

“Perceived contributions of team members in post-graduate medical education: A case study
of learning interprofessional collaboration during a critical care rotation.”

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Abstract

Purpose: To explore how non-physician team members of a health care team perceive their contributions to educating residents about interprofessional collaboration in an intensive care rotation and to compare this to residents' perceptions.

Method: Participants in this exploratory case study were selected using maximal variation, purposive and convenience sampling strategies. Data were collected through semi-structured individual and focus group interviews, and analyzed using inductive thematic analysis.

Findings: Contributions occurred *implicitly* and *explicitly* during patient care activities and focused on role clarification, sharing of expertise, and help navigating the workflow. Contributions were influenced by a) Intensive Care Unit context, b) tension between working and teaching, c) expectations, d) resident engagement, e) power/hierarchy.

Conclusion: Team members contribute to residents' education about collaboration through participation in the everyday business of caring for critically ill patients. Recognition of this contribution may improve resident training. However, some residents may not be learning basic skills, what they learn about interprofessional collaboration may have limited transferability, and team interactions may influence the validity of judgements made about entrustability and performance.

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List of acronyms and abbreviations

AAMC: Association of American Medical Colleges

AFMC: Association of Faculties of Medicine of Canada

CAIPE: Centre for the Advancement of Interprofessional Education

CFPC: The College of Family Physicians of Canada

CME: Continuing medical education

CMQ: Collège des Médecins du Québec

CPD: Continuing professional development

ICU: Intensive care unit

IPC: Interprofessional collaboration

IPE: Interprofessional Education

MD: Medical doctor

PGME: Post-graduate medical education

RCPSC: Royal College of Physicians and Surgeons of Canada

RN: Registered Nurse

RT: Respiratory Therapist

PharmD: Clinical pharmacist

SW: Social Worker

Glossary of terms

Collaboration: Based on sharing in a spirit of harmony and trust and results in collective action toward a common goal. (D'Amour, Ferrada-Videla, San Martin Rodriguez & Beaulieu, 2005).

Collaborative practice: The World Health Organization defines collaborative practice in health care as occurring when “multiple health workers provide comprehensive services by working together synergistically along with patients, their families, care-givers and communities to deliver the highest quality of care across settings” (Rodger, Hoffman & Nasmith, 2010).

Family: This term refers to anyone within the patient/client's social network; it includes but is not limited to their relatives.

Formal curriculum: A planned and structured educational activity that occurs away from everyday professional practice.

Formalization: Information exchange, tools, protocols and procedures that help clarify expectations (D'Amour & Oandasan, 2005; Mickan, Hoffman & Nasmith, 2010) and facilitate communication (Mickan et al., 2010; Oandasan et al, 2006).

Hidden curriculum: The teaching that occurs that is not articulated as part of the formal curriculum and is different from the informal curriculum. It includes processes, pressures and constraints which fall outside of, or are embedded within, the formal curriculum and which are often unarticulated or unexplored (Pingleton, Davis & Dickler, 2010; Cribb & Bignold, 1999)

Informal curriculum: Can be implicit or explicit, is usually opportunistic, may or may not be structured and occurs at or near the bedside.

Interdisciplinary*: Draws upon and integrates multiple disciplinary insights to produce a more comprehensive understanding (Klein & Newell, 1998). “Interdisciplinarity analyzes, synthesizes and harmonizes links between disciplines into a coordinated and coherent whole.” (Choi & Pak, 2006, p.359).

Interprofessional education (IPE): When two or more professions learn with, from and about each other to improve collaboration and the quality of care (CAIPE, 2002).

Interprofessional collaboration: Interprofessional collaboration is a form of collaborative practice that occurs when different professionals engage in the process of collaboration and

participate in a collective action that addresses the complexity of client needs (D'Amour et al., 2005). Collaborative practice assumes effective interprofessional collaboration.

Medical education workplace: “Any place where patients, learners, and practitioners come together for the conjoint purpose of providing medical care and learning.” (Dornan et al, 2009).

Multidisciplinary*: Draws upon knowledge from different disciplines to better understand or solve a problem (disciplinary insights contribute in parallel, with little interaction, each staying within its boundaries) (Choi & Pak, 2006).

Patient/Client: For this study, when this term is used, it should be taken as anyone admitted to the intensive care unit.

Professional socialization: “Consists of values, ideals, ethics, and attitudes of the profession...It is seen as a dynamic process that encompasses both development of a professional identity and the internalization of group norms.” (Valutis, Rubin & Bell, 2012, p. 1047).

Resident: A medical doctor completing the postgraduate medical education portion of his/her training.

Role: The part played by a person in a particular social setting, influenced by his expectation of what is appropriate (Collins dictionary).

Situated learning: “Learning through goal-directed activity situated in circumstances which are authentic, in terms of the intended application of the learnt knowledge.” (Billett, 1996, p. 263)

Tacit knowledge: Knowledge-in-practice that has been internalized through interactions, shared experiences and action. (McAdam, Mason & McCrory, 2007)

Teaching hospital: Hospitals which have membership in the Council of Academic Hospitals of Ontario (CAHO). Member hospitals provide highly complex patient care, are affiliated with a medical or health sciences school and have significant research activity and postgraduate training (The hospital report: acute care, 2007).

Team: For the purposes of this framework, this term is used to denote either: (a) a group of health professionals who work together around the care of a patient/client in an “informal” way; or (b) a collection of individuals who are interdependent in their tasks, who share responsibility for outcomes, who see themselves and who are seen by others as an intact

social entity embedded into one or more larger social systems and who manage their relationships across organizational borders i.e. a “formalized” team (Cohen & Bailey, 1997).

Tertiary care: Highly acute and specialized services provided in large community and academic hospitals (Rural and Northern Health Care Panel, n.d.).

Transdisciplinary*: Transcend disciplinary boundaries, providing holistic view of a whole system (participants develop a shared conceptual framework, drawing together but exceeding discipline-specific bases; participants are not bound by traditional role boundaries) (Choi & Pak, 2006).

Workplace (or work-based) learning: Situated learning in the circumstances of work (provides authentic workplace experiences).

* This research follows Choi and Pak’s (2006) view that the terms multidisciplinary, interdisciplinary and transdisciplinary refer to the involvement of multiple disciplines to varying degrees on the same continuum. “Multidisciplinary, being the most basic level of involvement, refers to different (hence “multi”) disciplines that are working on a problem in parallel or sequentially, and without challenging their disciplinary boundaries. Interdisciplinary brings about the reciprocal interaction between (hence “inter”) disciplines, necessitating a blurring of disciplinary boundaries, in order to generate new common methodologies, perspectives, knowledge, or even new disciplines. Transdisciplinary involves scientists from different disciplines as well as nonscientists and other stakeholders and, through role release (accepting that others can do a task that was typically reserved for a discipline) and role expansion (accepting to take on new tasks), transcending (hence “trans”) disciplinary boundaries to look at the dynamics of whole systems in a holistic way” (p. 359).

Introduction

The purpose of the present study is to explore how non-physician members of a health care team perceive their contributions towards the education of physicians in training (residents) completing a rotation in an academic intensive care unit (ICU). An important focus is the educational contributions made with respect to interprofessional collaboration (IPC). For the purpose of this research study, interprofessional collaboration is defined as occurring when different professionals engage in the process of collaboration and participate in a collective action that addresses the complexity of client needs (D'Amour et al., 2005).

The delivery of health care services, particularly in the modern intensive care unit, has evolved into a complex system where no one individual is solely responsible for the provision of care (Baker, Day & Salas, 2006; Rodger et al., 2010). In order to offer high quality and safe patient care, health care providers must engage in collaborative practice (Bainbridge & Nasmith, 2011; Mickan et al., 2010; Leape et al., 2009; Baker et al, 2006; Frankel, Leonard & Denham, 2006). To be effective collaborators, health care professionals must recognize the importance of collaboration, develop good communication skills and understand the roles and scope of practice of their colleagues. Interprofessional education occurs "... when two or more professions learn with, from and about each other to improve collaboration and the quality of care" (CAIPE, 2002); it is seen as a necessary step to foster collaborative practice (Romanow, 2002; Kohn, Corrigan, & Donaldson, 1999).

In medical education, initiatives to incorporate interprofessional education in the curriculum are occurring with increasing frequency at the undergraduate level (Nesbit, Hendry, Rolls & Field, 2008; Areskog, 2009). Uptake of interprofessional education, however, seems to be lagging behind in postgraduate medical education (PGME)

(Bainbridge & Nasmith, 2011). Most of PGME occurs in the workplace where residents are expected to learn from their participation as a member of the health care team. An important and often unnoticed or unofficial form of teaching that is present in workplace learning, called 'the hidden curriculum,' can positively or negatively influence what residents learn (Weissmann, Branch, Gracey, Haidet & Frankel, 2006; Lempp & Seale, 2004). Members of the health care team who interact with residents in the everyday activities related to patient care participate in this hidden curriculum (Aultman & Borges, 2011; Satterwhite, Satterwhite III & Enarson, 2000; White, Kumagai, Ross & Fatone, 2009). It is therefore crucial to gain a better understanding of the interactions between team members that occur in this context, in order to better prepare physicians for interprofessional collaboration.

This study explores the perceptions of nurses, respiratory therapists, pharmacists, social workers and residents about contributions made by team members to the interprofessional education of residents completing an ICU rotation. Interpretations of the findings were conducted through a socio-constructivist lens and implications for PGME are presented.

Rationale for the Study

Little information can be found in the literature regarding the role played by non-physician members of the health care team in PGME and whether they contribute to improving or hindering collaborative practice. In fact, a call for more investigation of the contributions made by trained nurses to the climate of basic medical education was made in a medical education study concerned with linking processes and outcomes in workplace learning (Dornan, Boshuizen, King & Sherpbier, 2007).

A project recently funded by Health Canada (2012) entitled “The Future of Medical Education in Canada – PG (FMEC-PG)”, highlights the need to focus on better preparing physicians for team-based care with skills in intra and interprofessional collaboration. In addition, the report suggests that identifying and addressing the positive and negative aspects of the “hidden curriculum” is a necessary step for improving the learning environment of residents during PGME (Association of Faculties of Medicine of Canada, College of Family Physicians Canada, Collège des Médecins du Québec & Royal College of Physicians and Surgeons of Canada, 2012, p.17).

Background

This literature review begins with a general overview of the postgraduate portion of medical education, exploring workplace learning and situating the intensive care clinical teaching unit within the PGME system. The subsequent section provides a description of teamwork and collaborative practice and presents evidence of the benefits associated with these approaches to providing health care. It also describes interprofessional education (IPE) and its role in improving collaborative practice and teamwork. Finally, the third part of the literature review explores the concept of the hidden curriculum and how it can influence what residents learn about collaborative practice and teamwork during their ICU rotation.

Postgraduate medical education

In Canada, medical education is considered a lifelong process that is divided into three distinctive phases: Undergraduate medical education (completion of the MD degree), PGME (from MD degree to licensure examinations) and continuing medical education (CME) which can also be referred to as continuing professional development (CPD) (AFMC et al., 2012; Bainbridge & Nasmith, 2011; Dornan, Mann, Scherpbier & Spencer, 2011). The present study relates to the context of PGME and, more specifically, to one clinical teaching

unit: the intensive care unit (ICU). This section begins with a general overview of the structure of PGME in Canada, exploring the concepts of workplace learning and then situates the ICU clinical teaching unit within PGME.

