EVALUATING INTERPROFESSIONAL COLLABORATION IN MEDICAL HOME OFFICE STAFF FOLLOWING AN EDUCATIONAL AND EXPERIENTIAL INTERVENTION: A CLUSTER DESIGN STUDY

A DISSERTATION

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BY

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To the Dean of the Graduate School:

I am submitting herewith a dissertation written by Janet Treadwell entitled "Evaluating Interprofessional Collaboration in Medical Home office staff following an educational and experiential intervention: a cluster design study." I have examined this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy with a major in Nursing Science.

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ABSTRACT

JANET TREADWELL

EVALUATING INTERPROFESSIONAL COLLABORATION IN MEDICAL HOME OFFICE STAFF FOLLOWING AN EDUCATIONAL AND EXPERIENTIAL INTERVENTION: A CLUSTER DESIGN STUDY

DECEMBER 2014

The aim of this study was to explore if an educational and experiential intervention supporting interprofessional collaboration in medical home practices would positively impact perceptions of team members on interprofessional collaboration. Education and action supporting interprofessional collaboration (IPC) behaviors was selected for research due to the potential positive impact on the quality of care and resulting safety of patients. An experimental cluster study involving a sample of 50 medical home practices, from a population of 254, received education and support one hour a week for 12 weeks. Team Stepps Primary Care Version was the evidence-based curriculum used in 25 intervention practices. The curriculum was coupled with an opportunity for team members to apply the Team Stepps methods through a quality improvement project specific to the needs of the individual sites. The 25 attention control practices also received 12 hours of contact using the evidence-based curriculum of Energize Our Families and monitoring team members' application of the tools. At the end of the 12week period the Assessment of Interprofessional Team Collaboration Scale

was taken by individual participants within the practices. The respondent tool completion rate was 90%. A statistically significant difference was found comparing total tool scores of the two groups (p=.000). There was not a significant difference in demographics between the intervention and attention control practices finding the majority of respondents to be female and in employment at the practices 3 or less years.

Conclusions to be drawn from this research include perceptions of interprofessional collaboration can be positively impacted through education and experience. Nurses in medical home practice roles of staff nurse, advanced practice nurse, or care coordinator can be facilitators of team training as well as benefit from the awareness of the benefits of mutual respect and clear communication. Team members with expanded awareness and positive perception of partnership/shared-decision making, and coordination, may engage in collaborative activities across roles. Given the limitations of size and setting there is a need to replicate the study to ensure that the findings are applicable across diverse settings.

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CHAPTER I

INTRODUCTION: INTERPROFESSIONAL COLLABORATION

The healthcare system is in a state of change, responding to challenges to ensure patient safety, meet workforce requirements, address the lack of primary care access, and to optimize the contributions of individuals with professional licensure. One approach to positively impact existing quality and financial concerns of the present delivery model is interprofessional collaboration (Mitchell, Parker, Giles, & White, 2009). Interprofessional collaboration (IPC) supports professionals to work to their maximum professional education and experience by focusing on the benefits of interdependence it fosters workforce retention, which improves patient access amidst the changes of reform (Stubenrauch, 2011).

Medical homes, a foundational element of new models of health care delivery, have the challenge of moving from an autonomous practice approach to a team based practice approach (American Academy of Child & Adolescent Psychiatry Practice, 2013). Historically, the professional hierarchy in health care has been a barrier to collaboration and positive teamwork outcomes as individuals tend to communicate based upon status to avoid hierarchy disruption (Lichtenstein, Alexander, McCarthy, & Wells, 2004). Team-based care is an integral part of the medical home concept because it is critical to quality and efficiency (McAllister, Cooley, Van Cleave, Boudreau, & Kuhlthau, 2013).

The benefits of effective teamwork include high function associated with decision-making, coordinated actions and appropriate use of expertise (Grumbach & Bodenheimer, 2004). The Institute of Medicine Future of Nursing report gave nurses a call to action to "expand opportunities for nurses to lead and diffuse collaborative improvement efforts" (Institute of Medicine, 2011, pS-9).

An initiative to address healthcare facility issues of poor collaboration, highlighted in the To Err is Human report (Institute of Medicine, 1999), was the 2006 release of TeamSTEPPS, a joint research project by the Department of Defense and the Agency for Healthcare Research and Quality (King et al., 2008). The researchers, inclusive of nurses, developed educational modules addressing areas of leadership, situation monitoring, mutual support, and communication that were initially applied in hospital interventions. In 2013, a primary care version was released (AHRQ, 2013). This training, applicable for medical homes, continues with the same four areas of content using applicable situations and team composition considerations present in primary care environments as the developers note the training is most effective when realistic situations are reenacted that provide opportunity for learning and skills reinforcement (King et al., 2008). Embedding use of skills learned in TeamStepps training can be facilitated through use of the Plan-Do-Study-Act cycle as this format includes developing a shared aim, team roles, and development of change within a work setting (Langley, Nolan, Nolan, Norman, & Provost, 2009). Nurses, who fulfill medical home roles of care coordinator, primary care practitioner, and practice nurse, have an investment in building

a collaborative environment across roles for issues of patient safety as well as role satisfaction. Because nurses often function as collaborators they can be key staff in facilitating skills improving interprofessional working in medical home environments. There is a need for evidence that nurses are effective in meeting healthcare challenges when they lead efforts to establish team based practice in medical homes

Primary care research on IPC has predominately focused on the role of physicians as seen in the work by Laird et al. (2011) and Goldman, Lawrie, and Reeves (2010), and between nurses and physicians as demonstrated in a study by Carney, West, Neily, Mills, and Bagian (2010). Missing in the literature is an evaluation of the impact of IPC use in medical homes in an experimental research study of the effect of IPC training for all roles within the medical home environment.

Rationale

It is important to conduct research about facilitators of interprofessional collaboration to increase our understanding of the fundamentals of effective teamwork to effectively respond to the healthcare reform focus on medical homes, emphasizing the contribution of individuals across disciplines and roles who come into contact with patients. Understanding how education can support and enhance interprofessional collaboration may provide teams with insight into their current level of collaboration and their further development needs. The medical home delivery model is a response to the rising need for primary care access that includes various disciplines in a practice setting. The model recognizes that a single profession does not have the capacity to address all

needs of patients in an efficient and effective manner (Xydrias & Lowton, 2007). Therefore, medical home sites are ideally suited for the study of issues related to interprofessional collaboration.

Interprofessional collaboration is defined in this research as interaction occurring when teams, formed of individuals from two or more healthcare roles, focus on achieving mutual goals and outcome improvements through a practice model of mutual respect, accountability, clear communication, and shared decision making. In a literature review several components and settings of interprofessional collaboration and educational interventions were identified. Reeves et al. (2008) reviewed existing research and determined that interprofessional collaboration provides the component of practice transformation and positive impact on outcomes. Role satisfaction gain, another outcome, was found among nurses working in teams with an interprofessional collaboration model. This outcome indicates that interprofessional collaboration supports the goal of workforce retention (Kim, Lowe, Srinivasan, Gairy, & Sinclair, 2010). Burzotta and Noble (2011) found interprofessional collaboration promoted an improved sense of professional identity. Attributes contributing to interprofessional collaboration include role clarification, role valuing, trusting relationships, shared decisions, and shared power (Orchard, King, Khalili, & Bezzina, 2012). The majority of IPC studies have been hospital based, primarily using convenience samples composed of student participants. One such example, applicable to this study, is a qualitative study by Robichaud et al.

(2012) who found that use of a quality improvement project fostered interprofessional collaboration.

Research measuring interprofessional collaboration following an education intervention found improved appreciation for collaborative benefits (Fothergill, Northway, Allen, & Sinfield, 2011), as well as improved attitudes of practitioners toward each other (Curran, Sargent, & Hollett, 2007). In an improvement intervention on rounding, training in interprofessional collaboration techniques were found to improve self-efficacy and the valuing of nursing input (Laird et al., 2010). Safety and quality concerns have been found to diminish through collaborative practice due to improved communication across roles and enhanced understanding of accountabilities (Agency for Healthcare Research and Policy [AHRQ], 2013).

Fragmentation of the United States healthcare system produces risk unacceptable to most Americans. Issues of safety, cost, and access due to poor collaboration present barriers to delivery of patient centered care and optimal outcomes. Since the Institute of Medicine Report, To Err is Human (1999), healthcare practitioners have understood the necessity to focus on collaboration as reflected in professional, legislative, regulatory, and accrediting entities addressing the issue in standards and position statements. As an example, The Joint Commission addresses requirements of clear communication and teamwork to support patient safety and professional satisfaction and the National Committee on Quality Assurance has integrated collaboration across professions into medical standards, including elements of communication, and shared care planning. The

Patient Protection and Affordable Care Act specified collaborative initiatives such as health homes and nurse-managed clinics (Gardner, 2010). The Affordable Care Act designates medical homes as a preferential delivery model for primary care with the goal to overcome barriers to access and quality care. Research on the impact of interprofessional collaboration (IPC) education and experience on medical home team member perceptions of interprofessional collaboration has the potential to inform on performance areas of care coordination, partnership, shared-decision making, and cooperation. These elements have association with increased patient access, safety, role satisfaction, and workforce retention in health care environments.

Theoretical Framework

The foundational theory for this study is John Kotter's change theory. Kotter's theory of change (Figure 1) was the basis for development of the TeamSTEPPS Primary Care curriculum (AHRQ, 2013). In relation to organizations undergoing change such as medical home practice settings, Kotter speaks of teamwork as an essential ingredient, recognizing the value of cross-discipline communication and the expertise of each individual. Kotter also states that the complexity and number of transactions involved in healthcare delivery requires accountability and inclusion of individuals in all roles in healthcare systems to achieve improvement as an organization (1996). Kotter puts forth that the composition of and trust between team members is foundational for an effective team that will communicate effectively, initiate and ingrain change into a culture, and practice in a safe manner. Creating the team is the second of Kotter's eight steps to

change, right behind creating the sense of urgency to recognize the need for change. Implementation of the TeamSTEPPS intervention in this study correlates to Kotter's theory component of team building and use of teams to promote successful change and an organizational culture of open communication, accountability and shared decision-making (Figure 2.). Implementing TeamSTEPPS encompasses building a change team and creating vision and values through the educational effort. Outcomes measurements include team member perceptions of communicating and engaging, empowering others, and noticing improvements. In application of Kotter's theory to medical homes and training on interprfessional collaboration, patient-centered care coordination would be the consolidating outcome of the change. Therefore, when team members are positive about the changes that result from the nurse-implemented TeamSTEPPS, consolidation of skills and information will occur to improve patient outcomes.

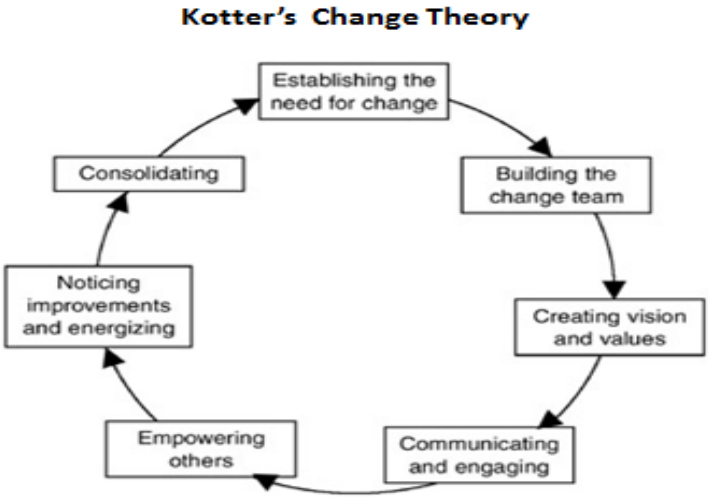

Figure 1. Graphic of John Kotter's Change Theory

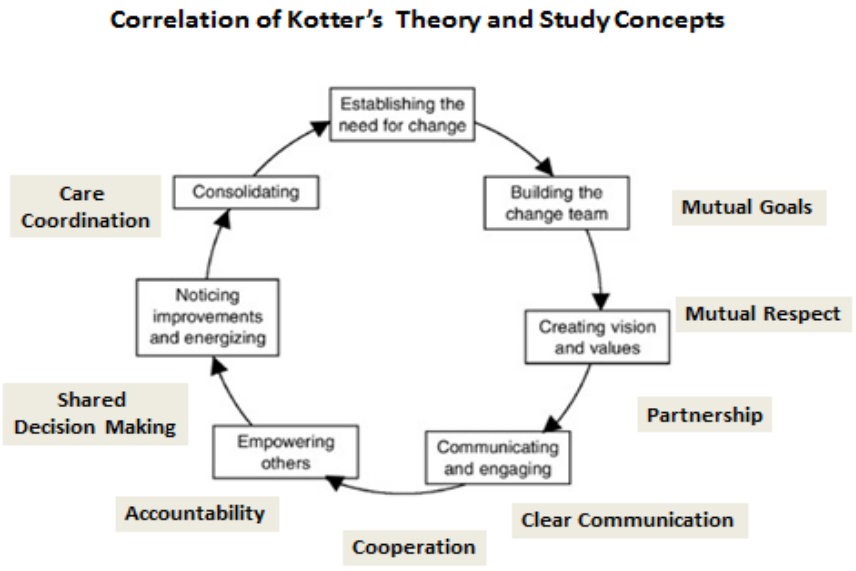

Figure 2. Kotter's Change Theory in Relation to Study Concepts

Assumptions

Assumptions of this study include that medical homes will continue to be an important vehicle of healthcare delivery, that the theoretical concepts and study variables are related, and that study participants will truthfully complete the study tool. There is justification for the premise of a continuation of medical homes due to existing legislation and a market access need. The paradigmatic assumption is that the study theory and variables correlate, leading to an ability for replication and generalization of findings. Kotter's steps of creating a team, and using values and communication to move a group to transformative change, align to the interprofessional collaboration attributes of mutual respect, clear communication, accountability, and shared decision-making. It is an assumption that individual participants will respond with truthfulness when

completing the outcome tool because they are aware the resulting data will be reported in aggregate form and that no individuals will be identified in the findings reports.

