.g., disks, tapes, transcripts) to the Researcher when I have completed the research tasks.

Name of participant (print): _____

Signature of participant: _____

Name of witness (print): _____

Signature of witness: _____

Date: _____

APPENDIX K Interview Guide – Research Question 1

RQ 1: How do HCPs define IPC? What are HCPs’ perceived level of personal and team productivity (efficiency, effectiveness) when working in a team environment?

Date: _____ Time: _____ Location: _____

Alias: _____

Demographic Data:

Age: _____ Gender: _____

Current health care provider designation (e.g.; physiotherapist, social worker, unit aide, ward clerk, etc): _____

Years working in current profession/designation: _____

Current role at CHC: _____

Years working in current role: _____

Employment status: full-time (FTE) _____ part-time (PTE) _____ Casual _____

Interview Questions:

1. Please recall situations when you have worked with other health care providers from other disciplines in your practice. Tell me about those experiences (What went well? What didn't?).
2. How do you define collaboration? What does it 'look like'?
3. Is there anything in your practice that helps you to collaborate? That hinders your ability to collaborate? Please describe these.
4. Please tell me about the times when you have felt productive (or efficient) in your day-to-day practice. What was it that made you feel this way?
5. Are there times when you did not feel as productive as you would have liked? What was it that prevented you from being productive?
6. What does it look like when your team is productive?
7. Is there anything you wish to add?

APPENDIX L Interview Guide – Research Question 3

RQ 3: How did the self- and peer- IPC competency assessments change HCPs' definitions of IPC? What are HCPs' perceptions of personal and team productivity after completing the self- and peer-assessments?

Date: _____ Time: _____ Location: _____

Alias: _____

Demographic Data:

Age: _____ Gender: _____

Current health care provider designation (e.g.; physiotherapist, social worker, unit aide, ward clerk, etc): _____

Years working in current profession/designation: _____

Current role at CHC: _____

Years working in current role: _____

Employment status: full-time (FTE) _____ part-time (PTE) _____ Casual _____

Interview Questions:

1. Share with me your thoughts about assessing yourself for the interprofessional collaborative competencies? Were the competencies appropriate to your practice?
2. Did the assessment for these competencies increase your awareness of interprofessional collaboration?
3. Has your definition of collaboration changed?
4. Did the assessment of the IPC competencies change your perceptions of how productive you were (or could be)?
5. If you assessed someone else, what were your thoughts about their performance?
6. Would adoption of these competencies affect your team's efficiency?
7. Is there anything you wish to add?

APPENDIX M Interprofessional Collaborator Assessment Rubric

Instructions: For each of the statements below, circle the number which corresponds to your performance or the performance of another health care provider on your team.

1	2	3	4	5	6	7	8	9	N/O
Well Below Expected	Below Expected		Expected		Above Expected		Well Above Expected		Not Observable

Communication: Ability to communicate effectively in a respectful and responsive manner with others (“others” includes team members, including the patient/client, and health providers outside the team).

1. Communicates and expresses ideas in an assertive and respectful manner.
2. Uses communication strategies (e.g. oral, written, information technology) in an effective manner with others.

Communication:

I/the health care provider...	1	2	3	4	5	6	7	8	9	N/O
Communicates with others in a confident, assertive, and respectful manner.										<input type="checkbox"/>
Communicates opinion and pertinent views on patient care with others.										<input type="checkbox"/>
Responds or replies to requests in a timely manner.										<input type="checkbox"/>
Uses communication strategies (verbal & non-verbal) appropriately in a variety of situations.										<input type="checkbox"/>
Communicates in a logical and structured manner.										<input type="checkbox"/>
Explains discipline-specific terminology/jargon.										<input type="checkbox"/>
Uses strategies that are appropriate for communicating with individuals with impairments.										<input type="checkbox"/>

Collaboration: Ability to establish/maintain collaborative working relationships with other providers, patients/clients and families.

1. Establishes collaborative relationships with others in planning and providing patient/client care.
2. Promotes integration of information from others in planning and providing care for patients/clients.
3. Upon approval of the patient/client or designated decision-maker, ensures that appropriate information is shared with others.

Interprofessional Collaborator Assessment Rubric

Collaboration:

I/the health care provider...	1	2	3	4	5	6	7	8	9	N/O
Establishes collaborative relationships with others.										<input type="checkbox"/>
Integrates information and perspectives from others in planning and providing patient/client care.										<input type="checkbox"/>
Shares information with other providers that is useful for the delivery of patient/client care.										<input type="checkbox"/>
Seeks approval of the patient/client or designated decision-maker when information is shared.										<input type="checkbox"/>

Collaborative Patient/Client-Family-Centred Approach: Ability to apply

patient/client-family-centred principles through interprofessional collaboration.