General overview of PGME. PGME is offered by universities' faculties of medicine through accredited residency programs. Accreditation is granted by the College of Family Physicians Canada (CFPC) for family practice residency programs and by the Royal College of Physicians and Surgeons of Canada (RCPSC) for all other specialties and sub-specialties. The goal for residency programs is to prepare physicians for clinical practice (Coles, 2011). The expectations for physicians in training (residents) are that they will achieve the necessary competencies to become functioning members of an integrated health care delivery system (Liaison Committee on Medical Education, 2012). The training programs of specialist physicians and family physicians follow, respectively, the CanMEDS (Frank, 2005) and CanMEDS-Family Medicine (Tannenbaum et al., 2009) competency-based frameworks. Both frameworks include 7 roles, one of which is the role of collaborator with associated competencies. The length and specific training requirements vary by discipline, from 2 years for family medicine programs to 4-6 years for primary specialty programs with additional training for physicians who specialize even further (RCPSC, n.d.).

Almost all PGME occurs in the clinical setting where residents assume an increasing number of clinical responsibilities which they perform with a decreasing amount of supervision (Dornan et al., 2011). This is accomplished in a series of clinical rotations (often called 'blocks') carried out in settings such as primary care (doctor's offices or clinics), acute care such as hospitals, or in chronic care such as long term care facilities. The clinical settings where rotations take place are called "clinical teaching units". Clinical rotations are

usually described in terms of months of training time (i.e.: one block = one month) (RCPSC, 2011a; RCPSC, 2010). The broad training requirements (clinical, academic and scholarly content of the program), based on the CanMEDS and CanMEDS-FM competency frameworks are established by the RCPSC or the CFPC; the specific compulsory or elective rotations and overall curriculum are elaborated by the specialty programs (RCPSC, CFPC & CMQ, 2011a and 2011b). The program director is responsible for overseeing the conduct and quality of the overall curriculum of a particular postgraduate residency program (RCPSC, CFPC & CMQ, 2011a and 2011b).

The intensive care unit in PGME. The adult intensive care unit (ICU) is a designated clinical teaching unit that is a compulsory rotation for certain residency programs such as internal and emergency medicine. It is also an elective for other programs such as ophthalmology or family medicine. The number of ICU rotations required varies by specialty programs. Residents pursuing their training in the sub-specialty of critical care medicine must complete a minimum of 12 blocks in the ICU (RCPSC, 2011b) whereas a general surgeon must complete only 1 block in the ICU clinical teaching unit (RCPSC, 2010).

The ICU is where patients with a life-threatening illness are admitted for care. During their ICU rotation, residents are expected to develop knowledge and skills related to the resuscitation and ongoing medical management of critically ill patients, make medical diagnoses, institute a plan of care and perform medical interventions as well as high risk but necessary procedures (University of Ottawa, 2003). The degree to which the resident performs these duties independently depends on their prior experience and the senior medical personnel available. As well, the experiences that a physician in training will be subjected to during his or her ICU rotation are influenced by the patients who are admitted to

the ICU. As in all health care practice environments, the patient's condition, family dynamics and resulting patient care activities shape the opportunities for learning in the workplace (Teunissen & Wilkinson, 2011).

PGME and workplace learning. Learning in residency programs mainly occurs in the workplace and is largely based on an apprenticeship model where the apprentice learns from the "Master" who acts as the role model (Swanwick, 2005; Dornan et al., 2011; Kneebone & Nestel, 2011; Teunissen & Wilkinson, 2011). Although medical education has evolved from this original model out of necessity such as the need to accommodate a growing number of residents, ethical climate and patient safety issues as well as limitations on working hours (Kneebone & Nestel, 2011), many features are still prominent. Attending physicians who are affiliated with the university continue to be seen as prominent role models (Rose, Rukstalis & Schuckit, 2005; Bickel, 1993). These 'Masters' assume the role of clinicians, with responsibilities for patient care, as well as the role of faculty, with responsibilities for the provision of learning opportunities for residents such as determining what level of supervision a resident requires to assume specific patient care activities (Sterkenburg, Barach, Kalkman, Gielen & ten Cate, 2010).

Clinical rotations offer a mixture of learning "on the job", where residents are involved in patient care, and learning "at the job", where time is set aside for structured and formal teaching sessions (Teunissen & Wilkinson, 2011). Teunissen and Wilkinson use Dornan's definition for medical education in the workplace as "any place where patients, learners, and [health care] practitioners come together for the conjoint purpose of providing medical care and learning"(p. 194). Learning in the circumstances of work (workplace learning) is situated learning which has been defined as "Learning through goal-directed

activity situated in circumstances which are authentic, in terms of the intended application of the learnt knowledge” (Billett, 1996, p. 263). Although learning in context offers many advantages, including immediacy and applicability, it offers some disadvantages including the possibility of divorcing practice from theory; that is, the reality of what happens in practice is not sufficiently linked or is contradictory to what is taught in theory (Teunissen & Wilkinson, 2011). This issue can be explained by the impact of the hidden curriculum which is discussed later in the literature review.

Collaborative practice, teamwork and interprofessional education

This section defines collaborative practice and teamwork, explains their importance, demonstrates their differences, and examines the critical elements for their effectiveness. Following this, interprofessional education as a means to improve collaboration and teamwork is discussed.

The delivery of health care services has evolved into a complex system where no one individual is responsible for the provision of care. As well, communication failures and ineffective interprofessional collaboration are frequently cited as contributing to adverse events causing death or serious physical or psychological injury (Joint commission, 2011; Baker et al. 2006; Stahl et al., 2009). The need for collaboration, not only between professionals, but among all members of the health care team is highlighted as one of the means to achieve patient safety (Baker et al., 2006; Rodger et al., 2010). In fact, the ability to engage in collaborative practice and effective teamwork is considered to be a critical component to improvements in health care (Frankel et al., 2006; Baker et al., 2006, Leape et al., 2009).

The World Health Organization defines collaborative practice in health care as occurring when multiple health workers provide comprehensive services by working together synergistically along with patients, their families, care-givers and communities to deliver the highest quality of care across settings (Mickan et al., 2010). Teamwork in health care is defined by Oandasan et al (2006) as: “the interaction or relationship of two or more health professionals who work interdependently to provide care for patients” (p. 3).

Interprofessional collaboration and teamwork is necessary in the ICU environment due to the complexity of critical illness, its management and the heavy workload that is generated (Nathanson et al., 2011; Rose, 2011; Hawryluck, Espin, Garwood, Evans & Lingard, 2002).

Critical elements for effective interprofessional collaboration and teamwork.

Clements, Dault and Priest (2006) explain that although often used interchangeably, teamwork and collaborative practice are not the same. They explain that interprofessional collaboration is a process used for teamwork and that professionals can collaborate without necessarily viewing themselves as part of a team. Conversely, effective teamwork rarely happens where there is no collaboration and can be viewed as a product of collaboration (Oandasan et al, 2006).

In their review of the literature on the conceptual basis of interprofessional collaboration, D’Amour et al. (2005) identify five important elements for effective collaboration. These include four recurring concepts and the process of collaboration. The most important concept was that of sharing. This concept had multiple facets such as shared responsibilities, shared decision making, shared understandings and shared values. The second concept is that of partnership which requires good communication, mutual trust and respect for one another’s roles and responsibilities. Others also advance very similar criteria

as important to collaboration and teamwork (Salas, Sim & Burke, 2005; Oandasan et al., 2006; Petrie, 1976; Hall, 2005; Rose, 2011). Another concept that D'Amour et al. (2005) identify is mutual dependence: Professionals (partners in the collaboration) need to realize that they must depend on one another to attain their collective objective of meeting the patient's needs. The fourth concept is power. The authors report that health care teams work better when power is shared and when collaborators are empowered based on knowledge and experience rather than title or function (D'Amour et al., 2005; Mickan et al., 2010; San Martin-Rodriguez, Beaulieu, D'Amour & Ferrada-Videla, 2005).

Interprofessional collaboration and teamwork is also about process. The process of providing an integrated and cohesive answer to the needs of patients and their families is influenced by human relationships including a willingness to work together, relationship building and trust, as well as organizational factors like governance (leadership) and formalization (D'Amour et al, 2005; D'Amour & Oandason, 2005; Mickan et al., 2010; Oandason et al., 2006). Formalization is described as information exchange, tools, protocols and procedures that help clarify expectations (D'Amour & Oandasan, 2005; Mickan et al, 2010) and facilitates communication (Mickan et al., 2010; Oandasan et al, 2006).

Benefits of collaborative practice and teamwork. For patients, the benefit of teamwork and collaborative practice includes prompt, appropriate treatment and improved trust in the health care team (Mickan et al., 2010). For the health care system, the benefit includes improved quality of patient care and patient safety (Oandasan et al, 2006). For health care professionals, collaborative practice results in better job satisfaction and confidence (Mickan et al., 2010; Oandasan et al., 2006; Zwarenstein, Reeves & Perrier, 2005). Mickan et al. (2010) recognize, however, that little is known about how professionals

learn to collaborate and suggest that there is a pressing need for formal education on teamwork and collaborative practice. Interprofessional education may be able to meet this need

Interprofessional Education (IPE). There has been a call for an increase in IPE from the Institute of Medicine (Kohn et al., 1999), the commission on the future of health care in Canada (Romanow, 2002) and the World Health Organization. The latter body also recognized IPE as a necessary component of every professional's education.

Interprofessional education is not a new concept. Decades ago, Hugh Petrie (1976) reflected on its importance and observed that even though there is awareness that interdisciplinarity is valuable, this knowledge does not necessarily ensure that it will be adopted. This insight can be applied to the health care setting where collaborative practice has been recognized as important but is not necessarily applied (Oandasan et al., 2006, Health Force Ontario, 2007).

A frequently cited barrier to interprofessional collaboration is the fact that the education of health care professionals has historically been provided in silos, with each profession belonging to a different faculty and being educated independently (Hall, 2005; D'Amour et al, 2005; Lucien Leape Institute, 2010). Although this structure has helped ensure the establishment of professional identity and a diversified knowledge base, it means that professional knowledge, values, beliefs and world view have evolved separately and very differently (D'Amour et al, 2005; Hall, 2005; McMurtry, 2010; Rose, 2011). This explains why, as Petrie (1976) states, two people from different educational and professional backgrounds may be part of the same situation but may interpret that situation very differently or even see very different things.

All kinds of conflicts can emerge when it is not recognized that the underlying assumptions or world views are different. This is why it is important for individuals who work in teams or who collaborate need to have a general understanding of other team members' beliefs and assumptions (Hall, 2005; McMurtry, 2010). Even in the recent past, because of the structure of the educational system, interactions between individuals of different professions during training has occurred mostly during clinical rotations and have rarely been incorporated as a formal part of education. This is just starting to change as more IPE initiatives are being incorporated into the undergraduate curriculum of health care professionals (Dumont, Briere, Morin, Houle, & Iloko-Fundi, 2010; Rodger et al., 2010; Muller, Klingler, Paterson, & Chapman, 2008; Rosenfield, Oandasan & Reeves, 2011). To date, however, uptake of IPE seems to be lagging behind in postgraduate medical education (Bainbridge & Nasmith, 2011). It is unclear whether one of the reasons for the limited uptake of IPE is the assumption that effective teamwork and collaboration will be learned within workplace learning.

The hidden curriculum and PGME

This section examines the hidden curriculum and how it relates to PGME and workplace learning, interprofessional collaboration and teamwork. The hidden curriculum is described, exploring both the positive and negative influences it can have on medical education and how it may contribute to what residents learn about collaborative practice and teamwork during their ICU rotation.