Study Aims and Hypothesis

The purpose of this study is to gain an understanding of the impact interprofessional collaboration training and application experience, implemented in medical homes, has on increasing the perception of interprofessional collaboration behaviors among medical home team members. Specifically, this study will investigate the relationships between interprofessional collaboration as measured through the Assessment of Interprofessional Team Collaboration Scale in medical home team members receiving, and not receiving, both targeted collaboration education and an integrated practice opportunity. The education intervention provides the appropriate environment to facilitate interprofessional collaboration, enabling the evaluation of participant perceptions in the medical home clusters. The hypothesis was that healthcare team members from medical homes who receive nurse facilitated interprofessional collaboration training and quality improvement project support will score higher on an assessment of interprofessional team collaboration within their team, compared to the healthcare team members in the attention control group.

Definition of Terms

Healthcare Team Member: individuals with patient contact, working in the same primary care medical home setting.

Medical Homes: primary care practices responsible for health care needs of medically underserved/vulnerable children located in the Harris Texas Medicaid service area contracted with one health plan and assigned more than 500 patients.

Interprofessional Collaboration Training: TeamSTEPPS Primary Care Version nurse facilitated curriculum (AHRQ, 2013).

Quality Improvement Project: a team-selected topic for improvement requiring involvement of all team members, implemented through a Plan-Do-Study-Act method integrating TEAMSTEPP skills (Best &Neuhauser, 2006).

Attention Control: Energize our Families facilitated curriculum and ongoing support of nutrition and activity skills into practice operations using handouts (U.S. Department of Health and Human Services, 2008).

Assessment of interprofessional team collaboration: a measure of perceptions of team working as measured through the Assessment of Interprofessional Team Collaboration Scale (Orchard, 2013).

Limitations

There are several limitations related to the study design. The generalizability of the findings is limited because only one geographic region is utilized and the participating sites are all medical homes operating primarily in the medically underserved market of Medicaid and Children's Health Insurance Program. Team members' perceptions are only collected after the intervention and thus the findings rely on their being able to accurately compare differences between the time before and the time after

the intervention. An additional limitation is the cross-sectional design of the study. The decision to perform only a post-test was made to prevent a testing bias for the intervention and attention control participants that could impact the internal validity of the study. Additional issues of role satisfaction or of changes in the expense of patients assigned to the clusters of medical homes before, compared to after, the intervention are not evaluated in this study. However, evaluation of those factors would provide a more robust assessment of the results of interprofessional collaboration in medical homes. Despite these limitations, this study is expected to contribute meaningful information to our understanding of the outcomes of the intervention.

Summary

Research supporting interprofessional collaboration will drive increased opportunities for nursing intervention and research, an inclusive culture of practice, improved team member satisfaction, workforce retention, and improved patient access to needed care. Research on medical home interprofessional collaboration across commercial and public reimbursement models is valuable for increasing our understanding of effective health care delivery models. There is a need for research on the efficiency and effectiveness of care in medical homes when it is provided using a model of interprofessional collaboration to establish medical homes as delivering effective care as envisioned in health care reform. This study is a response to that need.

CHAPTER II

AN INTEGRATIVE REVIEW OF INTERPROFESSIONAL COLLABORATION

A Paper Submitted For Publication in the Association of Managed Care Nurses Journal

Janet Treadwell

The status of the United States healthcare system is not acceptable to most Americans. Issues of cost, safety, and access present barriers to optimal health outcomes. The need to strengthen programs and services was made obvious in the Institute of Medicine Report, *To Err is Human*[1]. This startling report had a prominent recommendation to focus on collaboration. A slow but steady movement toward interdisciplinary teamwork and communication has occurred since that time supported by professional, regulatory and accrediting entities. The National Quality Forum's Nursing-Sensitive Care Performance Measures from The Joint Commission specifically address collaborative environments. In their report *Advancing Effective Communication, Cultural Competence, and Patient- and Family-Centered Care: A Roadmap for Hospitals,* the Joint Commission speaks to the need for clear communication across the workplace to support patient and professional satisfaction.[2]

Similarly, the National Committee on Quality Assurance, which accredits Patient-Centered Medical Homes, measures interprofessional collaboration as a requirement including elements of communication, role definition and shared care planning across team members.[3] On a more comprehensive basis, goal five of the Affordable Care Act

aims at strengthening human service infrastructure specifically calling out innovative collaborative initiatives. Healthcare reform legislation specifies team-based clinical practice sites of health homes and nurse-managed clinics where nurses can fill key intercollaborative roles.[4] The overall trend is an effort to change the culture of care delivery by incorporating collaborative requirements with economic bearing on healthcare organizations.[5] Interprofessional collaboration is not only an organizational or economic issue however as it also has a professional impact.

The Institute of Medicine Report, The Future of Nursing, promotes interprofessional collaboration giving nursing a call to action to "expand opportunities for nurses to lead and diffuse collaborative improvement efforts."[6] The Affordable Care Act requires a decrease in cost while balancing an increase to access when specifically for primary care, a deficit in professionals delivering preventive services already exists.[7] Nurses can be a solution to that deficit. A foundational element to that change is interprofessional collaboration due to its ability to impact quality and financial outcomes.[8] Leaders across the United States are seeking solutions for care models and educational approaches to arm professionals with the skills to perform with upmost quality and efficiency. The Interprofessional Education Collaborative Expert Panel as documented in the *Core Competencies for Interprofessional Collaborative Practice* has addressed the need for professionals to develop opportunities for deliberate collaborative practice working toward a common goal of patient-centered care within delivery models

such as medical homes.[9] To implement transformational operational changes, culture must also change.

Healthcare reform and professionalism has fueled the need for interprofessional collaboration (IPC), but so has the drive for individual role satisfaction. IPC relates to nursing as it supports working to maximum professional education and experience, focusing on the benefits of interdependence.[10] Orchard discusses the bearing of transparency in care team role and scope to bring satisfaction and professionalism to practice.[11] There is a need for satisfaction among nursing professionals to maintain and attract individuals in the workforce as well as a need to build on the significance of the role of nursing in leadership of innovative models of care supported by nursing science.[6]

Dr. Jean Watson has put forth a theory of Caring Science inclusive of professional relationship-centered care. In her theory, Dr. Watson posits how the actions of the team impact healing of patients and therefore the need for disparate professions to honor what each profession brings to the collective process of health care delivery.[12] The Caring Science approach includes team affirmation of shared values, a respect for others' talents, open communication, and congruence in action.[13] Dr. Watson collaborated on the build of a matrix of the categories of role and function to illustrate practitioner-practitioner relationships in the areas of knowledge, skills, and values. This practitioner framework includes awareness of self in relation to others, knowledge and diversity from others' work, building a caring team, communicating teams and supporting work dynamics of shared responsibility.[13]

The aim of this integrative literature review is to present the state of the science and synthesize existing research focusing on the role and function of interprofessional collaboration within a clinical setting and the bearing of those factors on professional satisfaction.

Questions guiding the review process were:

1) What are conditional factors for IPC in clinical settings?
2) Is there a difference in role satisfaction of nurses where the environment is engaged in IPC as compared to environments not using IPC components in practice?

LITERATURE SEARCH STRATEGIES

An iterative approach to this integrative review included evaluation of quantitative and qualitative empirical studies in an effort to provide a comprehensive understanding of the phenomenon of interprofessional collaboration in the clinical setting. Search was made of the databases of Medline, Health Source Nursing Academic, and the Cumulative Index of Nursing and Allied Health Literature (CINAHL) using keywords "interprofessional collaboration" with parameter years of 2009-2012. Keyword combinations adding the term "clinic," "communication," "medical home," pediatric," "family practice," narrowed the article volume to support the aim of this review. Filtering articles to address clinical and operational relevance to the aim, an integrative review method of data reduction was applied. Hand searching of select journals and the use of an ancestry approach from reference lists of selected articles identified two studies

included in the review. An initial review of abstracts from the searches revealed country of origin and study setting. Articles relative to the aim focusing on aspects of role and function were included if conducted in a clinical setting. All selected articles appeared in peer-reviewed journals. Exclusion criteria included studies not published in English, studies outside the designated time period, theoretical studies, dissertations, studies conducted using students, and literature reviews (Figure 1). Resulting articles from the focused elimination resulted in twenty-six relevant studies.

DATA SYNTHESIS

The product of the reduction phase contained primary source studies utilizing a variety of research methods including: case study, experimental, phenomenology, grounded theory, ethnography, instrument-development, and mixed-model design. Studies were reviewed for weakness as well as contribution although no study was excluded due to reason of poor study design. Descriptive qualitative designs were the predominant research method seen. Four of the twenty-six selected articles used a combined qualitative and quantitative design.[14, 15, 16, 17] Quantitative designs were selected for use in five included studies due to relevance to the review aim of identifying conditional factors for IPC in a clinical setting.[17, 18, 19, 20, 26] Case studies fitting the review criteria included Burzotta and Noble's singular case analysis and Richer, Richie and Marchionno's multi-case approach.[21, 22] Four studies using ethnographic methodology met the inclusion requirements. [23, 24, 25, 15]

Twelve articles utilized the predominant approach of thematic analysis. Studies meeting the inclusion criteria using the design of phenomenology included articles by Burzotta and Noble as well as Upenieks, et al.[21, 16] Quantitative approaches evidenced in the studies included a pretest posttest design used by Curran et al. and Laird et al. and cross-sectional factor validation for instrumentation development used by Upenicks et al.[14, 17, 16] Experimental correlational design was the chosen methodology for Kenaszchuk et al. while a quasi-experimental design was used in the selected study by Johnson and Kring with a non-experimental correlational design chosen by Carney et al.[20, 26, 18] Descriptive designs were used by Rubio et al. and Chong, Aslani and Chen.[27, 28] Grounded theory was used in research studies conducted by Russell, et al., Murray-Davis, Marchall, Wright et al., and Gordon, and Weller, Barrow, and Gasquoine.[15, 29, 30, 31]

Categories extracted included, year of study, place of study, aim, methodology, setting, sample size, findings and limitations. The geographic location of research was included due to relevance on healthcare system structure and cultural influences on healthcare models and use. As the iterative review of study abstraction proceeded, creation of a data display matrix provided visual correlations (Appendix A). Sample size for the qualitative studies ranged between 1 and 436 participants.[20, 29] Fourteen of the fifteen qualitative studies had less than 103 participants. Quantitative studies reported samples sizes ranging from 28 to 3,725 participants.[19, 14] Five of the six studies had greater than 362 participants. Included empirical studies had convenience samples used.

Reported findings were predominately completed in Canada [14, 34, 33, 23, 22, 15, 35, 30] The United States was the site of six studies including those authored by Carney et al.; Laird et al.; Mellin et al.; Robinson, Gorman, Slimmer, and Yudkowsky; Johnson and Kring; and Upenieks, et al.[18, 17, 36, 5, 26, 16] Four studies from England sites met the inclusion criteria.[21, 37, 20, 29] New Zealand and Australia, had combined representation of six articles.[28,25,32,24,31] An additional article came from research conducted in Spain, and another in Norway,.[27, 19] Settings for the studies included hospitals, primary care, behavioral health, and outpatient centers (Table 1). Within hospital settings, there was representation from intensive care, general medical-surgical, maternity, and oncology units. Multiple professions were included in the studies with the predominant professions being nurses and physicians.