1. Seeks input from patient/client and family in a respectful manner regarding feelings, beliefs, needs and care goals.
2. Integrates patient's/client's and family's life circumstances, cultural preferences, values, expressed needs, and health beliefs/behaviours into care plans.
3. Shares options and health care information with patients/clients and families.
4. Advocates for patient/client and family as partners in decision-making processes.

Collaborative patient/client-family-centred approach:

I/the health care provider...	1	2	3	4	5	6	7	8	9	N/O
Seeks input from patient/client and family.										<input type="checkbox"/>
Promotes and integrates patient/client's and family's circumstances, beliefs and values into care plans.										<input type="checkbox"/>
Shares options and health care information with patients/clients and families.										<input type="checkbox"/>
Advocates for patient/client and family as partners in decision-making process.										<input type="checkbox"/>

Roles and Responsibility: Ability to explain one's own roles and responsibilities related to patient/client and family care (e.g. scope of practice, scope of employment, legal and ethical responsibilities); and to demonstrate an understanding of the roles, responsibilities and relationships of others within the team.

1. Describes one's own roles and responsibilities in a clear manner.
2. Integrates the roles and responsibilities of others with one's own to optimize patient/client care.
3. Accepts accountability for one's contributions.
4. Shares evidence-based and/or best practice discipline-specific knowledge with others.

Interprofessional Collaborator Assessment Rubric

Roles and responsibility:

I/the health care provider...										N/O
Describes one's own roles and responsibilities in a clear manner with the team/patient/family.	1	2	3	4	5	6	7	8	9	<input type="checkbox"/>
Promotes and includes the roles/responsibilities of all necessary care providers to optimize collaborative patient/client care.	1	2	3	4	5	6	7	8	9	<input type="checkbox"/>
Demonstrates professional judgment when assuming or delegating tasks.	1	2	3	4	5	6	7	8	9	<input type="checkbox"/>
Accepts responsibility for the failure of collaborative goals.	1	2	3	4	5	6	7	8	9	<input type="checkbox"/>
Accepts responsibility for individual actions that impact the team.	1	2	3	4	5	6	7	8	9	<input type="checkbox"/>
Explains own scope of practice, code of ethics, standards and/or clinical guidelines in relation to collaborative patient-centred relationship.	1	2	3	4	5	6	7	8	9	<input type="checkbox"/>
Shares evidence-based or best practice discipline-specific knowledge with others.	1	2	3	4	5	6	7	8	9	<input type="checkbox"/>

Team Functioning: Ability to contribute to effective team functioning to improve collaboration and quality of care.

1. Recognizes and contributes to effective team functioning and dynamics.
2. Recognizes that leadership within the healthcare team may alternate or be shared depending on the situation.
3. Contributes in interprofessional team discussions.

Team functioning:

I/the health care provider...										N/O
Demonstrates recognition of the relationship between team functioning and quality of care.	1	2	3	4	5	6	7	8	9	<input type="checkbox"/>
Demonstrates recognition of strategies that will improve team functioning.	1	2	3	4	5	6	7	8	9	<input type="checkbox"/>
Shares and alternates leadership with others when appropriate for the discipline involved.	1	2	3	4	5	6	7	8	9	<input type="checkbox"/>
Demonstrates recognition of themselves as part of a team.	1	2	3	4	5	6	7	8	9	<input type="checkbox"/>
Contributes to interprofessional team discussions.	1	2	3	4	5	6	7	8	9	<input type="checkbox"/>

Conflict Management/Resolution: Ability to effectively manage and resolve conflict between and with other providers, patients/clients and families.

1. Demonstrates active listening and is respectful of different perspectives and opinions from others.
2. Works with others to manage and resolve conflict.