Wenger (1996) explains that learning is inherent in human nature and that learning is fundamentally a social experience. Billett (2001) applied this social-constructivist lens to his research in workplace learning. He points out that learning in the workplace is influenced by the indirect contributions provided by the physical and social environment. Tacit knowledge

can be described as knowledge-in-practice that has been internalized through interactions, shared experiences and action. (McAdam, Mason & McCrory, 2007). Valutis, Rubin and Bell (2012) expand on the definition of socialization provided by Patchner et al (1987) which “consists of values, ideals, ethics and attitudes of the profession” by adding the outcome which “encompasses the development of a professional identity and internalization of group norms” (p. 1047).

The acculturation of “becoming a doctor” is often referred to as the "hidden curriculum". Hidden curriculum is a term used to describe the teaching that occurs that is not articulated as part of the formal curriculum, is different from the informal curriculum (Pingleton et al., 2010) and contributes to what a resident learns about collaborative practice (Bainbridge & Nasmith, 2011). Cribb and Bignold (1999) define the hidden curriculum as: “...processes, pressures and constraints which fall outside of, or are embedded within, the formal curriculum and which are often unarticulated or unexplored” (p. 197).

Some of the content learned in this form of professional socialization can be congruent with the expressed curriculum, as was demonstrated by Weissmann, Branch, Gracey, Haidet and Frankel (2006) in their study of how humanistic care is taught in the clinical setting. The authors found that faculty identified by students as being excellent teachers of humanistic care taught this skill by role modeling and did not address the humanistic aspect explicitly with their students. Other studies have also shown positive effects of the hidden curriculum on patient safety (Pingleton et al. 2010) and professionalism when caring for patients in end of life care (Ratanawongsa, Teherani & Hauer, 2005).

Other aspects of the hidden curriculum can have a negative impact. In a qualitative study in the United Kingdom exploring the content of the hidden curriculum in one medical

school, Lempp and Seale (2004) found that most students learned about the importance of hierarchy in the clinical setting by humiliation, mostly during rounds with three quarters of incidents being perpetrated by senior medical staff. This study also revealed that a little more than one third of the students reported that they came to understand that in order to prepare for prestigious jobs in the future, they needed to be competitive (rather than collaborative) to “impress” the senior medical staff. This type of behaviour is also prevalent in the United States where the number of students who reported having been “publicly belittled or humiliated” once was 16.9%, occasionally was 16.3% and frequently was 1%. The most common sources of this practice were clinical faculty (30.7%), residents (27.9%), followed by smaller but significant percentages of nurses (11.4%) (AAMC, 2012). Multiple other studies (Caldicott & Faber-Langendoen, 2005; Satterwhite et al., 2000; Reddy et al, 2007; Hicks et al. 2001; White et al., 2009) have explored the negative influence the hidden curriculum can have on medical students and residents in the areas of ethical behaviour.

Residents completing an ICU rotation are expected to function within the team of health care professionals who are involved in the management of critically ill patients. It stands to reason that the ICU, which is recognized as currently practicing interprofessional care (Health Force Ontario, 2007), may be an ideal environment for residents to learn the importance and benefits of collaborative practice and teamwork. In fact, at the University of Ottawa internal medicine program, learning about collaboration is one of the objectives for residents completing an ICU rotation: “To learn the importance of the multidisciplinary approach in critical care medicine to learn to coordinate and integrate such multifaceted care in the critically ill patient” (University of Ottawa, 2003). Most of PGME occurs in the workplace. Thus, learning about teamwork and collaborative practice likely happens through

interprofessional interactions that occur as part of the everyday ICU activities. However, given the nature of workplace learning and the influences of the hidden curriculum, one must also consider that through experiences, learners may learn things that may or may not be aligned with the stated curriculum (Wenger, 1996). In fact, evidence suggests that the ICU teams still have much to learn when it comes to teamwork and collaboration (Rose, 2011; Stein-Parbury & Liaschenko, 2007; Reader, Flin, Mearns & Cuthbertson, 2009; Hawryluck et al., 2002). What then, are residents learning during their rotation? When considering that little is known about how or what residents learn about interprofessional collaboration within PGME, gaining a better understanding of the contributions made by other health care professionals to the education of residents may help to identify gaps in the curriculum that may need to be addressed in order to better prepare physicians for clinical practice.

Research questions

Numerous factors provide the rationale for this study: the paucity of literature about IPE in PGME, that little is known about the contributions made by other health care professionals in PGME, the calls for reforms in medical education that include better preparation for collaborative practice, and the need to better understand and shape the hidden curriculum. To begin to address these factors, this study asks two research questions:

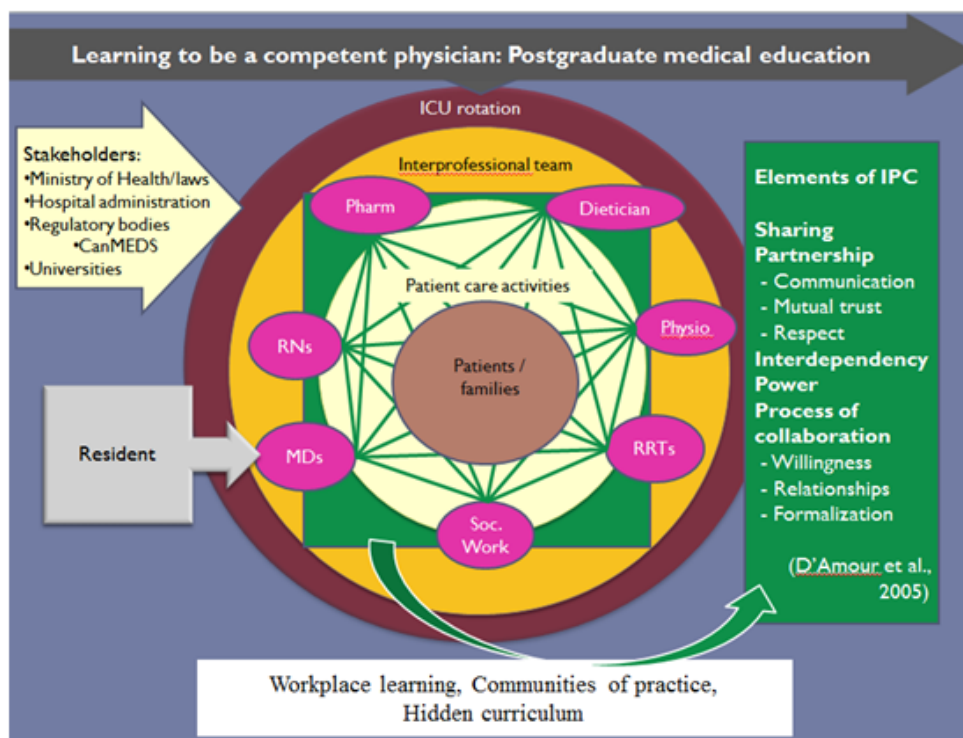
(1) How do different professionals (nurses, respiratory therapists, pharmacists, social workers, dietitians and physiotherapists) on a tertiary hospital ICU team perceive their own and one another's contributions to PGME?

(2) How do medical residents completing their ICU rotation describe the contributions these different professionals make to their education?

Conceptual framework

A conceptual framework called “The ICU rotation” has been developed to guide this study (Figure 1) and help organize data collection and analysis. The framework situates the ICU rotation as one component of postgraduate medical education. The learning about interprofessional collaboration (5 elements of IPC) that occurs during the ICU rotation is influenced by the stakeholders, the residents and their interactions with patients/families and members of the health care team.

Figure 1: IPC Education during the ICU rotation



Dark gray arrow: The objective of PGME is to ensure that residents achieve the basic competencies for each of the seven roles described in the CanMEDS competency framework (Frank, 2005) and are ready to transition to practice. **Pale grey arrow:** Residents in an ICU rotation vary with respect to disciplinary background and experience, and have individual learning objectives. **Pale yellow arrow:** Any clinical rotation is subject to pressures exerted by external stakeholders. **Dark red outer circle:** The intensive care (ICU) rotation takes place in an academic hospital where an interprofessional health care team works with the resident to provide tertiary care to patients with life threatening critical illness. **Dark yellow circle and pink circles:** The core interprofessional health care team members depicted in the figure are those who collaborate on a daily basis with residents. **Green square and lines:** Effective collaboration is determined by the processes of care and the team members' abilities to engage in elements important for IPC (D'Amour et al., 2005). **White box:** These theories help to describe how IPC is learned in this context. **Inner brown circle and pale beige circle:** The patients' conditions, family dynamics and resulting patient care activities shape the opportunities for learning in practice.

Methodology

Design and data collection

A qualitative case study design (Creswell, 2007) was conducted to provide in-depth analysis with rich contextual data (Gagnon, 2010). Yin (2003) explains that case studies are employed for ‘how and why’ exploratory questions and are useful when the objective is to gain a deep understanding of a phenomenon within a particular real world context. Case studies can also be useful to better understand contextual conditions relevant to the phenomenon. Creswell (2007) refers to case study research as “the study of an issue explored through one or more cases within a bounded system. This study was bounded by 1) The event: the ICU rotation and perceived interactions between the members of the health care team and the residents, 2) Time: a typical 4 week ICU rotation, and 3) Place: the ICU of a teaching hospital with the capacity to offer tertiary care.

The residents’ and health care team members’ perceptions were captured through their verbal accounts during semi-structured individual interviews and focus groups interviews. Semi-structured interviews/focus groups are appropriate when the researcher is interested in trying to understand how individuals make sense of their experiences (Savoie-Zajc, 2009). The semi-structured interview and focus group guides followed a broad pre-determined line of inquiry that included all elements of IPC, was flexible and could evolve as data collection unfolded. The focus groups were held with homogenous groups (RNs, RTs and Residents) to avoid the risk that participation (or lack thereof) be influenced by power differences that exist between professionals (Geoffrion, 2009). This data collection strategy was also helpful in capturing participants’ conversations with one another, allowing for exploration of diverse points of view. Adding this method of data collection can be an effective means to provide more in-depth understanding of the subject of study (Hennink et

al., 2011). Denzin and Lincoln (2005) explain that because of the multiple participant aspect of the focus group, this technique limits the control of the researcher over the research process; this can help to minimize the bias introduced by the researcher and give more freedom to the informants. Both the individual interviews and focus groups were conducted in a quiet meeting room near the intensive care unit. A third data collection strategy included researcher field notes, which captured the researcher's observations and early interpretations after each data collection activity.

Data were collected between October 31, 2013 and December 5, 2013. Four individual interviews and four focus group interviews were conducted. All individual interviews and focus group interviews were audio-recorded and transcribed verbatim. Transcriptions were verified for accuracy.

Context

Setting: The setting is an intensive care unit (ICU) in a teaching hospital system affiliated with one university, situated in a large city in the province of Ontario. The ICU has a 32-bed capacity and provides complex treatment regimens, intense monitoring and 1:1 to 2:1 patient to nurse ratio. Typical patients admitted into this ICU require complex medical care, including life saving measures to support multiple organ functions. Care is provided by an interprofessional health care team including physicians, registered nurses (RN), respiratory therapists (RT), pharmacists, dieticians, social workers and physiotherapists.

As a clinical teaching unit for PGME, the ICU offers residents the opportunity to participate as the physician member of the health care team. It is a challenging rotation for residents because in critical care, multiple concurrent tasks must be accomplished, often during an evolving situation, under time pressures and with limited information (Orgeas, 2008; Rothshchild, 2005).