Twelve included studies had theoretical frameworks identified in the background description. Burzotta and Noble used Jasper, Curran et al. related Kirkpatrick, Laird et al. discussed the Biopsychosocial model, and McDonald et al. associated to the Competing Values Framework.[21, 14, 17, 25] Mellin et al. chose to relate their study to Bronstein, Piquette et al. to Robson, and Rice's study aligned to Straus.[34, 33, 23] Richer et al. supported their study with the work of Ackerman, Robinson et al. to Bascher, Stein and Liaschenko to Fisher and Upenieks to Vincent's safety model.[22, 24, 16] Chong, Aslani and Chen used the framework of Legare in their research.[28] Inconsistent carryover to the discussion section occurred across articles. Sixteen studies reported ethical approvals or considerations. Articles not including reference to Institutional Review Board evaluation

included Burzotta et al, Carney et al., Mills et al, Reiger and Lane and Robinson et al.[21, 18, 32, 38, 5] Eighteen of the studies described limitations of sample size, response rate or site that might have bearing on validity or results for application in other settings. Only the studies of Burzotta and Noble, Carney et al., and Reiger and Lane did not mention study limitations.[21, 18, 38]

The articles were representative of the state of the science of interprofessional collaboration and relevant for the aims of the review to examine role, function and satisfaction of IPC in clinical settings. Studies addressed stated objectives of professional perception of the experience of IPC or components of the process. Burzotta and Noble explored the knowledge gain from other professionals occurring during provision of seamless care.[21] Carney et al. found an increasing confidence among professionals subsequent to interprofessional working while Murray-Davis found educational preparation important to shared partnership.[18, 29] Teamwork differences in IPC, discussed by Piquette et al., surveyed the differing needs among professions for communication and Reiger et al. recognized tensions in teams associated with role boundaries.[33, 38] The effects of IPC training for practice improvements and defining measureable benefits of IPC were included as aims of three selected studies.[20, 17, 32] These researchers agreed that understanding of roles and clarity of communication were important for elevating practice, delivering effective care and retaining the health care professional workforce as did the research of Chong, Aslani, and Chen, and Rubio-Valera et al.[31, 27]

Five themes of role and function surfaced across the twenty-six studies which correlated to Watson's practitioner-practitioner relationship categories of role and function (Figure 2). Mutual trust, professional accountability and role clarity were themes correlating to role and shared problem solving and clear communication were identified functional themes. There were twenty instances where findings solidified around issues of cultural accountability to the team and self for cohesion and collaboration. The sole exception came from a study by McDonald et al. where focus was at the higher level of organizational interaction.[25] The importance of role understanding across professions was stressed by Curran et al., Rice, et al., Chong, Aslani, and Chen, and Weller et al., agreeing on the need to recognize differences in priorities across professions so commonalities of practice goals can be fulfilled.[14, 23, 28, 31]

The function of communication was the most prevalent of identified themes. Laird et al. noted that experience and divisive training contrary to IPC would need communication for resolution.[17] Clancy, Gressnes, and Svensson saw an association in communication in relation to the size of communities in which professionals practices.[19] Robinson et al. explored the attributes of effective communication in enhancing IPC and Sinclair et al. examined communication structures that facilitated IPC communication.[5, 28] Shared decision making was put forth as important by Mellin et al., and Chong, Aslani, and Chen as an important way to take advantage of the skills and knowledge of each profession bringing an enhanced result through joint decision-making.[36, 28] Shared mental models in were discussed by Carney et al., and Weller et al. achieved from

activities of co-rounding and briefings.[18, 31] Shared problem solving as an interactive process resulting in shared insight provides a framework for IPC.[5, 25] Mutual values of trust and respect were reported as significant in IPC by Curran, et al., Fothergill, et al., Piquette et al., as well as Reiger and Lane.[14, 37, 33, 38] McDonald et al. discovered health professionals believe trust and respect are necessary for care continuity and Stein and Liaschenko recognized that knowledge application without valuing each other and behaving in a moral way during interactions does not provide optimal collaboration.[25, 24]

The impact IPC has on role satisfaction grouped into categories of recognition and perception. From a positive perspective, Burzotta and Nobel described a positive experience in a clinical situation where IPC was fully engaged leading to a sense of group identity.[21] Two articles revealed success in IPC after a collaborative education intervention explaining the concept and supporting professionals in exploration. Awareness of IPC increased an appreciation for collaborative benefits per Fothergill as well as improved attitudes of practitioners toward each other following the integrated education according to Curran et al.[37, 14] Subsequent to training nurses and residents on a medical ward in IPC technique, nurse self-efficacy improved after reversing a previous culture of non-inclusion.[17] The need for contribution and shared communication was also a finding in a study by Goldman et al. stressing the force of practitioner-practitioner relationship and role clarity.[34]

Kenaszchuk et al. described the asymmetrical nature of nurse and physician perceptions of collaboration.[20] Carney et al. reported similar findings in a study

conducted across Veteran's Administration facilities specific to operating rooms.[18] Findings indicated that nurses scored team climate items lower than did physicians, indicating perceptual differences in areas of support, input, and respect. A study conducted by Mills et al. supported the issue of nurses feeling "undervalued" when their role was not acknowledged or understood by physicians, however there was also a report of positive working relationships that led to role satisfaction from Goldman et al. and Richer et al.[32, 34, 22] Piquette et al. supported those findings in the research based in an ICU setting where satisfaction was present most of the times but the burden of post-crisis communication and inclusion was not met and led to potential nursing 'burn-out.'[33] The culminating theme is a necessity to disclose issues of communication needs and role definition across professionals on a team to foster respect and enhance communication for improved patient-centered care. The issue of unmatched expectations or understanding of roles and communication needs sets up barriers and creating potential safety issues for care.

Gaps in Nursing Science

Usefulness of this integrative review to guide practice, inform policy and build on nursing science as recommended by Whittemore and Knafl, is applicable to the approach of medical home delivering patient-centered care.[39] Congruence with Dr. Watson's transdisciplinary Caring Science of collaboration across practitioners builds on nursing science.

Of the articles site based in the United States, none came from a perspective of primary care delivery. Aims of the four primary care studies included in this review were disparate, ranging from reaction to IPC training and impact of IPC on chronic care outcomes to understanding roles in and perceptions of IPC.[14, 34, 32, 15] Missing in the literature review was an evaluation of role satisfaction and economic impact of IPC use in medical homes or primary care. Since the transformational model in health reform is medical homes, a need exists to investigate IPC in the United States primary care delivery system. Of interest, however, was documentation of clinical outcomes improvements in IPC primary care settings that utilized an advanced practice nurse.[15] Inclusion of nursing as the differentiator in IPC model success gives strength to the need for nursing research to validate influence of nurses on the IPC model. Four of the five articles from United States studies presented a theoretical basis for their research. All of those theories, Vincent, Basche, Bronstein, and the Bio-psychosocial model, came from a social interaction background and not from the discipline of nursing.[16, 5, 36, 17] An identified gap, therefore, is a need to support IPC research with nursing theory. The National Institute of Nursing Research (NINR) has a priority of investing in nurse scientists' development of nurses conducting investigation.[40] The NINR has placed a call to action for nurses to become engaged and supportive of nursing research. Future study initiated on investigation of clinical and financial outcomes as well as role satisfaction from use of IPC in a medical home setting would add to the body of nursing knowledge

and increase the visibility of nursing research through inclusion of nurse participants and published findings.

The review reveals five conditional factors supporting IPC as a practice model validating the themes of role and function described by Jean Watson in the Caring Science Theory. Self, in relation to others, knowledge and understanding the diversity in others' work contributes to building a caring team as seen across articles.[17, 37 ,27 ,20, 19] Issues of collaboration identified as driven by trust, respect, understanding and mutual values across professionals.[28, 31 ,34, 27, 35] Barriers to team communication due to perceptional differences across professions gave an importance to need for a reflective, clear communication style noted to promote IPC.[21, 24] The final component mentioned by Watson of supporting working dynamics of shared responsibility, was described in the articles as a mutual mental model using shared development and decision-making. Use of Watson's Caring Science theory is a solid base for future research on IPC across disciplines.

A model depicting conditions of Interprofessional Collaboration in clinical settings demonstrates the inter-related nature of the conditions with the operationalized process. The role of nursing theory is foundational, as depicted in the model, with outcome elements of role satisfaction and outcomes illustrated as having importance for further investigation to support closing the gap in nursing science on the topic of IPC (Figure 3).

CONCLUSION

This integrative literature of twenty-six research publications explores the science related to conditional factors of interprofessional collaboration in the clinical setting. This review has purpose in guiding future practice, research and policy. Conclusions of this integrative review validate existing literature noting consistent requirements necessary for collaborative practice across disciplines. Included articles reflect the state of the science of interprofessional collaboration in the clinical setting from a global view. The term interprofessional collaboration, based upon these integrative review findings, is interaction occurring when two or more disciplines focus on achieving improvements in patient-centered care sharing goals of optimal clinical and financial outcomes through a practice model of mutual trust, professional accountability, clear communication, role clarity, and shared problem solving.

It is important to conduct further research in the United States due the healthcare reform focus on medical homes emphasizing the importance of contribution across disciplines and roles. Health care reform will continue to place more pressure on the need for effectiveness and efficiencies in practice, facilitated through interprofessional collaboration. The transformational delivery model change of IPC addresses the issue that a singular profession does not have the capacity to address all needs of patients.[41] Policy development and research will need the input of nursing on the potential impact of IPC models. This review has limitations including the date range of article review and

novice abilities of the reviewer. Inquiry, through wider time period search, may produce additional insight.

Interprofessional collaboration has an opportunity to transform healthcare practice and health outcomes.[42] The role satisfaction gained by individual nurses working in IPC teams has the ability to improve workforce retention through reflective interaction with others.[43] It is important that nursing be participant in clarifying the concept of interprofessional collaboration and lead research to improve nursing knowledge and our role in the future of healthcare. Findings on efficiency and effectiveness of interprofessional collaboration will drive increased opportunities for nursing leadership and practice. Core to this premise is knowledge that faulty collaboration jeopardizes quality and safety of patients through poor communication leading to errors, service duplication, or conflicts limiting essential information exchange.[26]

Research questions suggested for future inquiry include:

1) Is there a difference in patient claim expense in medical homes practicing IPC as compared to primary care practices using a traditional medical model?
2) Does education of medical home team members in IPC improve perceptions of interprofessional relationships as compared to medical home team members without IPC education?

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Figure 1: Application of Literature Reduction Criteria

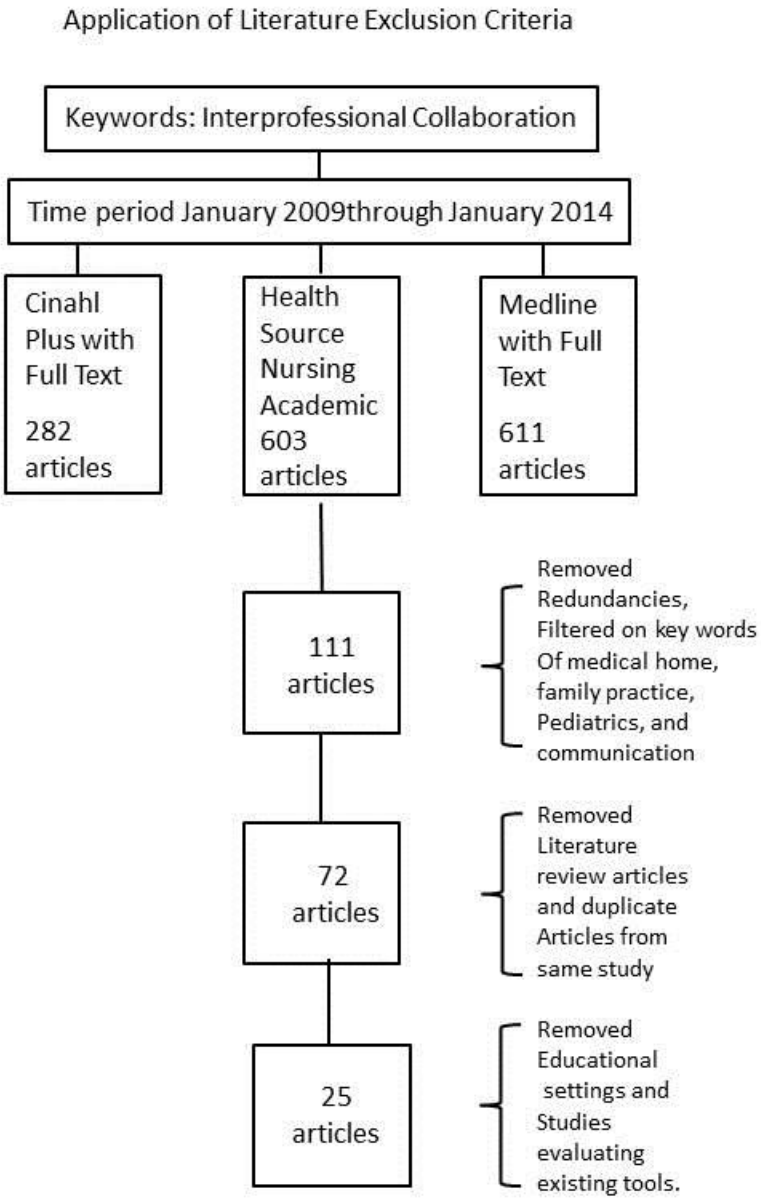

Figure 2: Themes of Role and Function Seen Across Studies

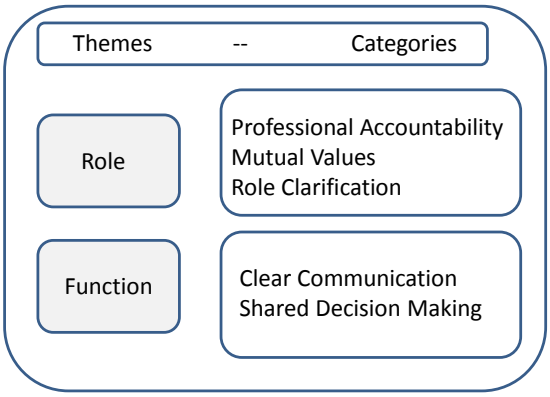

Figure 3: Interprofessional Collaboration's in Relation to Concepts, Theory and Practice