Interprofessional Collaborator Assessment Rubric

Conflict management/resolution:

I/the health care provider...	1	2	3	4	5	6	7	8	9	N/O
Seeks the perspectives and opinions of others.										<input type="checkbox"/>
Seeks clarification in a respectful manner when misunderstandings arise.										<input type="checkbox"/>
Uses active listening when others are speaking.										<input type="checkbox"/>
Uses appropriate conflict resolution strategies to manage and/or resolve conflict.										<input type="checkbox"/>

With respect to collaboration ability, compared to other health care providers you have previously interacted with, this person was:

1	2	3	4	5	6	7	8	9
Well Below Average		Below Average		Average		Above Average		Well Above Average

Demographic Questions:

- Name of Community Health Centre where you work: _____
- Select the category that indicates your profession or job category
 Social work Pharmacy RN NP FPN LPN Physician PT OT
 Dietician Clerk Complementary and Alternative Medicine Other _____
- Employment status: full-time ___ part-time ___ Casual ___
- Select the category that indicates the other members on your team
 Social work Pharmacy RN NP FPN LPN Physician PT OT
 Dietician Clerk Complementary and Alternative Medicine Other _____
- Gender: Male Female Transgender
- Total years of experience in your current profession or job category:
 Less than 1 2-5 6-10 11-15 16-20 21+
- Total number of years working with this team:
 Less than 1 2-5 6-10 11-15 16-20 21+
- Approximately how often did you interact with the health care provider being evaluated? If you are evaluating yourself, please skip this question.
 Multiple times per shift once per shift several times per week rarely

APPENDIX N Quantitative and Qualitative Data Analysis Procedures

(Adapted from Creswell & Plano Clark, 2011, p. 205-206)

Rigorous Quantitative Data Analysis Procedures	Preparing data for Analysis	Persuasive Qualitative Data Analysis Procedures
<ul style="list-style-type: none"> • Code data (assign numeric values) • Prep data for analysis with a computer program • Clean the data base • Recode/compute new variables for computer analysis • Establish a codebook 	Prepare the data for analysis	<ul style="list-style-type: none"> • Organize documents and visual data • Transcribe text verbatim • Prepare data for analysis with a computer program
<ul style="list-style-type: none"> • Visually inspect data • Conduct descriptive statistics • Check trends/distributions 	Explore the data	<ul style="list-style-type: none"> • Read through the data • Write memos • Develop qualitative code book
<ul style="list-style-type: none"> • Choose appropriate statistical test • Analyze data to answer research questions or test hypothesis • Report inferential tests, effect sizes and confidence intervals • Use quantitative statistical software programs 	Analyze the data	<ul style="list-style-type: none"> • Code the data • Assign labels to codes • Group codes into themes or categories • Interrelate themes or categories or abstract to a smaller set of themes • Use qualitative data analysis software programs
<ul style="list-style-type: none"> • Represent results in statements of results • Provide results in tables or figures 	Represent the data	<ul style="list-style-type: none"> • Represent findings in discussions of themes or categories • Present visual models, figures and/or tables
<ul style="list-style-type: none"> • Explain how results address research questions or hypothesis • Compare results with past literature, theories or prior explanations 	Interpret the results	<ul style="list-style-type: none"> • Assess how the research questions were answered • Compare findings with the literature • Reflect on the personal meaning of the findings • State new questions based on the findings
<ul style="list-style-type: none"> • Use external standards • Validate and check the reliability of scores from past instrument use • Establish validity and reliability of current data • Assess internal and external validity of results 	Validate the data and results	<ul style="list-style-type: none"> • Use researcher, participant and reviewer standards • Use trustworthiness strategies (e.g.; member checking, triangulation, disconfirming evidence, and external reviewers/auditors) • Check for accuracy of the account • Employ procedures for checking trustworthiness

APPENDIX O Thematic Analysis Codebook

Structured *a priori* codes from RQ 1 Interview Guide

IPC def	<p>1. Please recall situations when you have worked with other health care providers from other disciplines in your practice. Tell me about those experiences (What went well? What didn't?).</p> <p>2. How do you define collaboration? What does it 'look like'?</p> <p>3. Is there anything in your practice that helps you to collaborate? That hinders your ability to collaborate? Please describe these.</p>
Personal Prod	<p>4. Please tell me about the times when you have felt productive (or efficient) in your day-to-day practice. What was it that made you feel this way?</p> <p>5. Are there times when you did not feel as productive as you would have liked? What was it that prevented you from being productive?</p>
Team collab & prod	<p>6. What does it look like when your team is productive?</p> <p>7. What type of link is there between collaboration and productivity?</p>

