In Pursuit of High Performing Health Care Teams:

A Test of TeamSTEPPS® as a Model to Improve Relational Coordination

In Ambulatory Care Teams

Dylan V. Ross

Alliant International University

California School for Professional Psychology
Abstract

The purpose of this study is to explore whether TeamSTEPPS®, a popular health care team training program, impacts relational coordination in ambulatory health care teams. Seeing that this is the first study of its kind, it also aims to contribute to this nascent area of research by expanding what is known about which interventions impact relational coordination. In teams, higher levels of relational coordination have been shown to predict a wide range of performance outcomes including patient and provider satisfaction, improved safety and quality outcomes, as well as medical cost savings. TeamSTEPPS®, developed in 2004, is an evidence-based team training curriculum designed to improve medical team performance in military medical settings. Since its inception, the adoption of the TeamSTEPPS® curriculum has expanded and it is now widely used in an array of civilian health care settings. Because both TeamSTEPPS® and relational coordination theory share many of the same constructs, they appear to be complementary, yet to date no identified studies have attempted to assess the impact of TeamSTEPPS® on relational coordination. As a result, the objective of this exploratory study is to assess TeamSTEPPS® impact on relational coordination using a pre-experimental, one-group, pre-test/post-test study design. Overall, this research aims to contribute the first insights regarding what is known about the possible impact of TeamSTEPPS® on relational coordination.
In Pursuit of High Performing Health Care Teams: A Test of TeamSTEPPS® as a Model to Improve Relational Coordination in Ambulatory Care Teams

Introduction

The cost of health care in the United States has risen dramatically over the past 40 years. Within the last decade it is estimated that health care costs have risen over 76% (Keehan, et al., 2011). As the saying goes “you get what you pay for,” but in the case of health care in America, consumers not only have gotten less for more, but also have been placed at risk when in the hands of health care teams. In their ground breaking report, To Err is Human: Building a Safer Health System, the Institute of Medicine (IOM) estimated as many as 98,000 patients die each year as a result of medical errors and adverse events (IOM, 1999). As shocking as this number may be, more recent research published in the journal Health Affairs suggests that the number of adverse events in medical settings may be as much as ten times higher than what the IOM initially estimated in 1999 leaving questions regarding the actual number of deaths related to medical errors per year (Classen et al., 2011). In addition to the tens of thousands of lives lost, the financial cost of these adverse events has been estimated at $29 billion annually (IOM, 1999). The source of these errors commonly can be traced back to human error. In subsequent research, it was determined that many of these deaths could have been prevented through improved communication and coordination between health care teams across the care continuum (JCAHCO, 2004).

In their 2001 follow up report, Closing the Quality Chasm: A New Health System for the 21st Century, the IOM reiterated the following: to improving safety and quality in health care, medical providers must improve their ability to collaborate, communicate and coordinate across the care continuum (IOM, 2001). Within this report the IOM pointed to provider education as an
areas ripe for improvement, concluding that most physicians are not trained to work effectively as members of care-provider teams (IOM, 2001). In that same year, the American Hospital Association (AHA) convened the Task Force on Delivery System Fragmentation and separately arrived at a similar conclusion noting that better alignment among providers is the key to improving patient care and enhancing productivity (AHA, 2005). Despite the calls for improved coordination and communication through team training, the American health care system continues to be plagued by highly fragmented care, poor communication and disjointed coordination among providers.

Following the ground breaking IOM reports on medical errors, the federal branch of the U.S. government established a task force charged with addressing the recommendations set forth in To Err is Human. Because errors in health care are not confined to the civilian sector, the Department of Defense (DOD) joined forces with the Agency for Healthcare Research and Quality (AHRQ) to conduct a review of both DOD and non-military health care team training programs understanding that lacking coordination and communication at the team level was a root cause for many recorded medical errors (Powell, 2010). From their findings the DOD and the AHRQ identified gaps in health care team competencies, as well as in the curricular programs responsible for training these professionals. As a result, the DOD and AHRQ set out to design a new team training program with the aim of closing these gaps. What resulted was Strategies and Tools to Enhance Performance and Patient Safety, or TeamSTEPPS® (AHRQ, 2013).