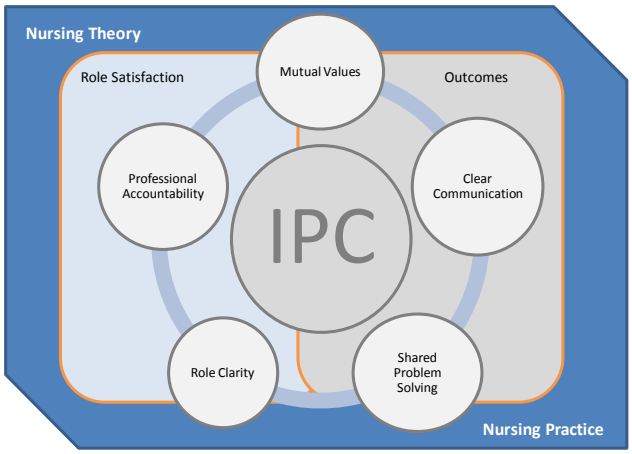

Table 1

Settings of Selected Studies Included in Literature Review

Study Settings Across Studies Selected for Integrative Review			
Hospitals	Primary care	Outpatient	Behavioral Health
Burzotta & Noble, 2011	Curran et al., 2007	McDonald et al., 2010	Fothergill et al., 2011
Carney et al., 2010	Goldman et al. 2010	Richer et al., 2009	Mellin et al., 2010
Kenaszchuk et al., 2010	Mills et al., 2010	Wright et al., 2007	
Laird et al., 2009	Russell et al., 2009		
Piquette et al., 2009			
Reiger & Lane, 2009			
Rice et al., 2010			
Robinson et al., 2010			
Sinclair et al., 2009			
Stein et al., 2007			
Upenieks et al., 2010			
Weller et al., 2011			

APPENDIX A

Author/Year	Place	Aim/Purpose	Methodology	Setting	Sample	Findings	Limitations
Burzotta, L., Noble. H. 2011	Essex, United Kingdom	To analyze a case study experience of interprofes-sional working through theory application.	Qualitative phenomenology case study and critical analysis using Gibb's reflective cycle.	Oncology Unit	1 case	Using reflective practice supports seamless care delivery. Communication is important with the team as is the need for clear role accountability.	One case prevents generalizatio n.
Carney, B., West, P., Neily, J., Mills, P., Bagian, J. 2010	Washingt on, D.C., USA	To confirm teamwork differences between surgeons and nurses as a step to improving outcomes.	Quantitative, Non-experimental correlation study using survey data before and after training. Statistically analyzed differences in communication and teamwork climate scores across professions.	Veterans Admin-is-tration facilities	2,024 health care professio nals, 312 surgeons , 378 nurses, 1,334 undisclo sed	Use of the Safety Attitudes Questionnaire results showed statistical significance between nurses and surgeons perceptions of communication.	Specific setting (operating room) would impact ability to generalize.
Chong, W., Aslani, P., Chen, T. 2013	Sydney, Australia	To identify provider perceptions of shared-decision .making and interpfrofes-sional collaboration	Qualitative investigation with semi-structured interviews	Hospital and primary care settings	31 total provider s 4 psychiatr ists 11 pharmac ists 7 nurses 2 occupati onal therapist s 1 psycholo gist 2 social workers 4 general practitio ners	Interviews found lack of consistency between providers in identifying barriers, noting backgrounds and settings were associated with differences	Setting in one state (NSW) of Australia
Clancy, A., Gressnes, T., Svensson, T. 2013	Västra Frölunda,	To examine collaboration elements and differences in relation to the size of communities	Quantitative, nonexperimen-tal, cross-sectional questionnaire	Public health	1596 total 849 nurses 113 physicia ns 519 child	Found collaboration frequency did associate to size of community, trust, respect and collaborative competence were seen as	Behavioral health missing as a contributing profession

					protection workers 115 midwives	facilitators	
Curran, V., Sargeant, J., Hollett, A. 2007	St. John's, Canada	To evaluate outcomes of Interprofes-sional Collaboration training for primary care healthcare professionals.	Mixed method design. One group pre-post comparative quantitative analysis using Barr framework. Questionnaire and semi-structured interviews using grounded theory for qualitative design.	Primary care clinics in Atlantic provinces of Canada	3,725 individuals, 1,620 nurses, 398 social workers, 285 others, and 113 physicians.	Showed increased in competencies after training. 683 modules delivered. Barr 6 level evaluation framework.	Use of self-report might introduce bias.
Fothergill, A., Northway, R., Allen, J., Sinfield, M. 2011	Wales, United Kingdom	To examine, in the context of holistic care, the benefits of Interprofes-sional Collaboration education for Mental Health staff.	Qualitative, descriptive design. Semi-structured interview participants across professions in Mental Health field using thematic content analysis.	Telephonic and in mental health clinic locations	15 participants, 11 nurses, 1 SW, 1 Psych, 2 CHW	Training with a diverse group impacts respect, recognition of the need for collaboration and improved relationship building.	Bias due to use of 2 teams, small sample
Goldman, J., Meuser, J., Rogers, J., Lawrie, L., Reeves, S. 2010	Ontario, Canada	To examine the perceptions and experiences of interprofes-sional collaboration in family health teams.	Qualitative descriptive study. Semi-structured interviews. Inductive thematic approach used.	Primary care	32 individuals, 12 teams	Findings indicated leadership, space and role definition all assist in explaining and supporting primary health teams.	Small sample.
Johnson, S., Kring, D., 2012	Winston-Salem, North Carolina, USA	To identify perceptions of collaboration by nurses of nurse/physician interactions.	Quantitative quasi-experimental design, descriptive survey	Intensive care unit.	174; 89 medical-surgical nurses, 77 intensive care nurses	Findings indicated ICU nurses were more likely to see a lack of physician collaboration than medical surgical nurses,	Study was sited at only one facility.

Kenaszchuk, C., Reeves, S., Nicholas, D., Zwarenstein, M. 2010	Toronto, Canada	To develop a scale of IPC for multiple provider groups.	Quantitative experimental design using round robin format for exploratory and confirmatory factor analysis (nurses and physicians).	Community and teaching hospitals (15)	479 cases, 144 nurses	Communication, isolation and accommodation identified as three important factors resulting in a scale for measuring IPC. Nurse and physician ratings are found to be asymmetrical across measures.	Items adapted from a nursing scale so may not reflect other professions; made for acute care settings.
Laird, H., Soloman, D., Jodoin, C., Dwamena, F., Alexander, K., Rawsthorne, L., Banker, T., Gourineni, N., Aloka, F., Frankel, R., Smith, R. 2010	Lansing, Michigan, USA	To conduct patient-centered care team training to measure nurses' learning, and patient outcomes.	Quantitative experimental design of retrospective pre/post/six month post design. Eight hours of training by trained nurse leaders.	Medical ward	28 nurses 86 patients	Training or residents and nurses was well received and nurse scores indicated improvement in knowledge. Patient satisfaction scores did not demonstrate a change.	Intervention and control groups of unequal size.
McDonald, J., Davies, G., Jayasuriya, R., Harris, M. 2010	Sydney, Australia	To identify factors influencing collaborative relationships, and strategies that support collaboration for future policy implication.	Qualitative ethnographic design using semi-structures interview process. Thematic analysis conducted using a social constructivist approach.	Private and public sector primary and community health service centers.	32 participant interviews from 20 organizations, 8 professions represented	Collaboration on diabetes care between private sector organizations was easier than between private and public organizations.	Specific model of government responsibility.
Mellin, E., Bronstein, L., Butcher, D., Amorose, A., Ball, A., Green, J. 2010	University Park, PennsylvaniaUSA	To measure team collaboration among mental health professionals in school settings.	Qualitative grounded theory design. Exploratory factor analysis.	Mental health teams in schools across the U.S.	436 school team members	Themes revealed were interdependence, reflection, mutual respect, shared decision making & responsibility & collective ownership of goals.	Reliability and validity need to be examined.

Mills, J., France, K., Birks, M., Coyle, M., Henderson, S., Jones, J. 2010	Queensland, Australia	To explore the role and scope of the registered nurse as an interprofes sional team member.	Qualitative descriptive design. Multi-case study, thematic review of interview transcripts.	Five remote areas of Queens Land Australia	35 nurses; 23 intervie ws and 4 focus groups	Nurses on IP teams see significance in collaboration, communication and partnerships. Understanding roles, enhances communication.	Remote site would impact ability to generalize.
Murray-Davis, B., Marchall, M., Gordon, F. 2014	Sheffield, United Kingdom	To understand how newly practicing midwives apply their interprofes-sional training,	Qualitative grounded theory using semi-structured interview, focus groups, and questionnaires	Communi ty setting	Midwive s, students, educator s	Application of collaboration in practice was dependent on learning environment and sense of shared partnership	Purposive sample associated with 4 Universities
Piquette, D., Reeves, S., Leblanc, V. 2009	Toronto, Canada	How a medical crisis in an ICU impacts interprofessio nal interactions.	Qualitative descriptive design. Semi-structured interview participants across professions using inductive thematic analysis.	ICU in a large Canadian health center	25 individu als 6 MD, 14 RN, 5 RT	Mutual respect was the premise of interactions in pre-crisis communication while hierarchical communication reigned during a crisis. Post crisis communication needs differed among professions.	
Reiger, K., Lane, K. 2009	Melbourn e, Australia	To investigate what doctors and what nurses define as a 'good' colleague.	Qualitative grounded theory analysis of semi-structured interviews and focus groups.	Suburban maternity units	102 76 midwive s, 19 physicia ns, 7 manager s	There were core similarities desired in professions however not a match in the' ideal' professional. Role boundaries, rude behavior and increasing workload impacted relationships. There was a foundation for professional courtesy present.	One specialty area of focus.
Rice, K., Zwarenstein, M., Conn, L., Kenaszchuk, C., Russel, A., Reeves, S. 2010	Toronto, Canada	To describe results of an interprofes sional intervention on an internal medicine ward.	Qualitative, 90 hours of ethnographic observation as a design.	General internal medicine ward (2) in Canadian urban hospital	250 staff, 10 professio ns included	Trial of using self-introduction, issue discussion and feed-back was not successful. Hierarchies have a bearing on communication but leaders did	The study was reported to be not supported by leadership, thus limiting participation.

						not communicate study to staff.	
Richer, M., Ritchie, J., Marchionno, C. 2009	Montreal, Canada	To identify ideas for improving collaboration through scenario team exercises	Qualitative ethnographic design. Multi-embedded case study. Two interdisciplinary groups using appreciative inquiry.	Outpatient cancer center	Total of 47 participants, 28 nurses, 3 physicians, 4 pharmacists, 7 volunteers, 5 others	Contribution to the literature on innovation for care delivery can occur through common goal development. Ideas were common education & lunchroom.	Observational period too short to fully evaluate implement-ation.
Robinson, F., Gorman, G., Slimmer, L., Yudkowsky, R. 2010	Illinois, USA	To describe what is meant by effective and ineffective interprofessional communication.	Qualitative descriptive design using focus group response evaluations to determine themes.	Acute care hospital	18 individuals, 9 physicians, 9 nurses	Themes of effective communication include clarity, precision, collaborative problem solving, mutual respect and calm support.	Participants viewed the questionnaire prior to the focus group.
Rubio-Valera, M., Jove, A., Hughes, C., Gullen-Sola, M., Rovira, M., Fernandex, A., 2012	Barcelona Spain	To identify and analyze factors impacting relationships between general practitioners and pharmacists	Qualitative descriptive-exploratory study design.	Physician offices	37 individuals, 18 physicians, 19 pharmacists	Economic issues and attitudes/perceptions can impact the collaboration of physicians and pharmacists.	Sample size limitation.
Russell, G., Dabrouge, S., Hogg, W., Geneau, R., Muldoon, L., Tuna, M. 2009	Ontario, Canada	To determine whether chronic disease management of 4 primary health models associate with high quality care.	Mixed method design. Qualitative case study grounded theory application and Quantitative quasi-experimental cross-sectional evaluation.	Primary care practices	363 individuals, 137 sites, two purposefully selected for qualitative case study	Chronic disease management superior with interprofessional collaboration and longer consultations.	Limitations due to response rate and exclusion of practices in the far north of the province

Sinclair, L., Lingard, L., Mohabeer, P. 2009	Toronto, Canada	To analyze IPC in the rehabilitation setting	Qualitative study using focus groups and thematic analysis.	Rehabilitation Unit	40 participants from three healthcare professions	Promotion of IPC is made through culture and communication (clinical and organizational).	Rehabilitation setting may limit application in other sites..
Stein, J., Liaschenko, J. 2007	Sydney, Australia	To analyze the ICU culture of collaboration	Qualitative ethnographic fieldwork study using model of knowledge types and quantitative correlation of survey responses.	Intensive care unit.	12 nurses	Types of knowledge (case knowledge) did impact level of collaboration.	Ethnographic observations were context specific.
Upenieks, V., Lee, E., Flanagan, M., Doebbeling, B 2010	California, USA	To conduct a study to refine an existing IPC tool	Mixed model. Qualitative phenomenology study of cognitive interviews followed by quantitative cross sectional factor validation (convergent validity) for instrumentation development.	Regional community hospital.	439 (of 464) completed the survey. Four professions represented. 15 of 18 targeted nurses completed interview.	The healthcare vitality instrument is valid and can assist in nurse retention, improved management, and better team communication.	Minimal participation from physicians.
Weller, J., Barrow, M., Gasquioine, S. 2011	Auckland, New Zealand	To examine interactions of new graduate nurses and physicians related to interprofessional collaboration.	Qualitative design. Gounded theory. Semi-structured interviews applied to health care team function theory.	Hospital	25 individuals 13 doctors 12 nurses	The conclusion was that shared information was the most vital attribute for interprofessional collaboration. The environmental barriers to attaining good communication were identified for future action.	Perspective of only new graduates
Wright, B., Lockyer, J., Fidler, H., Hofmeister 2007	Calgary, Canada	Examination of IPC by Family Practitioners in the field of Geriatrics	Qualitative descriptive design using focus groups and thematic analysis.	Geriatric health care teams	49 individuals 17 Family Physician's, 22 other health care professionals	Themes of: decision making, roles on the team, inclusion, and responsibility were identified. Identified differences create impediments to IPC.	Practitioners all from 1 city

CHAPTER III

METHODOLOGY AND STUDY DESIGN: AN EXPERIMENTAL CLUSTER STUDY

Procedure for Collection and Treatment of Data

This intervention study used an experimental, posttest only, cluster design to develop knowledge about facilitating interprofessional collaboration in medical homes. A study using cluster design is optimal for medical home research because the shared intervention exposure occurs at the group level with measurements collected at the individual level. Twenty-five medical home locations received the TeamSTEPPS for Primary Care (2013) education and follow-up application intervention and twenty-five the Energize our Families education and follow-up application attention control (U.S. Department of Health and Human Services, 2008). To ensure that the intervention and attention control groups were comparable at baseline demographic data, including gender, time with current team, role, and education, were collected and compared (Peiles, Zutshi, Genevro, Parchman, & Meyers, 2012).