Team members: The context also includes the team members. This section describes the role of team members in this particular ICU setting.

The nursing team in this ICU is composed of approximately 160 registered nurses (RN). Note that there are no registered practical nurses. Most nurses have completed additional training that is not part of the typical entry to practice nursing curriculum such as (but not limited to) Advanced Cardiac Life Support (ACLS), arrhythmia interpretation and hemodynamic monitoring. ICU nurses are expected to care for unstable patients that require more intense monitoring and an understanding of the use of complex equipment such as ventilators, CRRT or SLED (dialysis machines) as well as nursing considerations when using aggressive therapies such as vasopressors, inotropes, massive blood transfusions, etc. Nurses participate on rounds, provide information and support to families and help coordinate care.

Respiratory therapists (RTs) are specialized in airway and cardio pulmonary care. Their skills include (but are not limited to) establishing artificial airways (intubation), inserting arterial lines, obtaining and interpreting arterial blood gases, setting-up, adjusting and troubleshooting ventilators, assisting with bronchoscopies. They also assist the team in helping patients wean off ventilation or assist in establishing a plan to support long term ventilation with the intent to transition patients in the community. They have extensive knowledge of the physiology/pathophysiology of breathing and gas exchange. In this particular ICU, RTs have a lot of autonomy and can adjust ventilator parameters through the use of ventilation protocols. The respiratory therapist team counts approximately 70 RTs.

The pharmacist members of the ICU team are clinical pharmacists who are expected to participate on clinical rounds. Their role is to review each patient's pharmacological

treatment plan to ensure it is safe and appropriate. They provide information about interactions, monitor and help adjust dosing and are experts in best-practice evidence.

The social worker provides support to the patient and their family through counseling, assessment of the social environment, consultation and referral to other services in the community. The social worker is an important team member who can inform the team of factors that may have contributed to the current patient condition or family concerns that may not have been addressed. As well, the social worker has expertise to support the team when issues arise related to power of attorney and substitute decision making or when dealing with children's aid.

The physiotherapist helps to minimize complications of critical illness by providing chest physio and early mobilization of critically ill patients.

Dieticians use their expertise in nutrition and the energy demands of critically ill patients to individually assess each patient and recommend appropriate diets. They also help elaborate interventions that can help maximize the ability of the gastrointestinal track to tolerate feeds.

Participants

All pharmacists, physiotherapists, social workers and dieticians who work in the ICU were invited to participate in the study (no exclusions). Residents invited to participate were limited to individuals completing their ICU rotation at the time of data collection. Given the size of the RN and RT groups, participants were recruited using maximum variation, purposive sampling of select individuals who met a wide variety of criteria. RNs and RTs who work in the ICU can take on different roles that may have an impact on their perceived contributions to PGME. As well, RNs and RTs may have differing levels of ICU experience

(from novice to expert) which may influence their perceptions. Table 1 presents the number of participants recruited. Table 2 presents the actual recruitment by criteria of RNs and RTs.

Table 1: Overall participant recruitment

Individual interviews	#	Data collection method
Pharmacist	2	Individual interviews
Social Worker	1	Individual interview
Dietician	0	Not applicable
Physiotherapist	0	Not applicable
Medical Resident	6	Focus group
Registered nurse	5	One individual interview, one focus group
Registered respiratory therapist	11	Two focus groups
Total	25	8

Table 2: Participant characteristics related to the maximal variation criteria

Criteria	RTs*	RNs
Care Facilitator (RN only)		2
Bedside	9	3
RACE team	4	2
Full time	4	3
Part time	5	2
Works: Days (D), Nights (N), Both (B)	D = 4; B = 7	B = 5
Less than 5 years ICU exp.	4	0
5 or more years of ICU experience	7	5
* Two were RT students; they met only the 0 to < 5 years of experience criteria		

Positioning the researcher within the study

The principle researcher holds two positions that may have impacted this study. Her primary employer is The Royal College of Physicians and Surgeons of Canada which sets the standards for accreditation of educational programs of specialist medical doctors. She is also a staff nurse (casual status) in the ICU where this study took place and worked full time in this unit before her employment with the Royal College. The researcher's prior

relationship with participants who agreed to participate in an interview as well as her employment with the Royal College may have influenced what was shared during data collection activities.

Ethical Considerations

Applications were made to the Ottawa Health Science Network Research Ethics Board and the Social Sciences and Humanities Research Ethic Board. Application to both ethic boards was required because this research study was a partial requirement for a Master's of Arts in Education degree (needing uOttawa ethics board approval) and was conducted at a hospital needing the hospital's ethic's board approval. To ensure confidentiality, audio recordings were rendered anonymous at the time of transcription. Approval was received from both ethics boards prior to conducting any data collection activities.

Data analysis

Data analysis followed Creswell's (2012) inductive thematic analysis where data was initially explored to gain a general sense of the data. The transcripts were then imported into the NVivo qualitative data analysis software where they were coded. The initial coding strategy involved coding data by elements of the framework (figure 1). Data were also organized by professional designation so that similarities and differences could be examined. The data were then explored a second time through the workplace learning and hidden curriculum theory lenses described above. Coding labels were assigned and constantly examined and refined throughout the process. Finally, coding labels were collapsed into two overarching categories and associated sub-themes.

Rigor

The five criteria essential for a rigorous qualitative study include: 1) credibility, 2) dependability, 3) confirmability, 4) transferability and 5) authenticity (Guba & Lincoln, 1981; Lincoln & Guba, 1985). The measures taken were as follows: (1) Credibility: thesis committee continuous involvement, triangulation of data, multiple sources of data collection methods (individual and focus group interviews as well as field notes); (2) Dependability: semi-structured interview guides developed with thesis committee input were followed; (3) Confirmability: the researcher maintained an audit trail and field notes, and audio-recordings were transcribed verbatim and reviewed for accuracy; (4) Transferability: a rich description of the context was included in the report; (5) Authenticity: maximal variability purposive sampling technique was utilized.

Findings

Themes emerged from the data analysis under two categories: 1) Interprofessional collaboration (IPC) curriculum and 2) Key influences. Specific themes are listed under each category (Table 3). Each theme is illustrated by representative quotes. To clarify the discipline of the participants and demonstrate their varied opinions, quotes are followed by brackets containing acronyms and numbers. The acronym clarifies the discipline of the professional quoted (i.e.: Registered nurse = RN, resident = Resident, respiratory therapist = RT, pharmacist = PharmD, social worker = SW). To protect confidentiality and show that quotes were selected from a variety of participants, each individual of the same discipline was provided a unique number which appears following the acronym (e.g.: RN-1, RN-2).

Table 3: Categories and associated themes

1.0	Interprofessional collaboration curriculum
	a) Educational content
	b) Strategies for teaching/reinforcing IPC
2.0	Key influences

- | |
|--|
| <ul style="list-style-type: none">a) ICU culture and contextb) The 'good' and 'bad' residentc) Engagement of the learnerd) Balancing work and teachinge) Power and Hierarchy |
|--|

1.0 Interprofessional Collaboration Curriculum

The IPC curriculum category represents the reflections made by participants concerning the IPC educational content and the specific strategies used to teach it. All team members (non-physician health care professionals) who participated in this study felt that they contributed in some way to the resident's education. The content of team members' contributions included different elements of IPC such as role clarification, consultation, relationship building, trust, willingness to work together and frequent reinforcement of existing power differentials. In addition to content related to IPC, team members also helped residents gain ICU specific knowledge and skills to care for critically ill patients.

1.1 Educational content. Though the team members were not familiar with the learning objectives of residents completing their ICU rotation, they provided their perception of what these should be. Learning objectives related to collaboration that were felt to be important by team members included learning the different team members' roles, communication, learning the structure of care, asking for help from, and working with different team members.

The social worker, for instance, stated that it was important for residents to “not just have a meeting with the patient or a family member by themselves, to do it as a group process at least with the nurse, with me or the Chaplain, somebody like that”. Team members also mentioned technical skills such as “line insertion...” (RT-9), or building a “pharmacotherapeutic knowledge base” (PharmD-1). When asked what they should learn

during the ICU rotation, the residents had a more limited view of what they were there to learn. The items listed were practical in nature and related to technical skills such as “intubation, central lines... management of acutely ill patients...” (Resident-5) or understanding the ICU context in terms of available therapies: “What the capabilities are of the ICU and the monitoring as compared to the floor” (Resident-3). Learning to collaborate or work in teams was not mentioned by residents.

1.2 Strategies for teaching/reinforcing IPC. ‘Teaching’ IPC was enacted in many ways during the ICU rotation. These included formal planned teaching sessions, informal ‘just in time’ teaching moments and implicit ‘teaching’ through the hidden curriculum. This section provides more details regarding how these interactions were expressed in the participants’ discussions.

Formal/planned curriculum. Traditional/formal teaching sessions taught by different team members occurred regularly and were meant to supplement the knowledge base of residents. As the pharmacist explains,

...traditionally every topic was taught by physicians. But it doesn’t make sense to have a physician talk about nutrition when you have a registered dietician right next to you, right. And so we’ve modified our teaching’s strategies here, so, pharmacist talks about drugs, dieticians talk about nutrition. (PharmD-1)

Participation in the interprofessional patient rounds was also part of the stated curriculum. These rounds can be seen as a formalization that clarifies expectations and facilitates communication. The purpose of the patient rounds was to discuss the medical management of patients with the attending physician and team members. During these rounds, the residents experienced collaborative decision making and learned team members’

roles: “There’s a clear convention to how things work here and I think even after one day of being on rounds and being on service, you pick up very quickly on what everyone’s roles are.” (Resident-3)

Informal ‘just in time’. Most opportunities for learning about IPC came from experiences during the everyday business of ICU care. During these ‘just in time’ informal exchanges, content in the form of information or feedback was provided explicitly during or soon after a patient encounter. Experiences were dependent on the patient population and family dynamics which were present during the rotation. Team members and residents were opportunistic in their selection of teaching moments “But most of the time, I find questions on ventilation normally are in a circumstance where we might be having difficulty ventilating the patient.” (RT-3)

Implicit teaching through the hidden curriculum. The discussions included multiple examples of implicit reinforcement when residents participated as members of the health care team. Learning by experiencing was felt to have an impact through positive reinforcement when team member contributions helped the resident accomplish a task. The social worker explains that when her contributions are perceived as helpful, the residents gain more appreciation for the role she plays and are more likely to collaborate in the future: “If I help them discharge a patient, then they’re like – look you got to go use [Names self]”. What the social worker says next provides insight on how negative stereotypes may impact the interpretation of interprofessional interactions: “[I]f it’s just that more, touchy feely, you know [the social worker] is really good at hand holding and providing support, then not as much [appreciation] because it’s more the traditional stuff that they expect anyway”.

Team members' perceptions of residents can also shape interactions and the hidden curriculum — often without the resident being aware of it. The following excerpt is one example from the nursing focus group; in it, a nurse describes his/her resentment when residents appropriate her place and patient-care documents without asking:

My room and my table, where are my legal flow sheet that I'm writing in. Like get out of my chair, stop taking my flow sheet away, if you really want it, ask me," like that kind of thing (RN-5).

Modeling was often mentioned by team members as a means to teach residents. The modeling of collaboration by the attending physicians was felt to be very effective. "Well I think the staff [Attending physician] plays a big role in being receptive to every profession" (RT-4). Modeling between non-medical disciplines (eg: nurse and RT collaboration) was also mentioned "Like even, just doing physio on my patient, there's two of us in the room doing it, talking while were doing it, but getting everything done" (RN-6). But team members were not as confident about the impact of this latter sort of modeling on residents. When asked if he had heard comments from the residents about teamwork in the ICU, the nurse added: "No, but I've heard it from families. So if the families can see it, I would think that the residents should be, you know, smart enough to" (RN-6).