Structured a priori codes and emergent codes from RQ 1

Structural Codes	Structural Code Definition	Emergent Content Codes	Content Code Definition
IPC Def (IQ#1, 2, 3)	<p>Brief Definition: participants define interprofessional collaboration (IPC); also discuss things that help (enable) or hinder (barrier) IPC from happening.</p> <p>Full Definition: Participants define collaboration and describe how they know when they experience IPC. In this study, IPC is defined as an "inter-professional process for communication and decision making that enables the separate and shared knowledge and skills of care providers to synergistically influence the</p>	<p>Understanding, valuing & using team expertise</p> <p>Communication is key</p>	<p>When to use: use code when participants describe the importance of role understanding & of having the right mix of team members to meet patient needs; discuss the need for trust in HCPs abilities; may describe how/why roles overlap; describe the importance of role-modeling collaboration for others (i.e.; team members, students) to advance IPC.</p> <p>When to use: use code when participants describe IPC as</p>

	<p>client/patient care provided” (Way, Jones & Busing, 2000, p. 3). Participants also describe the things that happen while working with their team that enable them to &/or hinder them from collaborating with other team members.</p> <p>When to Use: Use code as a PLACEHOLDER CODE when participants discuss any of the points described above in the full definition.</p> <p>When not to Use: Do not use this code for emerging content coding purposes.</p>	<p><u>Child node:</u> Being available</p> <p>The impact of belongingness</p> <p>Hierarchy-turf protection</p>	<p>requiring two-way interprofessional communication that is safe; open communication (being able to share; listening) in relation to enabling IPC; can also be referred to as “being on the same page”; may discuss the need for technology or documentation to collaborate (having access to it or not).</p> <p>When to Use: Use code when participants describe the mental & physical availability of team members as an enabler to IPC; can also be used when participants discuss the enablers or barriers to being available (i.e.; having time; working part-time vs. full-time); may discuss strong leadership &/or availability of leader.</p> <p>When to use: use code when participants discuss the importance building team relationships through socialization has on working collaboratively; describes belongingness as knowing others on a personal level (having parties, socializing after work).</p> <p>When to Use: Use code when participants talk about team hierarchy, either described as being explicit (or blatant) or implicit in that it’s not spoken about; may discuss modelling of hierarchy; also includes discussions regarding turf protection; silos (separation between members of the team based on professional designations or job classifications).</p>
Personal Prod (IQ #4, 5)	<p>Brief Definition: Participant describes the reasons for feeling productive or non-productive; can also use the terms efficient or effective instead of productive</p> <p>Full Definition: Participants reflect on & describe moments when they feel productive & non-productive and share the reasons why they felt this way. The operational definition of</p>	Achieving-contributing to patient outcomes	<p>When to Use: Use code when participants describe feeling productive when care is patient-centered & they feel rewarded by helping patients attain outcomes (stemming from the patient care they’ve given); describe lack of follow-through from other people or other departments impacting their ability to provide patient care &</p>