The intervention was delivered by nurse case managers employed by the health plan sponsoring the study. The attention control activity was delivered by health workers. Consenting medical home team members at the intervention and attention control sites completed the Assessment of Interprofessional Team Collaboration Scale ([AITCS] Orchard, 2012) at the end of 12 weeks. The intervention and control arms of

the study received the same hours of intervention, one hour per week for 12 weeks. The nurse case managers and health workers received training in their respective curriculum. Both curriculums are prescriptive to the point of including presentation dialogue for the six weeks of educational sessions. Scripts for both the TeamSTEPPS intervention (nurse-led) and the attention control (health worker led) educational components of the research support replication across sites in a consistent manner.

The interprofessional team curriculum selection of TeamSTEPPS for Primary Care Teams, developed by the Agency for Healthcare Research and Quality and the Department of Defense, has an educational focus on communication, collaboration, and problem-solving to encourage teaming behaviors known to result in optimal outcomes (2013). The instructional methods included verbal instruction, handouts, video enactments, partnered work, and use of individual worksheets. In addition to the instruction script, the curriculum includes topics for breakout sessions, and handouts in addition to a workbook. The TeamSTEPPS program uses videos for scenario presentation and directions for break-out sessions. At the end of the first 6 weeks, participants receive a pocket-guide of tools introduced in the education. For the second six weeks, the nurses are educated to deliver a basic Plan-do-study-act overview and then coach the team as they proceed through a change. The attention control sessions led by health workers, also has a workbook to accompany the verbal educational presentation. During the second six weeks of the attention control activity, the health workers met

individually with participants to provide handouts for patient use and discuss the past weeks' success in utilizing new information during patient engagement opportunities.

Setting

The setting for this research is primary care medical homes contracted with one Texas health plan. Medical homes included in the study were selected from a population of 254 primary care medical home practices, with each practice having more than 500 patients. Additional inclusion criteria were the location of the medical home in the Harris County Medicaid service area

Population and Sample

The 254 sites that met the inclusion criteria were randomized into two groups using a table of random numbers, initially to provide ten medical homes for a pilot study. Although the intention was to randomize participating sites from assignment through a table of random numbers to the applied to the population, only 32 sites were recruited through that initial process. The additional 18 sites were recruited from the population and placed alternately in the intervention or control groups.

The medical home team members qualifying as participants in the intervention included physicians, nurses, nurse practitioners, physician assistants, medical assistants, licensed vocational nurses, social workers, and front-office staff. Eligibility criteria for the study included full time status, a position where the role includes patient interaction, as well as the ability to speak, understand, and write in the English language to enable attendance in the training, comprehension of the training, and as well as completion of

the measurement tool. An explanation of qualifications for inclusion was given to the practice during the first visit to determine how many individual participants were eligible at each potential participant site. These individuals completed consents prior to initiation of the intervention or attention control activity and completed the Assessment of Interprofessional Team Collaboration Scale (AITCS) tool at the close of the intervention.

A pilot study, with 10 participating sites, representing 20% of the sites in the full study complement, was completed during the time period of August through November of 2013. The pilot study used five medical homes in the intervention and five in the attention control arms of the study to gain an understanding of the feasibility of the intervention as well as the appropriateness of the AITCS measurement tool for gathering the data needed to address the research. The additional 40 sites were recruited over the period of January through March of 2014. Sample size was based on the randomized controlled trial of Solberg, Kottke, and Brekke (1998) who introduced quality improvement training in primary care practices. Their research, with a sample size of 44, yielded a 0.9 effect size when evaluating results. As in the pilot research conducted by this author and the proposed addition of 40 sites, the Solberg and colleagues study was a managed care initiated study involving training and an implementation experience. The Solberg study used a cluster randomization of primary care practices that also mirrors the approach for this medical home study. The intervention dose of this study was increased through training contact frequency and hours, use of an attention control group in the study design, and distribution of a TeamStepps pocket guide as a continued

reference/reminder for intervention team members. Intervention and attention control participants receive a curriculum workbook. The design feature of an attention control arm was employed to increase overall study validity, compared to the Solberg study use of 'regular care.' Nutrition education, an evidenced-based curriculum, with an emphasis on use of instructional aids with patients, was applied with the attention control group. The Solberg study had 44 medical homes included across control and intervention groups. To achieve an effect size of 0.80 with power of 0.80, fifty medical homes are required for this study, 25 in each arm.

Protection of Human Subjects

Two human subjects institutional review boards approved this study. Consents of participants are stored in a secure setting. A Data Collection and Procedures Protocol was followed for this study (Appendix B). The protocol includes facilitator explanation that breaks will mitigate fatigue of participants and that participants should alert the facilitator of any fatigue or other issues occurring during the intervention. Completed tools are kept in locked, secure storage and the data analysis was run on a password protected server.

Instruments

Determining effective collaborative functioning of an interprofessional team to assess culture change was accomplished through use of the AITCS (Orchard et al., 2012). The Likert scale survey tool, developed to assess self-perception of collaborative practice among healthcare team members, is useful across settings and diverse team roles and has

established validity and reliability. The AITCS, with thirty-seven items and three subscales of partnership/shared decision-making, cooperation, and coordination, uses a 5-point Likert scale to establish the level of collaboration within teams following the intervention (Appendix C). The tool has three subscales of partnership (19 items), cooperation (11 items), and coordination (7 items). Twenty-four interprofessional education expert reviewers evaluated the AITCS to gain content validity of the tool. Tested with 125 practitioners from seven healthcare teams practicing within a variety of settings, the AITCS had confirmatory factor analysis indicating a total variance of 61.02 percent. Internal consistency was determined through bivariate correlations, demonstrating 0.718 as the lowest Pearson score. Reliability of each subscale ranged from 0.80 to 0.97, with an overall tool Chronbach value of 0.98 indicating the AITCS is a reliable instrument (Orchard, King, Kalili, & Bezzina, 2013).

Completed tools are assigned an alpha character designation for each cluster with a field category recorded to indicate if the cluster is in the intervention or control arm of the study. Each question, as well as the demographics will be entered for individual participants. Grouping for the three subscales is accomplished by identifying responses to questions assigned to the three themes by the tool developer Orchard et al., 2013).

Data Collection

Following consent, weekly educational TeamSTEPPS (intervention) or Energize our Families (control) sessions occurred over the following 6 weeks, with implementation of new learned skills for the last six weeks of the intervention. The nurse or community

worker who facilitated the curriculum then administered the AITCS, collected the tools, and returned them to the researcher. The AITCS survey entry uses a de-identified alpha identifier for medical home sites. A confidential/secure location held completed surveys until data entry, as the small sample size at each location could be a risk to confidentiality. Data storage, maintained on a protected, secure, server, is password protected for respect of participants' privacy.

Treatment of Data

Analysis of the data employed the Statistical Package for Social Sciences (SPSS Version 17.0). The parametric procedure for testing the differences in means of the Assessment of Interprofessional Team Collaboration Scale from the experimental versus control groups was the t-test. The three subscales were also compared across attention and intervention arms of the study. The means within the clusters were analyzed for consistency. Descriptive statistics of demographic variables were used to assess the comparability of the experimental and attention control groups as well as for comparisons of clusters within each arm of the study. Instrument consistency was also evaluated.

Team use of interprofesional collaboration has the potential to improve the value of healthcare through promoting efficiency in operations and role satisfaction of team members. This study is designed to ensure meaningful results. There is evidence that the intervention is well designed. The nurses delivering the intervention have adequate training to deliver the intervention effectively. The tool used to measure the outcome variable has established reliability and validity. Finally, the results are likely to be

important to efforts to improve outcomes for patients receiving care in medical homes. Measurement includes multiple team member perspectives, in acknowledgment of the complexity of communication and interpersonal connections required to achieve shared team goals.

CHAPTER IV

DELIVERING TEAM TRAINING TO MEDICAL HOME STAFF TO IMPACT PERCEPTIONS OF COLLABORATION

A Paper Submitted For Publication in Professional Case Management

Janet Treadwell

The healthcare delivery landscape is changing. The Patient Protection and Affordable Care Act, a need for improved patient safety, and a desire to increase primary care access capacity through staff retention, drives the need for research. Legislation expanding insurance coverage and an increase in prevalence of chronic conditions has brought about emphasis on coordination for effective patient-centered care, teamwork, and communication to support safe care delivery (Weaver, Dy, & Rosen, 2013). Issues of access, safety, and quality continue to plague the U.S. health system years after the call to action by the *To Err is Human* report (Institute of Medicine, 1999). Attempts to initiate changes in teamwork through legislation and accrediting entities focus have resulted in process modifications but not in an overall culture transformation. Therefore patients remain at risk for unsafe and inefficient care (Mitchell et al., 2012). Medical homes in the primary care delivery model are purposed to provide holistic care, improve service continuity, and be accountable to patient-centered care which requires effective collaboration. Utilizing mutual respect, clear communication, and professional

accountability, team members can facilitate meeting the need, identified by Xyrichis (2008), for interprofessional collaboration using team member skills, experiences, and education to drive improved outcomes and efficiencies. Given that team based care is said to be integral to successful medical home practice and sustained transformation, it is important for all roles within the medical home to develop skills and attitudes that promote teamwork behaviors (McAllister, Cooley, Van Cleave, Boudreau, & Kuhlthau, 2013). Case managers have experience in collaboration, which makes them ideal candidates to facilitate team training and support of medical home practice staff in acquiring and applying collaborative skills.

Purpose

The Patient Protection Affordable Care Act designates medical homes as a preferential delivery model for primary care with the goal of overcoming barriers to access and quality care (2010). Research on the impact of interprofessional collaboration (IPC) education and experience on medical home team-members' perceptions of interprofessional collaboration has the potential to enhance understanding of the performance areas of care coordination, partnership, shared-decision making, and cooperation. These elements have an association with increased patient access, safety, role satisfaction, and workforce retention in health care environments.

Aim

This article describes the comparison of medical home team-members' perceptions of interprofessional collaboration subsequent to a 12-week intervention.

Participants were fifty practice sites, twenty-five receiving a Case Manager led intervention designed to enhance interprofessional collaboration and twenty-five receiving health worker-led educational sessions unrelated to interprofessional collaboration, on the topic of nutrition and activity. The latter served as the attention control. The hypothesis was that staff at the medical homes receiving team training would score higher on positive interprofessional perceptions than those receiving the attention control education and experience.

Past research has demonstrated the ability of IPC to encourage satisfaction and workforce retention (Burzotta & Nobel, 2011), and to increase appreciation for the work of other professionals (Fothergill, Northway & Sinfield, 2011). This is an important issue for medical home staffing as well as the case management profession. The majority of IPC study sites have been hospital based with participants most often being students. Primary care research on IPC has focused on the role of physicians as seen in the work by Laird et al. (2011) and Goldman, Lawrie and Reeves (2010), and on collaboration between nurses and physicians as demonstrated in the study by Carney, West, Neily, Mills, and Bagian which looked at differences in perceptions of those roles on team relationships (2010). In a qualitative research study Soklaridis, Oandasan, and Kimpton (2005) found that a barrier to team collaboration was the limited formalized education on collaboration for physicians and even fewer training opportunities for the other roles within an office practice (2007). Robichaud et al. found improvement projects gave an

opportunity to develop teamwork skills to foster interprofessional collaboration in healthcare settings (2012).

Missing in the literature review is an experimental study of the effect of IPC training in medical homes in the United States. Inclusion of all roles with patient contact within the medical home environment is also not seen in existing review of IPC research studies.

Theory

The foundational theory for this study is John Kotter's change theory. Kotter (1996) recognizes that every role contributes to safe and effective organizational culture. Kotter puts forth that trust and clear communication between members is foundational for a team that promotes safe healthcare practices. The Agency for Healthcare Research and Quality (2013) used Kotter's theory as the basis for the development of the training *TeamSTEPPS for Primary Care Version*, employed as the intervention curriculum in this research.