2.0 Key influences

Five main categories of influences, which impacted the form taken by the IPC curriculum during the ICU rotation, emerged from the data. These influences included: 1) ICU culture and context, 2) Balancing work and teaching, 3) The 'good' and 'bad' resident, 4)Engagement of the learner, 5) Power and hierarchy.

2.1 ICU culture and context. Interprofessional collaboration is a given in the ICU. Team members explained that a strong culture of collaboration exists out of necessity. The

“stakes are high” (Resident-3). The patients require highly specialized, complex and labor intensive treatment strategies that no one individual can manage alone: “...there’s so many things happening you need more than one set of hands, you would not be able to cope” (RN-6). Challenging clinical situations occurred regularly: “I had a situation a couple of weeks ago ... she [patient] arrested, bled out, we resuscitated her” using equipment and therapies that are used only in specialized units and “we had to use a level 1” that the resident “poor guy” may never have seen before (RN-5).

The strong culture of collaboration that exists in the ICU influences the IPC curriculum by shaping the experiences of residents. Through participation, they observe and experience what attitudes toward team members are welcomed, tolerated and not tolerated. They also learn to work differently through formalization, in this case of the process of care, which has been adapted to meet the needs of this specific context. Formalization is described as information exchange, tools, protocols and procedures that help clarify expectations and facilitate communication. The way patient care rounds are conducted in the ICU was an example used frequently by team members and residents alike. The interprofessional patient care rounds were adapted to favour interprofessional collaboration: “individuals with select expertise... within their individual discipline provide that additional insight to the group. It only makes patient care that much better” (PharmD-2). The residents concurred:

I think it’s almost the perfect example of interprofessional collaboration because it’s so important that all of these perspectives are involved in decision making...missing one of them would be a harm to your patient. So I think it’s the perfect example of that. I don’t see people work this well anywhere else to tell you the truth. (Resident-6).

It is important to point out that although these rounds were useful for promoting collaboration between certain professionals, they could also exclude others (Social worker and RTs) who were not always available. An RT explains that their participation on rounds is not often feasible “it’s difficult if they’re [the team] teaching on rounds, to spend 20 minutes with every single patient and still look after your 7 ventilated patients” (RT-9).

Time was also a factor. There was a perception that whatever was learned about collaborative practice during the short ICU rotation would only have a very limited lasting effect. The ICU rotation is only 4 weeks, out of post-graduate specialty programs that typically last 5 years. As one RN observed, “they’re going to go back and do months and months underneath the tutelage of somebody who doesn’t think that way” (RN-6). Team members felt that even though there is a strong culture of collaboration in the ICU setting, if this was not the case in the resident’s primary program, the impact would be minimal at best. Despite this, there remained hope that perhaps some lessons were learned that could translate to better collaboration in their own discipline later “I would hope they would think that this way is better...Maybe somehow it changes something in their behaviors, but I don’t know if it does” (RN-6).

For the residents, the ICU rotation was perceived as very different from their other rotations. Despite the fact that some of them are “highly skilled doctors in their own field”, they come to the ICU rotation and they “still feel like a learner” and that it is a “huge learning curve” (Resident-4). The resident goes on to explain that they “are thrown to the wolves” with other team members who “have expertise” and “very specialized knowledge that we don’t have”. The discomfort is compounded by the fact that residents are “expected

to know stuff that we don't know" and are "corrected all the time at first", leaving them feeling "a little bit intimidated".

2.2 Balancing work and teaching. There was a tension during the rotation between getting the work done and providing learning opportunities. This tension could lead to missed opportunities for learning. 'Doing' was perceived as more efficient by some team members than spending the time and energy teaching: "... it's just so much easier for me just to do it for you than to teach you how to do it" (PharmD-1). These tensions were particularly strong at the beginning of every new ICU rotation, which was associated with an increase in workload "Just a lot of extra...it's extra work I guess" (RT-3).

The increased workload was perceived to be related to an increased risk to patient safety requiring additional vigilance, monitoring of, and teaching of residents:

I'm more aware that...[the beginning of the rotation] is the time where I'm most likely to see errors. This is the time where my contributions may be most valuable.

And so, I would try and turn it on at those times (PharmD-1).

At other times, it was not feasible to take advantage of a teaching moment. The following quote is taken in the context of a discussion among nurses about teaching residents; the nurses were reflecting on times when a knowledge gap is evident but the situation calls for action rather than teaching. This quote also exemplifies the difficult position team members sometimes find themselves in when the only available physician is a resident with limited experience managing a crisis: "And that's another instance [when] they don't know what they're doing. Is when we're having a crisis. So unfortunately that's one of the hardest time to teach because you're so focused on the moment and what's happening."

(RN-4)

The social worker provided additional insight about how balancing work and teaching can result in missed opportunities. In the following excerpt, she explains how she often avoids the resident “I tend to use the staff [attending physician], they’re my go to people”. She explains that it is simpler to go directly to the attending “because they know me, and they trust me... whereas these people, the young residents are here for a short time.” She does however add that “The ones that come back for a second or third rotation, they know me and then they really use me well”, highlighting the importance of relationship building and how balancing work and teaching impacts the IPC curriculum.

For the residents, the beginning of the ICU rotation was associated with concerns related to their ability to meet the patient’s needs. “Many of us have relied on [the] ICU [resident] before ... So we know what they’re responsible for, or when you would need them. And now that would be our role” (Resident-3).

2.3 The ‘Good’ and ‘Bad’ Resident. From the team members’ perspective, ‘good residents’ exhibited three important behaviours: they acknowledged their limitations (admit when they don’t know), they were comfortable asking questions, and they were able to take suggestions from team members. For example, RT-9 observed, “I’m like, no problem, they’re asking me the right questions”. These abilities helped establish trusting relationships and favored a willingness to work as a team.

Additional desirable resident characteristics included having sound critical care related knowledge, being skilled in ICU related technical skills, and being in control during a crisis. For example, team members preferred residents who “could intubate” (RN-3) and be “the team leader...listen to suggestions, [without] getting really frantic” (RT-6).

Conversely, team members expressed misgivings when dealing with residents who were perceived as over-confident and not open to suggestions. This ‘bad’ resident raised a lot of concern for team members:

[T]hey're not open to input from myself or the bedside nurse who actually probably has more experience than them in terms of ...the specific scenarios that's at the bedside and provide some suggestion which they're reluctant to take in, at the jeopardy of the patient's care (PharmD-2).

Team members did not feel that it was their place to give feedback to residents. “I can’t really reprimand them or even, discipline them or talk to them about it really, because it has to come from their supervisors”, observed RN-6. All professional groups reported that they could contact the attending physician directly if they had serious concerns about the residents’ attitude or management plan. Only nurses and a few RTs reported that they had actually ever done so “... people come to me to tell me that the resident’s doing this type of stuff. I usually then go and talk to the staff [attending physician] about it” (RN-6).

From the medical perspective, the role of the physician is to make a diagnosis and determine the medical management plan for the patients. The residents must quickly learn to carry out this role as an effective member of the ICU health care team. Gaining the team’s trust was felt by residents to be a necessary step:

I think as a resident, you have to develop; you have to somehow get the multi-disciplinary team, especially the nurses, to trust you very early on. It’s very hard to be effective, especially when you’re by yourself overnight, if the nurses don’t trust you (Resident-3).

Strategies used by residents to gain the team's trust were aligned with what was identified by the ICU team members as behaviours associated with the 'good resident'. That is, the residents recognized that it was important to listen: "I don't think that people can trust you if they don't feel like you listen to them and what their concerns are", said Resident-3. It was also important to be honest about what they don't know and ask for help: "...and being honest with what you don't know..., because if they know that I'll get help if I need it I'm sure they would feel more comfortable" (Resident-2).

Through their participation and observations during the ICU rotation, residents received mixed messages. First, there was implicit reinforcement that the physician role and responsibility was to establish the medical care plan. (This topic will be discussed in more detail in the section on power and hierarchy.) The attending physicians and fellows (senior resident completing sub-specialty training to become a critical care specialist) were seen as confident and decisive; these attributes were positively reinforced by the team members who deferred to their leadership: "I tend not to trust people that are that cocky. Unless they're a fellow and they really, really, really know their stuff" (RN-6). However, residents who exhibited these attributes and were perceived as *not* having the necessary knowledge, received negative reinforcements such as overt disagreement and conflict: "So you do butt heads," said RT-3.

There was plenty of positive reinforcement for residents who asked questions, consulted team members, were open to suggestions and asked for help: "...as long as you're willing to communicate, you know I'll always have your back" (RN-2). Yet there was a stigma of failure associated with the resident calling in an attending physician at night to assist in the management of critically ill patients. As RN-3 commented, some residents feel

that they are not meeting expectations in this situation: “we’ll say, no you’re not [failing], you can’t cope, it’s just too busy”.

2.4 Engagement of the learner. The relevance of ICU learning to the resident's future plans was felt to have a large impact on their motivation to learn from the individual team members’ knowledge and expertise: “[It] depends upon where they’re headed in their life, and whether they see it as a valuable piece of information” (SW). The team member’s perception of relevance to the resident’s future professional trajectory has an influence on expectations and efforts made to teach. A nurse makes the following statement:

I think it changes the focus or changes, like you were saying, spending the energy.

Well if you got somebody who is eager to learn and is asking questions, you spend... more positive energy trying to encourage them to achieve that. (RN-4)

The residents echoed the ICU team members’ perceptions. Residents who saw long term value for future practice tended to be more motivated to take additional steps to learn ICU specific knowledge and skills: “You have to go ask them about that thing, about tracheostomies and ask them about cuff leaks...and stuff” (Resident-4). They explained that although they discussed their learning objectives amongst each other and with the attending physician, they do not share these with the team members. Rather, they seek out the information they need: “I ask questions, but I’m not like ‘these are my goals for this rotation,’ but can you explain to me, sort of, why you decided on this” (Resident-6).

Team members expressed concern that given the highly collaborative team dynamic, residents completing an ICU rotation may not learn certain basic ICU specific knowledge or skills if they did not recognize the need for their future practice: “I worry that these guys leave the ICU not having learned some of the basics, fundamental things” (PharmD-1).

There were examples of residents needing to come back after having transitioned to the workplace to get additional training on ventilation. The residents also acknowledged this risk, although they did not seem overly concerned. They understood that they were responsible for recognizing the need to gain new knowledge or skills [particularly ventilation] and to actively seek out the information:

If we go and work somewhere else in another emerge[ncy department] or ICU ..., we wouldn't have gained that knowledge if we wouldn't have actually looked for it.

Because ... the dieticians and the RTs, they just deal with those things on their own (Resident-3).

Residents were expected to manage critically ill patients alongside team members with "their own expertise... and specialized knowledge" (Resident-4). They were also expected to debate the medical management plans during rounds, despite their limited critical care experience. These expectations provided a powerful incentive for residents to collaborate with team members. Residents explain how they have little time to prepare for rounds: "I'm like very quickly focused on what I'm going to discuss so that, when you're up there you're not like, ah, 'what are my issues?' " (Resident-6). When asked if any health care team member helped them prepare for rounds, the group replied in unison: "Nurses".