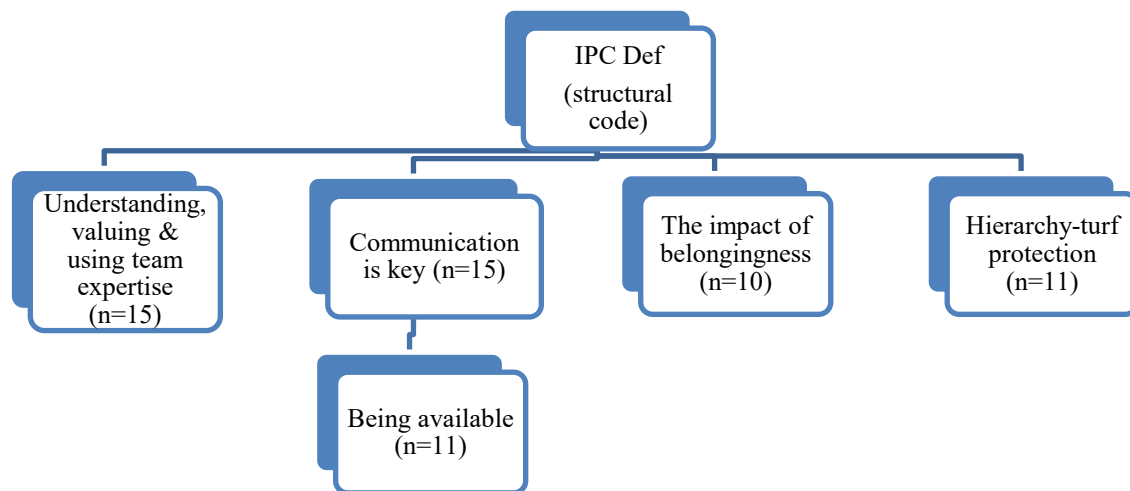
	<p>productivity may or may not be linked.</p> <p>Full Definition: Participants bring their thinking from the ‘individual’ to the ‘collective’ to describe what team productivity looks like (using examples) & the reasons it happens; describe how they believe collaboration and productivity may influence one another.</p> <p>When to Use: Use code as a PLACEHOLDER CODE when participants discuss any of the points described above in the full definition.</p> <p>When Not to Use: Do not use this code for emerging content coding purposes.</p>	<p>Collaboration leads to higher productivity</p>	<p>outcomes; describe team productivity occurring when HCPs with the necessary competencies meet the needs of the patient; acknowledge that knowing their own scope of practice (SoP) in relation to others SoP allows the team to provide the right person with the right skills to meet patient care needs; discuss that in order to be productive, members of the team need to trust one another and allow them to be autonomous within their own SoP.</p> <p>When to use: use code when participants discuss how collaboration leads to better personal and team productivity; may discuss the effects of IPE, role education and communication as enablers to IPC and thus productivity.</p>
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		The medical model usurps IPC	<p>knowing the knowledge & skills related to IPC, hence there was no change in their definition; use code when participants explain that they knew the theory related to IPC but do not see it in practice; describe how they know someone is collaborative, either by what they say or what they do; may also discuss the barriers to IPC.</p> <p>When to Use: Use code when participants describe how the medical model usurps collaboration; may describe HCPs who are not being collaborative because they have never been taught how to collaborate, &/or those who do not value IPC; use when discussing unchanging hierarchy, power & turf protection; lack of respect for knowledge & role.</p>
Change Prod perception (IQ #4)	<p>Brief Definition: Changes to perceptions of personal productivity</p> <p>Full Definition: Participants discuss whether self-assessment for IPC competencies changed their perceptions of their <u>own</u> productivity</p> <p>When to Use: Use code as a PLACEHOLDER CODE when participants discuss any of the points described above in the full definition.</p> <p>When Not to Use: Do not use this code for emerging content coding purposes.</p>	<p>A status quo practice environment results in status quo perceptions</p> <p>Looking at my productivity differently</p>	<p>When to use: use code when participants describe no changes to the way they perceive their own productivity as a result of self-assessment; status quo relates to no changes in the practice setting that either prevents optimized practice or limits scope of practice.</p> <p>When to use: use code when participants describe self-assessment for the IPC competencies as a starting point to evaluate their own productivity; describe feeling productive when they have used IPC to influence patient outcomes; may notice that when the team is collaborating their personal productivity has increased.</p>
Comp-Team productivity (IQ #5)	<p>Brief Definition: Effects of IPC or adoption of IPC competencies on team productivity</p> <p>Full Definition: Participants discuss their thoughts regarding whether adoption of IPC competencies or working collaboratively would affect team productivity; may discuss the utility of using a</p>	Being proficient in & modelling IPC competencies positively impacts productivity	<p>When to use: use code when participants describe how performance of the IPC competencies would affect their team's productivity; may describe in more depth specific competencies that affect productivity (communication, role understanding); describe how IPC is modeled for team members & for newcomers;</p>