Methods

A cluster design experimental study was conducted between August 2013 and June 2014. Twenty-five medical home locations received a *TeamSTEPPS for Primary Care* education and application intervention and twenty-five received the attention control of *Energize our Families* curriculum, developed by the U.S. Department of Health and Human Services (2008). The *TeamSTEPPS for Primary Care* curriculum covers content areas of leadership, communication and mutual support through multiple learning methods including initiating topics with video depictions that support insight of

team participants in the value of every role on the team. The *Energize our Families* curriculum also uses multiple learning vehicles such as role play, demonstration and power points.

The sessions were held for one hour each week at the medical practice location. A meal was provided, as the intervention took place during the normal lunch period of the participants. Case managers who were registered nurses from the sponsoring health plan served in the role of facilitators for the intervention curriculum and skill use. Certified community health workers from the sponsoring health plan deliverecd the attention control curriculum and contact to encourage use of nutrition and activity tools. Data collection for the study included initial consents prior to study initiation and survey tools at the completion of the 12 week study.

Setting

The setting for this research was primary care medical home practices contracted with one Texas health plan. These primary care practices were located in urban areas, with the predominant patient base served being covered by Medicaid and Children's Health Insurance Program insurance. Each primary care practice was different in team composition. The roles of physician, front office staff, and medical assistant were consistent across all practice sites. Additional roles occurring in at least one medical home practice included office manager, registered nurse, licensed vocational nurse, licensed clinical social worker, advanced practice nurse, and physician assistant.

Population and Sample

The population consisted of 254 medical home sites, with each site having at least 500 members associated with the sponsoring health plan located in Houston, Texas. Randomization through use of a random table of numbers identified the sites for the intervention and attention control arms of the study. Eligibility criteria for the study included individuals working in the practices with full time status, a role including patient interaction, as well as the ability to speak, understand, and write in the English language to enable attendance in the training, comprehension of the training, and completion of the measurement tool. The medical home participants completed consents at the beginning of the study. At the close of the 12-week intervention they completed the Assessment of Interprofessional Team Collaboration Scale (Orchard, King, Khalili, & Bezzina, 2012).

Informed by a similar study conducted by Solberg, Kottke, and Brekke (1998) the required sample size was determined to be fifty medical homes. Their randomized control trial with a sample size of 44 yielded a 0.9 effect size when evaluating results of introduction of quality improvement into primary care settings. As in the Solberg study, this research is a managed care initiated study involving a training and implementation experience. The Solberg study used a design with randomization of primary care practices, an approach that this study partly replicates. Compared to the Solberg study, in designing this study the intervention dose was increased by providing more training contact frequency and more training hours, including an attention control group, and distributing a *TeamStepps* pocket guide as a continued reference/reminder for

intervention team members after completion of the training. The design feature of an attention control arm increased overall study validity from the Solberg et al. study use of regular care. Therefore, it was determined that to achieve an effect size of 0.80 with power of 0.80, would require 50 medical homes, 25 in each arm of the study. To evaluate the study design for this research, a pilot study was completed from August 2013 through November 2013, using five medical home practices in the treatment arm and five in the attention control arm of the study. The pilot results established the feasibility of the intervention from an operational perspective and confirmed that the outcome measurement tool was appropriate. Additionally the results revealed a difference in the perceptions of interprofessional collaboration in participants who received the educational and experiential intervention on interprofessional collaboration compared to participants who received the nutrition and activity intervention (p =.0045).

Instrument

The Assessment of Interprofessional Team Collaboration Scale (AITCS), with thirty-seven items and three subscales of partnership/shared decision-making, cooperation, and coordination, uses a 5-point Likert scale to measure the level of collaboration in teams. Testing of the tool revealed an overall tool Chronbach Alpha value of 0.98 demonstrating internal consistency. A professional review (24 experts) established content validity and a Confirmatory Factor Analysis total variance of 61.02% supported construct validity (Orchard et al., 2012). The tool takes approximately 15 minutes for completion.

Human Subjects Protection

Appropriate institutional review boards approved this study. Consents of participants were stored in a secure setting, as were completed survey tools because the small sample size at each location was an identified risk to confidentiality. The AITCS survey entry used a de-identified alpha identifier for medical home sites. Data storage, maintained on a secure server, was password protected for respect of participant privacy.

Findings

Statistical Design

Descriptive statistics were used to examine the demographic variables to assess the comparability of the experimental and attention control medical home practices. Demographic comparison between the intervention and attention control sites indicated similarity between intervention and control practices for the elements of gender, time with current team, role, and education (Table 3). The majority of participants were female with a mode age of 26 and range of 18-63 years. Individuals with three or less years in their roles represented more than a third of participants while half of the participants had been functioning in their present teams for 3 or less years (mode = 1 year). The team member role appearing most frequently in the data was the medical assistant at 47% of participants (46% intervention, 47% control).

Table 3

Comparability between Intervention and Attention Control Participants for Elements of Gender, Education, Years in Profession, and Time in Current Role

Gender	Control	Intervention	Total
Male	21	17	38
Female	136	154	290
Total	157	171	71

Education	Control	Intervention	Total
Certificate	10	10	10
Diploma	2	2	4
High School	7	18	25
Bachelors	6	0	6
Masters	1	3	4
Doctorate	5	7	12

Years in Profession	Control	Intervention	Total
0- 3 yrs.	11	17	28
4-10 yrs.	11	14	25
11-20 yrs.	9	8	17
Total	31	39	70

Years on Present Team	Control	Intervention	Total
0-3 yrs.	18	25	43
4-10 yrs.	6	10	16
11-20 yrs.	7	3	10
Total	31	38	69

The Statistical Package for Social Sciences (SPSS Version 17.0) was used for statistical analysis of the data. There were few missing data points as the participants received instruction to complete all 37 items of the survey tool. The unit of

randomization and measure was the medical home. During the recruitment phase of the research, there were 32 sites agreeing to participate based upon the randomization of the population initiated at the start of the study. The remaining 18 practices were drawn from the initial population however did not follow the initial pattern of randomization as many practices did not agree to participate due to their busy schedules. This left the study sample containing 32 practices drawn from randomized assignment and 18 drawn from a convenience sample, based on the practice willingness to commit to the 12 week study. There was no attrition of medical homes. Three hundred twenty eight participants completed the tool as compared to three hundred sixty three originally enrolled in the study for a 90% participant completion rate. Statistical significance was set at an alpha level of 0.05. The non-parametric procedure for testing the differences in medians of the experimental versus control groups was the Mann Whitney U Test. A non-parametric measure was used because the Kolmogorov-Smirnov statistic of normality revealed a significance value of .000 indicating the data was not of normal distribution.

Table 4

Comparison of Total Tool Means, Standard Deviations, and Median in Study Arms

Study Arms	Mean	N	Std. Deviation	Median
Intervention	176.52	171	18.903	178.00
Control	154.02	157	28.838	162.00
Total	165.75	328	26.632	170.00

Using the Mann Whitney U Test to compare the medians of the experimental and control practices, a significant difference in the perceptions of interprofessional collaboration among the intervention practices (Md = 178, n = 171) and the attention control practices (Md = 162, n = 157), U = 6559, z= -8.10, p = .000 was revealed (Table 4).

Study analysis included instrument reliability and validity across the three tool subscales of partnership/shared decision-making, cooperation, and coordination (Table 5). The Chronbach alpha for the overall tool showed good internal consistency matching the .98 value obtained during tool development (Orchard et al., 2012). The Chronbach alpha values for the subscales of Partnership, Cooperation, and Coordination displayed reliability across the three domains. The effect size measured using Cohen's d was 0.923 which indicates 92% of the variance is explained by being in an intervention practices as opposed to an attention-control practices.

Table 5

Assessment of Interprofessional Team Collaboration Scale Subscales, Item Numbers, and Chronbach's Alpha Reliability for Tools Completed by Participants

Subscale	Items	Alpha
Coordination	7	0.917
Cooperation	11	0.948
Partnership	19	0.971
Total Tool	37	0.982

As a validation measure to the study, the practices that were obtained using a random sampling technique (n=32) were evaluated using the non-parametric measure of

the Mann Whitney U Test to discern any differences in the total tool results between the entire sample results and the medical home practices selected into the study through random sample. The p value for those 32 medical homes was p = .003 with the z score being -2.93 indicating a higher total tool score measure in the intervention practices than the control practices.

In the experiential component of the intervention arm, the practices were charged with conducting a team-selected quality improvement project in which team roles were assigned.

Table 6

Selected Quality Improvement Projects and Role of Chosen Leader

Team-Selected Quality Project Topic and Number of Sites Selecting the Topic for Improvement	Selected Role of Chosen Leader for Quality Improvement Project
Huddle Use (8)	Nurse (2), Medical Assistant (5), Office Manager (1)
Debrief Use (5)	Medical Assistant (4), Social Worker (1)
SBAR Use (2)	Nurse (2)
Briefing Checklist (3)	Nurse(1), Medical Assistant (2)
Staffing Notice (2)	Office Manager (1), Medical Assistant (1)
Feedback (2)	Front Office (1), Medical Assistant (1)
Staff Safety (2)	Medical Assistant (2)
Patient Flow (1)	Medical Assistant (1)

A non-physician team member was required to be the project lead. Topics of the quality interventions ranged from initiating use of huddles to providing a practice security plan. The role type most often selected to be the leader of the study was medical assistant

(the predominant participant role in the study). Nurses led the quality improvement studies across 20% (5) of the intervention practices however it is important to note nurses comprised only 10% of intervention participants (Table 6). Participants enthusiastically embraced the opportunity to integrate their newly acquired skills in an application relevant to their individual practice sites.

Summary

The analysis suggests, from the statistical significance between tool scores of the intervention and control practices shown using the Mann Whitney U Test, that use of Case Managers to deliver education on tools and need for medical home collaboration along with an opportunity to practice team skills was effective in impacting positive perceptions of interprofessional collaboration. The evaluation of demographics of the intervention and attention control participant practices as being similar strengthens this assumption.

Discussion

There are limitations to generalizability of the conclusions of this study because the sample was limited to 50 practices within one Texas geographic region. The results did indicate the intervention is worth the effort of expanding, using the existing research methodology, to other populations. The medical homes that received the intervention serve over 250,000 patients who can now benefit from the training provided through this research. It will be helpful to return to this study population to evaluate the economic

impact of the intervention on efficiencies, worksite retention, and avoided adverse safety occurrences over time.

Education addressing teamwork competencies may need to be conducted on at least an annual basis because 60% of participants had been on the team for three years or less when the study was conducted. The *TeamSTEPPS for Primary Care* curriculum includes opportunities for role play and critiquing video scenarios relative to current practice experience. These tools could be helpful in periodic reinforcement sessions as well as in initial training for new staff.

Routine education would enhance a sustained culture change of respecting and valuing each role and obtain the most gains in the areas of efficiency, worksite retention, and patient safety due to training in mutual trust, clear communication and shared decision making.

Experience in collaboration across roles, held by the Case Manager resulted in their effectiveness in facilitating training and skill implementation. Case Managers reported that their ability to use motivational interviewing to stimulate discussion during the training was helpful. This was specifically seen in the *TeamStepps* skill training and experience reflection of feedback, debrief, and mutual support where all roles in the team were encouraged to share their experiences and opinions of how mutual trust might improve the specific team's collaboration using these skills.

This research indicates that having health plan Case Managers educate teams about interprofessional collaboration tools and the use of supporting techniques may be

an effective strategy to assist medical homes in developing collaborative environments. Transforming culture from hierarchical to team based care supports the case management approach of collaborative practice. Giving all roles within the medical home team a respected voice in contributing to process decisions and communication about patients is encouraging to the professional and supports issues of patient safety. Additionally, the role satisfaction attained through the respect and communication of team-based care may influence retention.

Conclusion

Medical home practice staff in this study, receiving team training scored higher on positive interprofessional perceptions than those receiving the attention control education and experience. These findings suggest interprofessional collaboration in medical homes, gained through an educational and experiential intervention, may facilitate an inclusive culture of practice, improved team member satisfaction, and workforce retention leading improved patient access to needed care. The results of this research are promising for developing effective interprofessional teams and indicate directions for further research across medical home settings. Nurse Case Managers have an interest in interprofessional collaboration within primary care settings and a responsibility to implement collaborative improvements as the role of care coordinator expands within medical home settings (Institute of Medicine, 2011). As Case Managers in primary care settings assume the additional roles of embedded care coordinators, program leaders, and transition facilitators, an understanding of collaboration techniques

is needed to support the entire care team to achieve desired outcomes of efficiency, safety, and workforce retention. The overarching goal is to transfer the tools and skills of interprofessional collaboration into the daily practice environment, using the synergy of the team to deliver quality, patient-centered care.