Resident-4 added:

Yeah, nurses! If you don't talk to them you're in trouble, they'll tell you where rounds are going to go, they pretty much know ahead of time because they're so experienced. They can make you or break you here.

Some nurses, however, interpreted the residents' reliance on their expertise and guidance as a failure to provide good patient care. Nurses expected residents to assess the

patient and make their own medical judgement: “I know a lot of nurses get frustrated. They would like the resident to go in the room, see the patient, and assess the patient properly” (RN-3).

The residents provided additional insight on how the resident's personality can have an impact on their learning in the ICU context. In an exchange during the resident focus group, a resident explained that unlike other rotations where they discuss patient care issues directly with the attending physician, the public nature of the interprofessional patient care rounds was referred to as “public shaming”. He goes on to explain that “you’re in front of 20 people and you’re expected to know... You’re called out, kind of with a complex plan for a complex patient...In front of other team members you don’t even know, you haven’t met them before” (Resident-4). The need to perform during rounds may favor certain personality types: “I think if you’re an extrovert, you might like it more, to be honest. I think it’s harder. I’m not good at that, I’m not used to speaking in front of people, it’s challenging” (Resident-3). It may also have served as a good motivator for introverted residents to make extra efforts to learn: “I’ll ask and look it up at the same time” (Resident-4).

2.5 Power and hierarchy. There is a hierarchy in the way decisions about medical management are made in the ICU. Most discussions about power or hierarchy centered on the physicians being responsible for determining the medical management plan: “the staff man is definitely still in charge of that patient’s care and can direct it as they see fit” (RN-6). When specifically asked about hierarchy, team members explained that there was a clear hierarchy in the physician group itself: “So the resident can veto the med student; the fellow can veto the resident; the staff can veto the fellow” (PharmD-1).

When asked about power differentials, most team members felt that the team functions with a fairly flattened hierarchy. The perception was that team member input was valued and important in decision making “I think it’s relatively flat and I think that’s one of the reasons I like working in this environment ...all individual s’ opinions [are] valued and taken [at] face value, and considered” (PharmD-2).

The terms used in conversation serve to reinforce the hierarchy that exists within the medical profession: One social worker described the attending physicians as “the big guns” (SW), implying decisive force, while RN2 uses ‘junior’, a common term used to describe the level of experience but is also associated with level of influence: “... junior resident, predominantly, and I hate to blame them, but that’s where we find the most issues”.

Power differentials could result in the formation of alliances:

So then it’s more of a discussion between [me and] the nurse and then we are kind of a unified front to discuss with the resident. Especially on night shift, like that usually is what happens if there’s conflict with the resident (RT-6).

As well, power and hierarchy could result in certain team members failing to engage. Two good examples emerged from the RT focus group. First, the RTs explained that they were encouraged by the attending physicians to reach out to them directly if they were concerned about the resident’s management plan. But they also pointed out that newly hired RTs who don’t “know this doctor who’s on the phone at home, at night” may not feel comfortable to “explain to him my point of view” (RT-8).

In the second example, during a discussion about the need for residents to understand that RTs can intubate patients, an RT shared an experience encountered where a resident was struggling to insert a breathing tube (intubation) “I think the intubation, that one the other

night, we could've done. She [the resident] wanted to" (RT-7). The discussion then focused on the need for role clarification. Residents, the RTs observed, "just aren't aware that they can ask us [RTs] to intubate, that "[i]t's not an advanced skill for us" (RT-6). They also remarked that RTs need to "learn to offer the service" (rather than remain silent) and how this was a reflection of RTs "not being good at promoting what we do" (RT-9).

Despite the general impression that the hierarchy is flattened, examples provided suggest that nurses hold a significant amount of influence. When asked what residents should learn during their ICU rotation, the RTs explained that residents need to learn to "listen to each discipline. ... they [residents] might tag on to one discipline [nursing] more than the other and then they're stuck in that area of expertise" (RT-1). The RTs were frustrated that residents tended to rely more heavily on the nurses' opinion even when the issue fell within the RT area of expertise: "Yeah, if the nurse says that patient should go on Bipap..." (RT-7). "They're going to go on Bipap, regardless what the RT tries to tell them" (RT-8). This could also lead to filtering of information: "I've seen where, they feel the resistance so they call the staff, but they share only the perception of the nurse, so our issues never made it to the physician" (RT-9).

The residents acknowledged the hierarchy in medicine. They also felt that in the ICU, being able to express your opinion with authority made a difference. "There's no right answer so it becomes who's the person speaking more strongly" (Resident-4). This may also explain why certain team members felt that they needed to speak with authority on rounds "In a situation where I think they need to defer to my expertise, then I can get pretty [hits table for emphasis], um, like this is the way it is" (SW). The residents also explained that they judge the team member's "rationale" and "how they communicate and their confidence"

(Resident-3) when considering suggestions made. This could explain why residents tended to rely more heavily on nurses' opinions if they perceived (accurately or not) the nurses' arguments as more valid.

The structure of care, with the attending physician making the final decision, was seen as an effective conflict resolution strategy: "There's no argument to win, it's just the staff deciding based on information given to them from both sides" (Resident-4). However, there may be more overt conflict when disagreements occur between two physicians of the same level of power: "when there're people at the same level making decisions, then you have more conflict" (Resident-4). Not all conflicts that arose on rounds were addressed or resolved by the attending physician. A nurse explained that moments before the focus group, he had experienced a conflict with a resident over the frequency of bloodwork "... so she [resident] argued with me". The conflict did not get resolved: "... she left it as Q8 [every 8 hours] because that's what the other resident said out loud". But the nurse decided to ignore the resident's order: "...it will stay q6, I'm there again tomorrow, I'm going to continue to do them q6 because I want the information q6" (RN-6).

In summary, team members' contributions to educating residents about collaboration (the IPC curriculum) included the content and strategies used for teaching. Role clarification, trust, relationship building, reinforcement of power differentials, willingness to work together and consultation were the most prominent elements that were part of the IPC curriculum content. This content could be shared explicitly or implicitly using the following strategies for teaching: a) formal planned sessions, b) informal (just in time) teaching at the bedside, c) modeling and d) participation in the everyday business of caring for critically ill patients. The teaching and learning about collaboration and team work that occurred during

the ICU rotation were influenced by a) the ICU culture and context, b) the tension that exists between getting the work done and teaching, c) the expectations of team members towards residents (the good and bad resident), d) the engagement of the resident, and e) the overarching influence of power and hierarchy. The findings have also been organized in a meta-matrix format to show the links between content, contributors, teaching strategies and key influences (refer to Table 4 in appendix A).

Discussion

This study explored how non-physician members of the health care team in a tertiary intensive care unit (ICU) perceive their own and one another's contributions to educating residents about effective interprofessional teamwork and collaboration and how this compares to the residents' perceptions. As presented above, two main categories emerged: Interprofessional collaboration curriculum and Key influences. This section, presented in two parts, begins with a brief discussion of the IPC curriculum, including content taught and strategies used by team members to teach residents during the ICU rotation. The majority of the discussion, however, focuses on the second category: Key influences on the curriculum.

Part 1 - IPC Curriculum

ICU non-medical team members believe that they contribute to residents' education. Contributions were felt to include ICU specific knowledge and skills required to manage critical care patients as well as knowledge and skills for collaborative practice. Team members were not aware of the formal learning objectives of residents and therefore made their own assumptions about what residents should learn. These were not always aligned with the residents' formal learning objectives. As expected, based on the workplace learning literature, data in this study suggests that contributions are often informal and opportunistic (Billett, 2001; Eraut, 2004; Swanwick, 2005; Teunissen & Wilkinson, 2011). For example,

team members, often prompted by residents' questions, take advantage of patient care situations to provide instruction and feedback. Through their interactions with residents in the everyday business of caring for critically ill patients, team members explicitly and implicitly clarify their roles, share their expertise and help residents assimilate and navigate the ICU specific workflow. Others have pointed out informal contributions to educating residents from team members. Lundenberg, Wali, Thomas and Cope (2006) describe informal teaching by nurse practitioners after institution of a nurse practitioner supplemented model of care delivery in an attempt to comply with regulations for decreased resident duty hours. Similarly, Pingleton et al. (2010) identified an informal curriculum of patient safety delivered to residents by team members. Through a quality improvement lens, Pingleton et al (2010) explain the importance of this informal curriculum for improving performance of a health care system that is committed to continue to learn (learning organization) to offer quality, safe patient care.

Residents acknowledged the contributions of team members to their education. The contributions most valued by residents were related to what they perceived as important for physicians to know and be able to do to care for critically ill patients (ICU specific knowledge and skills). Residents did not acknowledge contributions related to the elements of collaboration. There was evidence, however, that some implicit contributions positively influenced collaboration, for example, when the residents acknowledged that they learn the different team members' roles after a few days of participation on rounds. Other contributions did not seem to have the intended effect, for instance, when team members were frustrated with residents who do not assess patients. Evidence of the influence of the

hidden curriculum on team members' 'contributions to' and residents' 'learning about' collaboration surfaced through the key influences theme that will be discussed next.

Part 2 - Key Influences

Findings related to key influences on the curriculum are interpreted through the lens of the social constructivist theories of situated learning and communities of practice. These theories view learning as something that is inherently social and cannot be divorced from the concrete social contexts, like workplaces, in which it arises (Wenger 1996). Teunissen and Wilkinson (2011) offer a practical framework to facilitate analysis of learning in situated workplace contexts. They identify three main interrelated constructs, which they call constituent parts, common to varying degrees in different theoretical perspectives. These three constituent parts are Tasks, Contexts and Learners. Recognizing that these three parts are interrelated and that they cannot be divorced from one another, the authors' distinction can be useful for analytical and presentation purposes. This framework will be used to organize this second part of the discussion, specifically how the five themes that emerged from the key influences category shaped the IPC curriculum.

Tasks. Differences exist in critical care compared with other departments when it comes to the types of tasks that are carried out (e.g.: use of vasopressors), how they are carried out (urgency and sequencing) and who is responsible to carry them out (division of labour). In the ICU, certain team members perform tasks that, although recognized as part of their discipline's scope of practice, are typically performed by physicians in other settings.

Gaining a shared understanding of and clarity about one another's roles and responsibilities is frequently mentioned as important for effective IPC (D'Amour et al., 2005; San Martin et al., 2005; Salas, Sim & Burke, 2005; Oandasan et al., 2006). Issues

related to blurring of roles, when there is overlap in scope of practice and conflicts related to the perception of professional boundary infringements, have also been well described (Hall, 2005; Rose, 2011). Adding even more support to the importance of role clarity, Suter et al. (2009) found that understanding roles and responsibilities and communication were the only two core competencies considered most relevant by health professionals for effective collaboration. Not surprisingly, many of the examples of contributions made by team members to educating residents about collaboration were related to clarification of roles and responsibilities.

The influence of power and hierarchy was evident throughout the participants' discussions about how roles and responsibilities are clarified (either explicitly or implicitly) during the ICU rotation. Behaviours that can be interpreted as reactions or attempts to balance power differentials were often described by participants, such as the need to speak with authority. Though there was a clear hierarchy in medicine, nurses exerted a significant amount of influence. The RTs were most vocal about issues of power. Significantly, RTs did not always have the opportunity to establish a relationship with the residents and were not always able to participate on rounds. It is unclear how much this contributed to their perception of power imbalances.