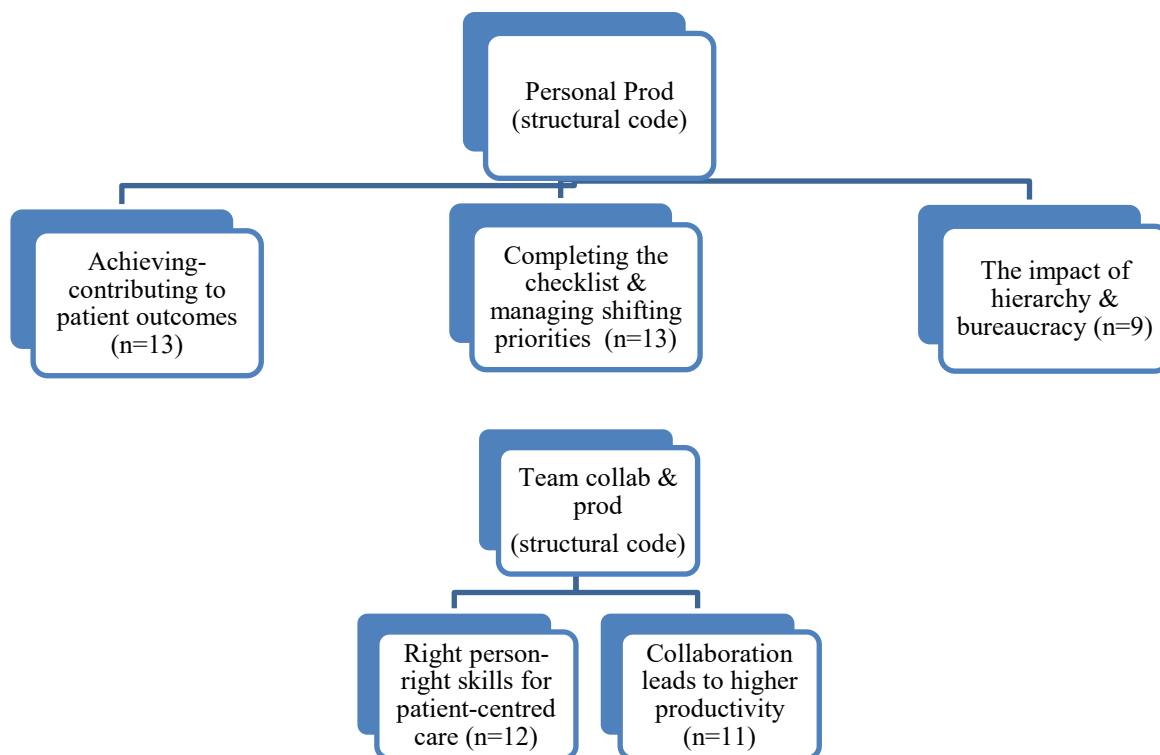
	<p>competency tool to assess team productivity</p> <p>When to Use: Use code as a PLACEHOLDER CODE when participants discuss any of the points described above in the full definition.</p> <p>When not to Use: Do not use this code for emerging content coding purposes.</p>	<p>People leave, it's just natural selection</p> <p>The effects of the 'powers that be' on productivity</p>	<p>participants discuss the importance of informal or formal evaluation of team processes in relation to how they collaborate</p> <p>When to use: use code when participants describe what happens to people on the team who choose not to collaborate or who are not allowed to collaborate</p> <p>When to use: use code when participants discuss the positive effects of IPC on the internal system (absenteeism); effects of administrators/managers on the ability to collaborate; effects of funding models on IPC and productivity.</p>
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APPENDIX P Themes Schemata – Research Question 1

How do health care providers define interprofessional collaboration?

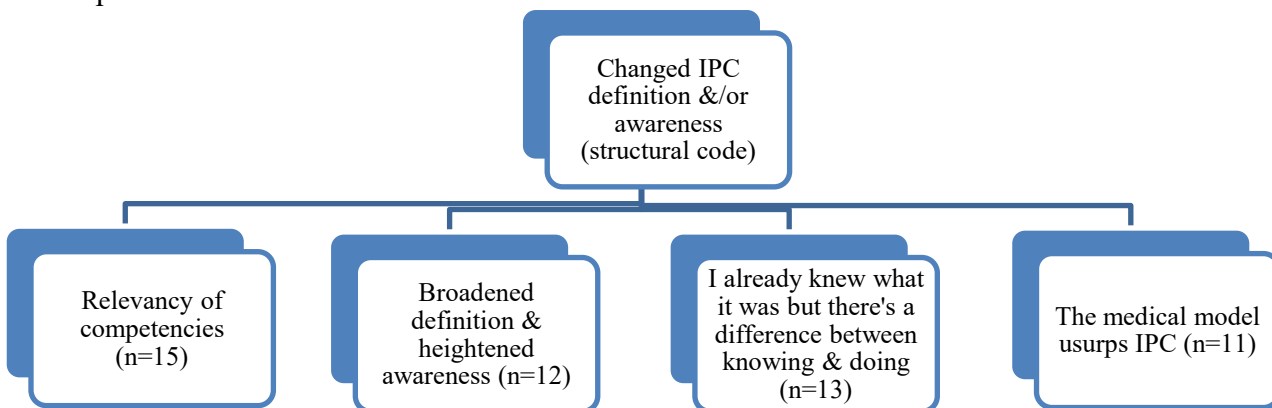


What are health care providers' perceived level of personal and team productivity (efficiency, effectiveness) when working in a team environment?



APPENDIX Q Themes Schemata – Research Question 3

How did the IPC competency self-assessments change health care providers' definitions of interprofessional collaboration?



What are health care providers' perceptions of personal and team productivity after completing the self-assessments?