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APPENDIX A

Matrix of Selected Studies

Author/Year	Place	Aim/Purpose	Methodology	Setting	Sample	Findings	Limitations
Burzotta, L., Noble. H. 2011	Essex, United Kingdom	To analyze a case study experience of interprofes-sional working through theory application.	Qualitative phenomenology case study and critical analysis using Gibb's reflective cycle.	Oncology Unit	1 case	Using reflective practice supports seamless care delivery. Communicatio n is important with the team as is the need for clear role accountability.	One case prevents generalization.
Carney, B., West, P., Neily, J., Mills, P., Bagian, J. 2010	Washingt on, D.C., USA	To confirm teamwork differences between surgeons and nurses as a step to improving outcomes.	Quantitative, Non-experimental correlation study using survey data before and after training. Statistically analyzed differences in communication and teamwork climate scores across professions.	Veterans Admin-is-tration facilities	2,024 health care professiona ls, 312 surgeons, 378 nurses, 1,334 undisclosed	Use of the Safety Attitudes Questionnaire results showed statistical significance between nurses and surgeons perceptions of communicatio n.	Specific setting (operating room) would impact ability to generalize.
Chong, W., Aslani, P., Chen, T. 2013	Sydney, Australia	To identify provider perceptions of shared-decision .making and interpfroles-sional collaboration	Qualitative investigation with semi-structured interviews	Hospital and primary care settings	31 total providers 4 psychiatrist s 11 pharmacists 7 nurses 2 occupationa l therapists 1 psychologis t 2 social workers	Interviews found lack of consistency between providers in identifying barriers, noting backgrounds and settings were associated with differences	Setting in one state (NSW) of Australia

					4 general practitioners		
Clancy, A., Gressnes, T., Svensson, T. 2013	Västra Frölunda,	To examine collaboration elements and differences in relation to the size of communities	Quantitative, nonexperimental, cross-sectional questionnaire	Public health	1596 total 849 nurses 113 physicians 519 child protection workers 115 midwives	Found collaboration frequency did associate to size of community, trust, respect and collaborative competence were seen as facilitators	Behavioral health missing as a contributing profession
Curran, V., Sargeant, J., Hollett, A. 2007	St. John's, Canada	To evaluate outcomes of Interprofessional Collaboration training for primary care healthcare professionals.	Mixed method design. One group pre-post comparative quantitative analysis using Barr framework. Questionnaire and semi-structured interviews using grounded theory for qualitative design.	Primary care clinics in Atlantic provinces of Canada	3,725 individuals, 1,620 nurses, 398 social workers, 285 others, and 113 physicians.	Showed increased in competencies after training. 683 modules delivered. Barr 6 level evaluation framework.	Use of self-report might introduce bias.
Fothergill, A., Northway, R., Allen, J., Sinfield, M. 2011	Wales, United Kingdom	To examine, in the context of holistic care, the benefits of Interprofessional Collaboration education for Mental Health staff.	Qualitative, descriptive design. Semi-structured interview participants across professions in Mental Health field using thematic content analysis.	Telephonic and in mental health clinic locations	15 participants, 11 nurses, 1 SW, 1 Psych, 2 CHW	Training with a diverse group impacts respect, recognition of the need for collaboration and improved relationship building.	Bias due to use of 2 teams, small sample

Goldman, J., Meuser, J., Rogers, J., Lawrie, L., Reeves, S. 2010	Ontario, Canada	To examine the perceptions and experiences of interprofes-sional collaboration in family health teams.	Qualitative descriptive study. Semi-structured interviews. Inductive thematic approach used.	Primary care	32 individuals, 12 teams	Findings indicated leadership, space and role definition all assist in explaining and supporting primary health teams.	Small sample.
Johnson, S., Kring, D., 2012	Winston-Salem, North Carolina, USA	To identify perceptions of collaboration by nurses of nurse/physician interactions.	Quantitative quasi-experimental design, descriptive survey	Intensive care unit.	174; 89 medical-surgical nurses, 77 intensive care nurses	Findings indicated ICU nurses were more likely to see a lack of physician collaboration than medical surgical nurses,	Study was sited at only one facility.
Kenaszchuk, C., Reeves, S., Nicholas, D., Zwarenstein, M. 2010	Toronto, Canada	To develop a scale of IPC for multiple provider groups.	Quantitative experimental design using round robin format for exploratory and confirmatory factor analysis (nurses and physicians).	Community and teaching hospitals (15)	479 cases, 144 nurses	Communication, isolation and accommodation identified as three important factors resulting in a scale for measuring IPC. Nurse and physician ratings are found to be asymmetrical across measures.	Items adapted from a nursing scale so may not reflect other professions; made for acute care settings.

Laird, H., Soloman, D., Jodoin, C., Dwamena, F., Alexander, K., Rawsthorne, L., Banker, T., Gourineni, N., Aloka, F., Frankel, R., Smith, R. 2010	Lansing, Michigan, USA	To conduct patient-centered care team training to measure nurses' learning, and patient outcomes.	Quantitative experimental design of retrospective pre/post/six month post design. Eight hours of training by trained nurse leaders.	Medical ward	28 nurses 86 patients	Training or residents and nurses was well received and nurse scores indicated improvement in knowledge. Patient satisfaction scores did not demonstrate a change.	Intervention and control groups of unequal size.
McDonald, J., Davies, G., Jayasuriya, R., Harris, M. 2010	Sydney, Australia	To identify factors influencing collaborative relationships, and strategies that support collaboration for future policy implication.	Qualitative ethnographic design using semi-structures interview process. Thematic analysis conducted using a social constructivist approach.	Private and public sector primary and community health service centers.	32 participant interviews from 20 organizations, 8 professions represented	Collaboration on diabetes care between private sector organizations was easier than between private and public organizations.	Specific model of government responsibility.
Mellin, E., Bronstein, L., Butcher, D., Amorose, A., Ball, A., Green, J. 2010	University Park, PennsylvaniaUSA	To measure team collaboration among mental health professionals in school settings.	Qualitative grounded theory design. Exploratory factor analysis.	Mental health teams in schools across the U.S.	436 school team members	Themes revealed were interdependence, reflection, mutual respect, shared decision making & responsibility & collective ownership of goals.	Reliability and validity need to be examined.
Mills, J., France, K., Birks, M., Coyle, M., Henderson, S., Jones, J. 2010	Queensland, Australia	To explore the role and scope of the registered nurse as an interprofes sional team member.	Qualitative descriptive design. Multi-case study, thematic review of interview transcripts.	Five remote areas of Queens Land Australia	35 nurses; 23 interviews and 4 focus groups	Nurses on IP teams see significance in collaboration, communication and partnerships. Understanding roles, enhances communication.	Remote site would impact ability to generalize.

Murray-Davis, B., Marchall, M., Gordon, F. 2014	Sheffield, United Kingdom	To understand how newly practicing midwives apply their interprofes-sional training,	Qualitative grounded theory using semi-structured interview, focus groups, and questionnaires	Community setting	Midwives, students, educators	Application of collaboration in practice was dependent on learning environment and sense of shared partnership	Purposive sample associated with 4 Universities
Piquette, D., Reeves, S., Leblanc, V. 2009	Toronto, Canada	How a medical crisis in an ICU impacts interprofessional interactions.	Qualitative descriptive design. Semi-structured interview participants across professions using inductive thematic analysis.	ICU in a large Canadian health center	25 individuals 6 MD, 14 RN, 5 RT	Mutual respect was the premise of interactions in pre-crisis communication while hierarchical communication reigned during a crisis. Post crisis communication needs differed among professions.	
Reiger, K., Lane, K. 2009	Melbourne, Australia	To investigate what doctors and what nurses define as a 'good' colleague.	Qualitative grounded theory analysis of semi-structured interviews and focus groups.	Suburban maternity units	102 76 midwives, 19 physicians, 7 managers	There were core similarities desired in professions however not a match in the' ideal' professional. Role boundaries, rude behavior and increasing workload impacted relationships. There was a foundation for professional courtesy present.	One specialty area of focus.

Rice, K., Zwarenstein, M., Conn, L., Kenaszchuk, C., Russel, A., Reeves, S. 2010	Toronto, Canada	To describe results of an interprofes sional intervention on an internal medicine ward.	Qualitative, 90 hours of ethnographic observation as a design.	General internal medicine ward (2) in Canadian urban hospital	250 staff, 10 professions included	Trial of using self-introduction, issue discussion and feed-back was not successful. Hierarchies have a bearing on communicatio n but leaders did not communicate study to staff.	The study was reported to be not supported by leadership, thus limiting participation.
Richer, M., Ritchie, J., Marchionno, C. 2009	Montreal, Canada	To identify ideas for improving collaboration through scenario team exercises	Qualitative ethnographic design. Multi-embedded case study. Two interdisciplinar y groups using appreciative inquiry.	Outpatient cancer center	Total of 47 participants , 28 nurses, 3 physicians, 4 pharmacists , 7 volunteers, 5 others	Contribution to the literature on innovation for care delivery can occur through common goal development. Ideas were common education & lunchroom.	Observational period too short to fully evaluate implement-ation.
Robinson, F., Gorman, G., Slimmer, L., Yudkowsky, R. 2010	Illinois, USA	To describe what is meant by effective and ineffective interprofes-sional communica-tion.	Qualitative descriptive design using focus group response evaluations to determine themes.	Acute care hospital	18 individuals, 9 physicians, 9 nurses	Themes of effective communicatio n include clarity, precision, collaborative problem solving, mutual respect and calm support.	Participants viewed the questionnaire prior to the focus group.
Rubio-Valera, M., Jove, A., Hughes, C., Gullen-Sola, M., Rovira, M., Fernandex, A., 2012	Barcelona Spain	To identify and analyze factors impacting relationships between general practitioners and pharmacists	Qualitative descriptive-exploratory study design.	Physician offices	37 individuals, 18 physicians, 19 pharmacists	Economic issues and attitudes/perce ptions can impact the collaboration of physicians and pharmacists.	Sample size limitation.

Russell, G., Dabrouge, S., Hogg, W., Geneau, R., Muldoon, L., Tuna, M. 2009	Ontario, Canada	To determine whether chronic disease management of 4 primary health models associate with high quality care.	Mixed method design. Qualitative case study grounded theory application and Quantitative quasi-experimental cross-sectional evaluation.	Primary care practices	363 individuals, 137 sites, two purposefully selected for qualitative case study	Chronic disease management superior with interprofessional collaboration and longer consultations.	Limitations due to response rate and exclusion of practices in the far north of the province
Sinclair, L., Lingard, L., Mohabeer, P. 2009	Toronto, Canada	To analyze IPC in the rehabilitation setting	Qualitative study using focus groups and thematic analysis.	Rehabilitation Unit	40 participants from three healthcare professions	Promotion of IPC is made through culture and communication (clinical and organizational).	Rehabilitation setting may limit application in other sites..
Stein, J., Liaschenko, J. 2007	Sydney, Australia	To analyze the ICU culture of collaboration	Qualitative ethnographic fieldwork study using model of knowledge types and quantitative correlation of survey responses.	Intensive care unit.	12 nurses	Types of knowledge (case knowledge) did impact level of collaboration.	Ethnographic observations were context specific.
Upenieks, V., Lee, E., Flanagan, M., Doebbeling, B 2010	Califor-nia, USA	To conduct a study to refine an existing IPC tool	Mixed model. Qualitative phenomenology study of cognitive interviews followed by quantitative cross sectional factor validation (convergent validity) for instrumentation development.	Regional commun-ity hospital.	439 (of 464) completed the survey. Four professions represented. 15 of 18 targeted nurses completed interview.	The healthcare vitality instrument is valid and can assist in nurse retention, improved management, and better team communication.	Minimal participation from physicians.

Weller, J., Barrow, M., Gasquioine, S. 2011	Auckland, New Zealand	To examine interactions of new graduate nurses and physicians related to interprofes sional collaboration.	Qualitative design. Gounded theory. Semi-structured interviews applied to health care team function theory.	Hospital	25 individuals 13 doctors 12 nurses	The conclusion was that shared information was the most vital attribute for interprofessio nal collaboration. The environmental barriers to attaining good communicatio n were identified for future action.	Perspective of only new graduates
Wright, B., Lockyer, J., Fidler, H., Hofmeister 2007	Calgary, Canada	Examination of IPC by Family Practitioners in the field of Geriatrics	Qualitative descriptive design using focus groups and thematic analysis.	Geriatric health care teams	49 individuals 17 Family Physician's, 22 other health care professiona ls	Themes of: decision making, roles on the team, inclusion, and responsibility were identified. Identified differences create impediments to IPC.	Practitioners all from 1 city

APPENDIX B

Data Collection Procedure

Data Collection and Procedures Protocol

Initial Site Permission

Go to medical home at 12 noon. Introduce self to front desk identifying self as research representative from Texas Children's Health Plan and ask for escort to physician office.

Introduce self to physician and briefly explain study goals, duration, and time commitment. Answer any questions about the study. Obtain physician permission for site intervention.

Initial Staff Introduction Consent Explanation

Go to medical home at 11:45. Identify self to the receptionist, requesting escort to the break room. Meet as a group, introducing self to the group. Explain the study, including that breaks will mitigate fatigue of participants and that participants should alert the facilitator of any fatigue or other issues connected with the study. Meet individually with staff in a private room further explaining the study, answering questions, screening for inclusion criteria, and requesting participation. If individual declines, attempt to determine reasons for decision.

Have agreeing individuals sign consent form after giving explanation.

Intervention Group

Meeting WK 1, Intervention Group: Arrive at 11:45, identifying self to the receptionist and requesting escort to set out lunch and materials and get computer online. Introduce self and ask group members to introduce themselves and wear name tags for the first week. Distribute TeamSTEPPS binder. Follow the TeamSTEPPS Primary Care Version training protocol beginning with 'Introduction' through' Let's Talk About Your Team,' using scripts, video, and materials.

Meeting WK 2, Intervention Group: Arrive at 11:45, identifying self and request escort to set out lunch and materials and get computer online. Take attendance. Recap the prior weeks' information, take attendance, and solicit any discussion from prior material. Next, follow TeamSTEPPS Primary Care Version training protocol beginning with Obstacles Primary Care Office-Based Teams Face through Debrief Checklist using scripts and course materials.