The quote from the RT focus group about the resident who makes the decision to perform an intubation and experiences some difficulty (see the power and hierarchy section) is an example of how power and hierarchy influences the learning environment. The most experienced clinician present, the RT, who could have performed the intervention, remained silent. Silence can be interpreted as a reflection of power dynamics at play (Gardezi et al., 2009). In this example, since the situation occurs at night, the resident is granted full

participation opportunity [in the community of practice of critical care medicine] and is expected to ‘act as a physician’.

Baker, Egan-Lee, Martimianakis and Reeves’ (2011) work helps shed light on what it means to act as a physician. In their secondary analysis of the imbalances of power theme that emerged from the original commissioned evaluation of multi-site IPE initiatives, the authors found that physicians’ perceive themselves as leaders and decision makers in health care and that this self-perception is reified in the structures and processes of care. Reification means to project our understanding (an abstraction) as some ‘thing’ that exists. Building on this work, the RT’s silence can be interpreted as a reification of the position of physicians as leaders and decision makers.

The relationship between participation and reification described by Wenger (1998) offers a useful lens for interpretation of these findings and can help shed light on how power differentials and hierarchy in healthcare shape the hidden curriculum. When discussing this during the focus group, an RT colleague recognized the need for RTs to learn to ‘offer the service’ (RT-9), again, reifying the notion that the physician in training is the decision maker and has priority. A subsequent quote about implementation of the ‘Wednesday is RT intubation day’ (RT-9) rule can be interpreted as an attempt to balance power differentials through formalized structures of care. This rule was perceived as being useful to clarify the role of the RTs and to ensure that RTs had some protected time to carry out intubations and maintain their skills in the context of needing to provide residents with sufficient learning opportunities. The rule is a good example of a hidden curriculum that supports collaborative practice. The example also demonstrates how the different key influences — in this case context, power and learner engagement — interact and shape clinical experience.

It is important to note that the RTs did not consider or discuss the option of asking the resident to step aside. This was an action that the RTs most likely do not feel empowered to pursue, yet it is an action that would have reinforced the priority given to patient safety through collaborative practice and shared decision making.

Context: This study has revealed two aspects of the social context and how these influence the learning that occurs. The ICU culture (how things are done here) and the dual role of the resident (as service provider and physician in training) will be examined through a range of learning perspectives to explore issues of transferability and judgements of trust.

Culture. Findings suggest that there exists a culture of collaboration in this particular ICU. Given that the care that is provided in an intensive care unit is complex, often provided under time pressures and always by multiple professionals, teamwork and collaboration are necessary and opportunities to engage in it, and thereby learn, are abundant. Team members and residents alike often described learning as happening implicitly from observing and interacting with others. Two quotes will be discussed, to highlight how participants acknowledged the social aspect of learning but would fall back to the more conventional ideas about knowledge transmission to articulate it.

The first quote is provided by an RT who explains why it is essential for residents to recognize the importance of collaboration. This RT summed it up in the following statement: “And it boils down to behavior more than knowledge; because if you pay attention, the knowledge can come from the [people in the] room (RT-9)”. The participant’s statement seems to be founded on assumptions that knowledge resides in a person and is transmitted from one person to another. Two perspectives on learning can help analyze this particular statement. The first is the constructivist view that personal knowledge cannot be transmitted

from one head to another and is in fact always interpreted or ‘construed’ by individuals. From this perspective, our knowledge is always a subjective personal construction that dynamically evolves or ‘accommodates’ when new experiences cannot be explained by, or fit within existing understandings. From this perspective, paying attention to others helps us learn *not* because we can directly access the knowledge in their heads, but because what they do or say may prompt us to elaborate our existing beliefs (Dewey, 1956; Mann, Dornan & Teunissen, 2011).

A related, second perspective on learning that can shed light on the statement — specifically, the awareness that other people may play an important role in our learning — is social constructivism. From this perspective, learning is a function of participation in social activities in which knowledge is co-constructed among people; indeed, knowledge can be seen as distributed among participants and artefacts (eg: a patient’s chart, computer software, clinical resources such as a medication administration manual) (Eraut, 2000; Bleakley, 2006).

The second quote, again from the RT perspective, reflects a more relational view where learning through participation is seen as adapting behaviours to be consistent with the social norms. Respiratory therapists start by explaining that they mostly build rapport with residents through caring for patients with difficult-to-manage breathing problems and that it is through these interactions that residents get a better sense of their roles and expertise. They explain that residents will seek them out in the ICU if they are having difficulty managing a patient “Yeah they know where to find us ... They always wander over like "soooo..." [group *laughing*] ... Mister so and so...” (RT-7). Later-on in the discussion, the RTs conceded that when on service in other clinical units, residents do not consult them

directly; rather, they discuss issues with the nurse, who then relays the information to the RTs.

Socio-cultural theory offers a useful analytical perspective here. This view of knowledge as originating in our situated, social interactions was articulated first in the work of Lev Vygotsky (Davidov, 1995; Mann et al., 2011). This theory postulates that individual knowing is construed and given structure based on the larger social practices that we participate in and that learning cannot be divorced from the context and collective social processes in which it arises. The latter part of the RT discussion highlights the issue of transferability when learning is context dependent. Learning to participate and collaborate in a context where interprofessional collaboration and teamwork is part of the ‘convention of how things are done’ (albeit often implicitly) does not mean that the resident has gained an understanding of how to effectively collaborate with the same professional groups in a different setting.

Dual roles of residents. Team members experienced tension between getting the work done – providing care to critically ill patients – and dealing with a constant flow of ‘residents in training’ rotating through the ICU every 4 weeks. The structure of the ICU rotation is such that residents are asked to be the front line, ‘in-house’ physicians at night with remote supervision from the attending physician. This structure provides the learner with a wide range of opportunities to engage as a full participant in the critical care team. For the team member, this brings an additional burden of ensuring that the patient remains safe, particularly at the beginning of the rotation. Team members’ perception of the ‘good resident’ and associated expectations are formulated based on this context and are related to

the need to quickly establish a working relationship where judgements of trust are an important factor.

Findings in this study ('good resident' theme) were similar to what has been documented in the literature about trainee characteristics that influence supervisor judgements of trust. For team members, particularly nurses and RTs who work at night, the emphasis was placed on accuracy in residents' self-assessment of limitations (Ginsburg, McIlroy, Oulanova, Eva & Regehr, 2010; Papadakis et al., 2005) and a self-confidence that was tempered by a willingness to ask questions and take suggestions (Benabou & Tirole, 2003; Grant & Dweck, 2003). Although confidence was recognized as important (Brower, Schoorman & Tan, 2000; Brower, Lester, Korsgaard & Dineen, 2009), for team members who participated in this study, resident competence was considered an added bonus and not absolutely necessary for making a judgement of trust. That is, even if a resident was not perceived as competent to make all the necessary medical decisions or perform certain procedures, it did not prevent team members from trusting him/her.

Hauer et al. (2014) have proposed a model to explain the factors that influence trust and therefore decisions about independence and responsibility given to trainees in the workplace learning environment. The five factors identified were supervisor, trainee, supervisor-trainee relationship, context and task. In their description of how context contributes to trust, the authors describe elements of the workplace environment such as added responsibilities at night. But they do not recognize the potential influence of team members on the resident's performance in these circumstances nor the feedback that may or may not be provided to the residents' supervisor and how these interactions may influence judgements of trust.

Findings from this study suggest that ‘Good residents’ were more likely to be trusted and received implicit positive reinforcement such as collegial team members who were willing to work with them and who were generous in the information provided. Residents who were inaccurate in their self-assessment (‘know it all’) and who were unwilling to take suggestions may have experienced a very different learning environment. Overconfident residents attempting to ‘act as a physician should’ could alienate team members who may be less likely to collaborate. This could set-up a negative feedback loop that is counterproductive. Residents who value autonomy in decision making may interpret implicit negative cues of team members’ (overt frustration, forceful suggestions, forming of alliances) as a challenge to their authority rather than a measure to ensure safe patient care. Given the ample evidence of the limitations of self-assessment (Davis et al, 2006) and the possible alienation of team members, it is unclear how these negative feedback loops impact resident’s performance and assessment.

The learner. Engagement of the learner has been recognized as an important factor from the perspective of workplace learning (Billett, 2011; Eraut, 2004) and communities of practice perspectives (Lave & Wenger, 1991; Wenger, 1998). Findings in this study suggest that resident ‘motivation’ for engaging in [therefore learning about] collaborative practice during the ICU rotation was influenced by three main factors: a) their responsibilities as physicians in patient care situations, b) the perceived applicability for their future practice, c) their need to perform on rounds.

When faced with patient situations requiring medications or other interventions they were not familiar with, residents recognized the need to establish a relationship with team members based on mutual trust. In these situations, residents would seek input from team

members present at the time of crisis. Residents who recognized the expertise of team members may also have been more likely to engage in and experience the benefits of collaboration. Residents who recognized the need to gain a better understanding of specific interventions such as invasive ventilation modes and troubleshooting issues with ventilation would set personal learning objectives and make a point of consulting team members with expertise in the subject matter in order to meet their learning goals.

On the other hand, residents who did not perceive any applicability to their future practice setting, would simply consult appropriate team members and defer to their expertise when making decisions about patient care. This openness toward collaborative practice combined with an inaccurate understanding of their future practice environment raised concerns about the risk that some residents may not be learning certain basic skills they will need when they transition to their future practice setting. Pharmacists raised this concern, as most community hospital resources do not include clinical pharmacists to assist physicians. RTs also explained that ex residents have returned to the ICU for additional training when they recognized that certain physicians who work in a community hospital setting take a more active role in the management of ventilated patients. Finally, needing to perform during the ICU rounds and to debate the appropriateness of the medical plan was a strong motivator for residents to build a relationship, consult and establish good communication with the bedside nurse who would 'tell you where rounds are going to go'. One must wonder whether this openness to collaboration will change when the trigger (wanting to perform on rounds) is no longer relevant. A more in-depth understanding of effective collaboration may be important for residents so that they are better prepared to foster and participate in collaborative practice throughout their career.

Implication for PGME

The following section will explore the possible implications of this research for PGME. The first part explores potential ways to enhance how medical residents are taught about collaboration in the ICU rotation. The second explores the concern that residents may not be learning certain basic skills. And the third explores the possible influence of team members' contributions on judgements made about residents' readiness for independence and additional responsibilities, also known as the 'granting of entrustment'.

This study highlights that collaboration is context specific. This context includes the health care team members, their relationship with residents and how power differentials influence the learning environment. Team members participate in the socialization of physicians in training. Billet (2011) points out "... The majority of learning for occupations across humanity has, and still continues to occur through the circumstances of work" (p. 3). Gaining an appreciation of the nature of these contributions may therefore highlight areas for improvement not only for educating residents but for all health care professionals. In addition, residents' collaboration with team members influenced the content (what was taught); this content could range from specific knowledge and skills related to caring for critically ill patients (for instance, learning about the use of pulmonary artery catheters) to the benefits of collaborative practice (for example, shared responsibilities where the RT manages the ventilation and the dietician manages the patient's nutrition).

This context-dependence raises questions about transferability of learning to other settings. Billett (2000) suggests that it may be important for an expert co-worker to facilitate, help articulate and reflect upon experiences so that learners gain a deeper understanding. Rather than relying on residents implicitly learning about collaboration through participation alone, attending physicians may have a greater impact in helping to transform residents'

attitudes, knowledge and skills for collaborative practice by engaging in deeper discussions. These discussions could include reflections about the principles of collaboration and how they are applied in the ICU, or how power differentials influence working relationships and structures of care. Like other concepts discussed about the medical management of critically ill patients, the topic of collaborative practice can be discussed in relation to real patient cases and real situations where collaboration was effective or not. Billett (2011) points out that learning in the circumstances of work is an ongoing, lifelong process where practitioners apply and reinforce prior knowledge and engage in co-learning with their peers/colleagues. By encouraging and modeling reflective practice related to collaboration and teamwork, attending physicians would likely also have an impact on improving collaborative practice within the ICU team.