Meeting WK 3, Intervention Group: Arrive at 11:45, identifying self and request escort to set out lunch and materials and get computer online. Take attendance. Recap the prior weeks' information, take attendance, and solicit any discussion from prior material. Follow TeamSTEPPS Primary Care Version training protocol from Leadership Video through Task Assistance using script and course materials

Meeting WK 4, Intervention Group: Arrive at 11:45, identifying self and request escort to set out lunch and materials and get computer online. Take attendance. Recap the prior weeks' information, take attendance, and solicit any discussion from prior material. Follow TeamSTEPPS Primary Care Version training protocol from Feedback through CUS Words using scripts and materials.

Meeting WK 5, Intervention Group: Arrive at 11:45, identifying self and request escort to set out lunch and materials and get computer online. Take attendance. Recap the prior weeks' information, take attendance, and solicit any discussion from prior material. Follow the TeamSTEPPS Primary Care Version training protocol beginning with DESC Script through Check Backs using scripts and materials

Meeting WK 6, Intervention Group: Arrive at 11:45, identifying self and request escort to set out lunch and materials and get computer online. Take attendance. Recap the prior weeks' information, take attendance, and solicit any discussion from prior material. Follow TeamSTEPPS Primary Care Version training protocol beginning with

Communication through Bringing It All Together using scripts and course materials. Explain the transition to next week's quality project for an opportunity to put into practice what we have been learning. Distribute TeamSTEPPS laminated pocket cards to participants as well as a certificate of completion.

Quality Project Meeting, WK 7: Arrive at 11:45, identifying self to receptionist and request escort to set out lunch and materials. Take attendance. Explain the timeframe for the project and give an overview of a Plan-Do-Study-Act process using handout. Ask the team to develop a list of 4-6 potential improvement projects the Group might be interested in. Through individual ballot selection, identify a project choice. Identify roles of the group for this project with a handout. Explain the group is to select project lead. Document accountabilities by role as decided. Charge the group to establish desired timeline and identify who and how to obtain baseline data. Document the current flow of the selected project using a flipchart (as related by team members). Hand out information on responsibilities of roles and an agenda for the next meeting. Explain telephonic availability for support.

Quality Project Meeting, WK 8: Arrive at 11:45, identifying self to receptionist and requesting escort to set out lunch and materials. Take attendance. Revisit project decision and roles and distribute the agenda and notes from the prior session. Have the selected individual present baseline data. Support the scribe role, in documenting the current flow of the selected project using a flipchart (type minutes and return them at next session) as items are related by team members. Encourage the lead to discuss what parts of the flow might be eliminated without impacting value or what might increase value. Have scribe, (at the direction of the team) document a new flow. Create a list of actions that might help impact the project. Have the team vote on to select a strategy. Set a start date to implement the strategy. Distribute an agenda for the next meeting.

Quality Project Meeting, WK 9: Greet receptionist and ask for entrance to break room. Arrive at 11:45, identifying self to receptionist and requesting escort to set out lunch and materials. Take attendance. Discuss any changes since last week. Have team, through agenda, seek clarification and, if needed, discuss any barriers or needed modifications. Discuss data collection.

Quality Project Meeting WK 10: Arrive at 12 noon for meeting with project lead. Greet receptionist and ask for entrance to break room. Take attendance. Discuss any changes since last week. Have team, through agenda, seek clarification and, if needed, discuss

any barriers or needed modifications. Have the team review data and compare to baseline.

Quality Project Meeting, WK 11: Arrive at 12 noon for meeting with project lead. Greet receptionist and ask for entrance to break room. Take attendance. Discuss any changes since last week. Have team, through agenda, seek clarification and, if needed, discuss any barriers or needed modifications. Discuss team satisfaction with their contribution to the project thus far and how TeamSTEPPS training might have impacted the team interaction.

Quality Project Meeting, WK 12: Arrive at 11:30 to set up room and set out lunch. Greet receptionist and ask for entrance to break room. Take attendance. Discuss group progress and how group believes the project is to be sustained. Explain measurement instrument of interprofessional collaboration. Collect measurement tools when completed.

Document quality project and return to the lead physician for potential submission as their Maintenance of Certification quality activity.

Control Group Intervention

Meeting WK1, Control Group: Arrive at 11:45 to set up room and lunch. Greet receptionist and ask for escort to the break room. Introduce self and ask group members to introduce themselves and wear nametags for the first week. Distribute educational binder. Follow the Energize our Families curriculum training protocol beginning with Lesson 1. Hand out workbooks. No subgroup breakout sessions or shared discussion opportunities will occur. Answer questions on an individual period at the end of the session.

Meeting WK2, Control Group: Arrive at 11:45 to set up room, lunch and get computer online. Greet receptionist and ask for escort to the break room. Take attendance. Present Lesson 2 to staff. No subgroup breakout sessions or shared discussion opportunities will occur. Answer questions on an individual period at the end of the session.

Meeting WK 3, Control Group: Arrive at 11:45 to set up room, lunch and get computer online. Greet receptionist and ask for escort to the break room. Take attendance. Present

Lesson 3 to staff. No subgroup breakout sessions or shared discussion opportunities will occur. Answer questions on an individual period at the end of the session.

Meeting WK 4, Control Group: Arrive at 11:45 to set up room, lunch and get computer online. Greet receptionist and ask for escort to the break room. Take attendance. Present Lesson 4. No subgroup breakout sessions or shared discussion opportunities will occur. Answer questions on an individual period at the end of the session.

Meeting WK 5, Control Group: Arrive at 11:45 to set up room, lunch and get computer online. Greet receptionist and ask for escort to the break room. Present Lesson 5 to staff. No subgroup breakout sessions or shared discussion opportunities will occur. Answer questions on an individual period at the end of the session.

Meeting WK 6, Control Group: Arrive at 11:45 to set up room, lunch and get computer online. Greet receptionist and ask for escort to the break room. Take attendance. Present Lesson 6 to staff and remind them of next week's session changing to an individual format. No subgroup breakout sessions or shared discussion opportunities will occur.

Meeting WK 7 Control Group: Arrive at 11:45 to set up room and lunch. Greet receptionist and ask for escort to the break room. Meet individually with staff in a private room to discuss how information from Energize our Families was used the week prior with self or in the practice. Give support for any roadblocks or clarify any information. Take attendance.

Meal Planning WK 8: Arrive at 11:45 to set up room and lunch. Greet receptionist and ask for escort to break room Meet individually with staff in a private room to discuss how information from Energize our Families was used the week prior with self or in the practice. Give support for any roadblocks or clarify any information. Take attendance.

Meal Planning WK 9: Arrive at 11:45 to set up room and lunch. Greet receptionist and ask for escort to the break room. Meet individually with staff in private room to discuss how information from Energize our Families was used the week prior with self or in the practice. Give support for any roadblocks or clarify any information. Take attendance.

Meal Planning WK 10: Arrive at 11:45 to set up room and lunch. Greet receptionist and ask for escort to the break room. Meet individually with staff in private room to discuss how information from Energize our Families was used the week prior with self or in the practice. Give support for any roadblocks or clarify any information. Take attendance.

Meal Planning WK 11: Arrive at 11:45 to set up room and lunch. Greet receptionist and ask for escort to the break room Meet individually with staff in private room to discuss how information from Energize our Families was used the week prior with self or in the practice. Give support for any roadblocks or clarify any information. Take attendance.

Meal Planning WK 12: Arrive at 11:45 to set up room. Greet receptionist and ask for escort to the break room. Hand out meal planning tools for future use. Explain the interprofessional collaboration measurement instrument. Collect measurement tools when completed and distribute certificates of completion as completed tools are received.

Data entry

Determine coding to be used for SPSS for entry of the Collaborative Practice Assessment Tool as well as demographic data.

Enter individuals enrolled in the study into an excel spreadsheet on the password encrypted study computer. After each week's meeting document attendance at the meeting.

At the end of the 12 week intervention, have the participants complete the Collaborative Practice Assessment Tool. Enter the data collection forms into SPSS on the password encrypted study computer.

Note 'entered' on the entered tools and then place in a locked file in the locked study office.

Maintain the locked information for 12 months before shredding the information.

APPENDIX C

Assessment of Interprofessional Team Collaboration Scale

Assessment of Interprofessional Team Collaboration Scale (AITCS)

The AITCS is a diagnostic instrument that is designed to measure the interprofessional collaboration among team members. It consists of 37 statements considered characteristic of interprofessional collaboration (how team works and acts). Scale items represent four elements that are considered to be key to collaborative practice. These subscales are: (1) Partnership/shared Decision Making —19 items, (2) Cooperation--11 items, and (3) Coordination—7 items.

Scoring AITCS

Respondents indicate their general level of agreement with items on a 5-point rating scale that ranges from 1 = "Never"; 2 = "Rarely"; 3 = "Occasionally"; 4 = "Most of the time"; to 5 = "Always".

These ratings produce scores from 37 to 185. It takes approximately 15 minutes to complete.

Demographic Information

Please check □ the category you belong to:

Gender: □ Male □ Female Age: ____years

Educational Preparation

□ Certificate □ Bachelor Degree

□ Diploma □ Masters Degree

□ High School Graduate □ Other (specify): _____

Please check one of the following discipline categories:

□ Physician (Medicine) □ Nurse Practitioner

□ Office Manager □ Physician Assistant

□ Medical Assistant

□ Nursing: Registered Nurse

□ Other (please specify) _____

□ Social Worker

□ Practical Nurse

Assessment of Interprofessional Team Collaboration Scale

Instructions:

Note: Several terms are used for the person who is the recipient of health and social services. For the purpose of this assessment, the term ‘patient’ will be used. While acknowledging other terms such as ‘client’ ‘consumer’ and ‘service user’ are preferred in some disciplines/jurisdictions.

Please read over each statement and circle the value which best reflects how you currently feel your team and you, as a member of the team, work or act within the team.

| ---------- | ---------- | ---------- | ---------- | ---------- |

1	2	3	4	5
Never	Rarely	Occasionally	Most of the time	Always

Section 1: PARTNERSHIP/SHARED DECISION MAKING[1]

When we are working as a team[2] all of my team members…..

1 Orchard & Curran “A partnership between a team of health professionals and a client in a participatory collaborative and coordinated approach to shared decision-making around health and social issues” (2003)

2

1	establish agreements on goals for each patient we care for	1 2 3 4 5
2.	are committed to the goals set out by the team	1 2 3 4 5
3	include patients in setting goals for their care	1 2 3 4 5
4	listen to the wishes of their patients when determining the process of care chosen by the team	1 2 3 4 5
5.	meet and discuss patient care on a regular basis	1 2 3 4 5
6.	would agree that there is support from the organization for teamwork	1 2 3 4 5
7.	coordinate health and social services (e.g. financial, occupation, housing, connections with community, spiritual) based upon patient care needs	1 2 3 4 5
8.	use a variety of communication means (e.g. written messages, email, electronic patient records, phone, informal discussion etc.)	1 2 3 4 5
	use consistent communication with team members to discuss	1 2 3 4

9.	patient care	5
10.	are involved in goal setting for each patient	1 2 3 4 5
11.	listen to and consider other members' voices and opinions/views in regard to deciding on individual care planning processes	1 2 3 4 5
12.	would agree when care decisions are made, the leader strives to obtain consensus on planned processes from all parties	1 2 3 4 5
13.	feel a sense of belonging to the group	1 2 3 4 5
14.	establish deadlines for steps and outcome markers in regards to patient care	1 2 3 4 5
15.	jointly agree to communicate plans for patient care	1 2 3 4 5
16.	consider alternative approaches to achieve shared goals	1 2 3 4 5
17.	encourage each other and patients and their families to use the knowledge and skills that each of us can bring in	1 2 3 4 5

	developing plans of care	
18.	focus of our teamwork is consistently the patient	1 2 3 4 5
19.	work with the patient and his/her relatives in adjusting care plans	1 2 3 4 5

Section 2: COOPERATION

When we are working as a team all of my team members…..

20.	share power with each other	1 2 3 4 5
21	help and support each other	1 2 3 4 5
22.	respect and trust each other	1 2 3 4 5
23.	are open and honest with each other	1 2 3 4 5
24.	make changes to their team functioning based on reflective reviews	1 2 3 4 5

25.	strive to achieve mutually satisfying resolution for differences of opinions	1 2 3 4 5
26.	understand the boundaries of what each other can do	1 2 3 4 5
27.	understand that there are shared knowledge and skills between health providers on the team	1 2 3 4 5
28.	exhibit a high priority for gaining insight from patients about their wishes/desires	1 2 3 4 5
29.	create a cooperative atmosphere among the members when addressing patient situations, interventions and goals	1 2 3 4 5
30.	establish a sense of trust among the team members	1 2 3 4 5

Section 3: COORDINATION

When we are working as a team all of my team members…..

31.	apply a unique definition of Interprofessional collaborative	

	practice to the practice setting	1 2 3 4 5
32.	equally divide agreed upon goals amongst the team	1 2 3 4 5
33.	encourage and support open communication, including the patients and their relatives during team meetings	1 2 3 4 5
34.	use an agreed upon process to resolve conflicts	1 2 3 4 5
35.	support the leader for the team varying depending on the needs of our patients	1 2 3 4 5
36.	together select the leader for our team	1 2 3 4 5
37.	openly support inclusion of the patient in our team meetings	1 2 3 4 5

Revised version June 28, 2011

Thank you for completion of this questionnaire!