A second possible implication for PGME relates to the concerns expressed by team members about whether or not certain residents were learning the necessary basic ICU knowledge and skills. This may be compounded by the challenge team members face with balancing getting the work done and teaching. By including discussions about career plans when developing individual learning goals with residents, attending physicians may be able to recognize inaccurate self-assessment of learning gaps. This can lead to clarification of the roles of physician in other types of workplaces and the importance of gaining a good understanding of certain basic concepts such as pharmacotherapy for the management of shock, antibiotic stewardship, and causes of refractory hypoxemia and associated ventilation strategies. In addition, they may consider encouraging residents to share their learning objectives with team members who may have worked in these settings and could be helpful in identifying and taking advantage of important teaching moments.

A third possible implication for PGME relates to the judgements made about residents' performance during the ICU rotation and the granting of entrustment. Data in this study suggest that judgements of trust made by team members influenced their willingness to work with residents (e.g.: information sharing or relationship building). As well, in this particular ICU, attending physicians were receptive to concerns expressed by team members about residents. Expressions of concern were most often associated with lack of trust. The importance of trust has also been described in the medical education literature as an essential element of trainee supervision and learning in the workplace but has been limited to the relationship between supervisor and trainee (Hauer et al, 2014). It is unclear how much of an impact team members' behaviours and expressions of concern about residents contribute to judgements made by attending physicians (supervisors) about residents' performance or entrustability. Do these positively or negatively influences the validity of judgements made? More research should be conducted to better understand its impact.

Limitations of the study

There were a number of limitations to this study. The inability to recruit dietitians, physiotherapists and nurses with less than 5 years' experience means that their perspectives are not represented in the data set. In addition, attending physicians (who supervise residents during the rotation) were not included in the study therefore their perceptions – of how the team members' expressions of concern or their observations and interpretation of resident/team members' interactions when giving feedback to residents – could not be explored.

The researcher's prior relationship with some of the participants (from the site where she is employed as a staff nurse) may have resulted in constrained responses. It is possible

that participants refrained from mentioning some information or examples that may be controversial or that had the potential of being perceived as unprofessional to one of their peers; that is, they may choose to divulge only information that is in keeping with the beliefs/values they perceive to be held by the researcher. Finally, for pragmatic reasons, the study is limited to participants' *perceptions* of the contributions made to educating residents; it did not attempt to fully describe and define the contributions *actually made* in the education of residents during their ICU rotation nor the impact on learning.

Conclusion

In conclusion, this study adds to the literature on contributions made by team members in the education of residents in the workplace setting, more specifically in the ICU rotation. Non-medical members of the health care team and residents alike believe that, during the ICU rotation, team members contribute to the residents' education about collaborative practice. Contributions were made implicitly through participation in the everyday business of caring for critically ill patients as well as explicitly when taking advantage of certain patient situations. Elements of collaboration that were reinforced included clarification of roles and responsibility, sharing of expertise, and helping residents assimilate and navigate the ICU specific workflow. The teaching and learning that occurs concerning collaboration and team work during the ICU rotation is influenced by the context of the ICU rotation which includes interactions with team members, the tension that exists between getting the work done and teaching, the expectations of team members towards residents, engagement of the resident, and the overarching influence of power and hierarchy. Resident/team member interactions and team member expressions of concern about residents are subject to the same influences.

This study also highlights three important cautions that could be considered and further explored in an attempt to improve PGME. What residents learn about collaborative practice and team work during their ICU rotation is context-dependent, may be superficial and have limited transferability to other settings. Engaging in thoughtful discussions about IPC may better prepare residents for ongoing collaboration in future practice. Residents need to learn certain basic skills in their ICU rotation for future practice. Ironically, there is a risk that highly collaborative teams may shelter residents from this necessary learning, especially if the resident doesn't appreciate the need to acquire those skills. Finally, observed interactions between team members and residents by attending physicians, and expressed concerns by team members about residents (subject to the same key influences described in this study), may impact the validity of judgements made about entrustability and about the residents' performance.

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Table 4: Contributions made by team members

INTERPROFESSIONAL COLLABORATION CURRICULUM				
Team members' perspective				
Contributors	Content (Element of IPC)	Exemplar quotes	Strategies used	Key influence
SW, RT, PharmD, RN	Contributions made to the knowledge and skills of the resident were related to each professional group's expertise.	<p>I do a lot of teaching on power of attorney and substitute decision makers and helping them understand what the hierarchy is of the substitute and decision makers and, um, public guardian and trustees, a lot of them don't know what public guardian or trustees are. -SW-</p> <p>Residents will come and seek me out outside of rounds because they don't feel comfortable asking silly questions in front of their fellows or staff or colleagues. -PharmD-1-</p>	<ul style="list-style-type: none"> - Planned formal sessions - 'Just in time' informal teaching moments 	<ul style="list-style-type: none"> - Context - Balancing work and teaching - Good/Bad resident - Engagement - Power and hierarchy
SW, RT, PharmD, RN	Role clarification was mentioned most frequently. For most team members, the need for clarification was related to the residents gaining a better understanding of their scope of practice.	<p>But sometimes when we have trouble ventilating a patient and they have to get involved and they're like: Oh, you guys did a lot of work we were not aware of. -RT4*-</p> <p>RN3*: You [the residents] got to wonder [think of] the educational level on the other side. Um, ok you want me to D/C the chest tube? ... I don't think so! It's not my scope of practice. RN4*: Yeah, I think what your trying to say is that they need to learn what our scope of practice is.</p>	<ul style="list-style-type: none"> - Planned formal sessions - 'Just in time' informal teaching moments - modeling - formalized processes - Implicit through participation 	<ul style="list-style-type: none"> - Context - Balancing work and teaching - Power and hierarchy
SW, RT, PharmD, RN	There were also examples of encouraging residents to consult other team members.	<p>I try to make myself present and as the month progresses you can see them using me more. The nurses will often direct them to write a consult but the nurses tend to write the consults. But they do talk about this in rounds, like [Social worker name] should do this or we should get [Social worker name] involved or... -SW-</p>	<ul style="list-style-type: none"> - 'Just in time' informal teaching moments - modeling - formalized processes 	<ul style="list-style-type: none"> - Context - Engagement

<p>SW, RT, PharmD, RN</p>	<p>Conflict resolution was described by all professional groups (including residents). When disagreement about the plan of care was not resolved through debate based on rational, the team would defer to the attending physician for a final decision.</p>	<p>... so that hierarchy exist within our team. And, I think that despite that; [pause] decisions are made by a group process. In our ICU at least, everybody who wants to have a voice, can have a voice. -PharmD-1*- I think it is fellow or staff [Attending] who make the bottom line decisions. -SW-</p>	<ul style="list-style-type: none"> - modeling - formalized processes - implicit through participation 	<ul style="list-style-type: none"> - Good/Bad resident - Power and Hierarchy - Mixed messages
<p>RN, RT</p>	<p>The importance of ensuring good communication with team members about new consults and plan of care was stressed.</p>	<p>I just keep telling them. You got to talk to us. I can't read your mind, I don't know that you're in emerge seeing a patient. Call me, I have this phone, it's in my pocket, I have it all the time. It has the same phone number. -RN6*- Um, definitely the importance of communicating to everybody. Um, maybe what your goals are, what your plan is... -RT1*-</p>	<ul style="list-style-type: none"> - Planned formal sessions - 'Just in time' informal teaching moments - formalized processes - implicit via participation 	<ul style="list-style-type: none"> - Context - Good/Bad resident - Power and hierarchy
<p>SW, RN</p>	<p>Certain team members talked about pointing out when the residents needed to collaborate with physicians from other services.</p>	<p>... generally speaking I really encourage the communication with GPs because they're always trying to invent stuff out of nothing, I'm like, why don't you go to the people that know this patient best? -SW-</p>	<ul style="list-style-type: none"> - 'Just in time' informal teaching moments 	<ul style="list-style-type: none"> - Context - Good/Bad resident - Power and hierarchy
<p>SW, RT, PharmD, RN</p>	<p>Other elements of IPC such as relationship building, willingness to work together and trust were evident throughout the discussions of participants.</p>	<p>Well trust I guess is a, you know, a feeling of confidence in each other's abilities. So it's basically proving yourself in the other person's eyes. So making yourself available, making yourself non-confrontational. Like all you can do is I can just present myself as a professional, I try and be light hearted and supportive. -SW- I think most of us are, you know, quite open, you know, and willing to work as a team and if anybody has any questions or need any guidance from us, you know, for the most part, were quite, you know, open and welcome and you know ... happy to provide that. -RN2*-</p>	<ul style="list-style-type: none"> - modeling - implicit through participation 	<ul style="list-style-type: none"> - Context - Balancing work and teaching - Good/Bad resident - Engagement - Power and hierarchy

Resident perspective				
Contributors	Element	Exemplar quotes	Strategies used	Key influences
SW, RT, PharmD, RN, Dietician	When asked what they were learning from team members, the residents gave examples of receiving pertinent information about their patients or gaining new knowledge and skills related to the management of patients. Learning from dieticians and social workers was felt to be limited to occasional specific situations.	<p>I think probably when everyone starts their ICU rotation, they feel a lot less comfortable with the vent settings, and the airway. And all of the new and interesting things that they use like you know, tracheostomies and different types of ET tubes and all these things. So it's like a grey zone, a black box for us, so, and RTs are the experts in that so. I ask lots and lots of questions to the RTs and they're always very receptive and have really good explanation and are very very, know a lot about the physiology and, just, I've learned a lot of them, more than anything else I think. -Resident6*-</p> <p>Well they [social workers] know a lot more also about the family dynamics like we said the nurses do. - Resident3*-</p> <p>Overall I find they [Dietician] just take care of it for us, to be honest. Unless you seek out the very specific. - Resident3*-</p>	<ul style="list-style-type: none"> - 'Just in time' informal teaching moments - Implicit through participation 	<ul style="list-style-type: none"> - Context - Good/Bad resident - Engagement
Physio	When it came to contributions from physiotherapists, the residents did not feel that they learned from this group.	<p>They're not with us on rounds. ..., what they do is technically more for planning for discharge, we're not, it's not so close to be an issue for us, is what the patient's ambulatory status is or if they're able to do active or passive range of motion only if it impedes their progress from the ICU. Which is not typically a mobility issue. - Resident4*-</p>	Not applicable	<ul style="list-style-type: none"> - Context - Engagement
<p>*Each number following the professional designation represents a different person. Professional designations: RN: Registered nurse, RT: Respiratory therapist, PharmD: Clinical pharmacist, SW: Social worker, Physio: Physiotherapist.</p>				

Statement of contributions

Angele Landriault (student): Elaborated the research question, conducted the review of the literature, drafted the thesis proposal, application to ethics, data collection and analysis and wrote the manuscript.

Angus McMurtry, thesis supervisor provided guidance and advice for the development of the research proposal and approved the research plan, provided consultation during the analysis and contributed to the intellectual content of the manuscript.

Colla Jean MacDonald and Frances Fothergill-Bourbonnais provided input on the development of the research proposal, approved the research plan and manuscript, participated in meetings and acted as jury members for the thesis defence.