For the purpose of this dissertation, I propose to study the possible impact of the primary care team training curriculum, TeamSTEPPS®, on team member’s perceptions of coordination and communication, as measured by the Relational Coordination Survey 2.0, a valid and reliable
measure of coordination. Within teams, higher levels of relational coordination have been shown to predict a wide range of performance outcomes including, employee and patient satisfaction, improved safety and quality outcomes, as well as medical cost savings (Gittell, et al., 2000; Gittell, 2002b; Gittell, Weinberg, Pfefferle & Bishop, 2008; Gittell, 2008). TeamSTEPPS® is an evidence based team training curriculum originally designed to improve medical team performance in military medical settings. Since its inception, the adoption of the TeamSTEPPS® curriculum has expanded and now is widely used in an array of health care settings.

TeamSTEPPS® and relational coordination theory share many of the same constructs and thus it is proposed that the application of TeamSTEPPS® will positively affect relational coordination in ambulatory health care teams (see Figure 1).

Figure 1: Complementary and Shared Constructs

<table>
<thead>
<tr>
<th>Relational Coordination</th>
<th>TeamSTEPPS®</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mutual Respect, Problem Solving Communication</td>
<td>Mutual Support</td>
</tr>
<tr>
<td>Shared Knowledge</td>
<td>Situational Monitoring, Shared Mental Models</td>
</tr>
<tr>
<td>Frequent, Timely, Accurate Communication</td>
<td>Core Competency of Communication</td>
</tr>
</tbody>
</table>

Despite their similarities, no identified studies to date have assessed the possible impact of TeamSTEPPS® on relational coordination. As a result, the objective of this study is to measure the possible impact of the TeamSTEPPS® training on relational coordination using a pre-experimental, one-group, pre-test/post-test study design (Campbell and Stanley, 1963). As such, the guiding research question for this project is as follows:

**Does the application of the TeamSTEPPS® team training curriculum improve team-level relational coordination scores in cross-functional health care teams?**
Statement of Hypotheses

**H1:** Team participation in the team training will produce positive changes in the overall team-level relational coordination scores from T1 to T2.

**H2:** Some roles, compared to other roles, will experience significant change in relational coordination from T1 to T2.

**H3:** Intra-professional role ratings (i.e. MD to MD, RN to RN) will result in significantly higher RC scores both at T1 and T2 when compared to inter-professional role ratings (i.e. MD to RN).

**Exploratory Research Questions**

**Q1:** Are there any individual-level demographic variables that correlate with relational coordination scores at T1 and T2, or with the degree of change in relational coordination between T1 and T2?

**Q2:** Is there a relationship between a professional group’s reported level of training use and group level relational coordination scores at T2?

- *As measured by the question: “To what extent do you use in your daily work what you learned in the team training?”*

- *(Likert scale: 1-5; where 1 = “Not at all” and 5 = “Completely”)*
Overall, this research aims to contribute to what little is known about the use of TeamSTEPPS® as a model of improving relational coordination. It is my hope that by identifying reliable means of improving team coordination within health care settings that the quality and safety of health care in U.S. will improve.

Background

Coordinating Work: A Historical Perspective

Establishing highly effective and coordinated work systems in organizations is both necessary and difficult. This difficulty results not only from the complexity of coordination itself, but also from the dynamic contexts where work occurs. Many underlying structures in contemporary organizations inhibit coordination by fragmenting job functions whose role in the work system requires input from others outside of their particular domain. These functional domains or silos were once thought to leverage efficiency, though many organizational theorists today view silos as constraints to efficiency (March & Simon, 1958; Deming, 1986; Gittell, 2011a). This sea change from silos to multidisciplinary teams has been fueled by the changes in the nature of work itself.

As the U.S. economy has moved from a production to a knowledge-based orientation, the requirements placed on organizations have changed. Traditional top-down bureaucracies previously assumed a technological perspective when conceiving the organization. As such, vertical silos and functional specialization were believed to increase organizational output. Management within these organizations commonly minimized coordination within and between departments and viewed communication at lower levels of the organization as being on a “need to know” basis only.
Theoretical perspectives espoused throughout the years previously included technical and psychological approaches to job design (Gittell, 2008). Historically, the technical approach assumed that organizations were similar to machines and therefore jobs within organizations should be mechanistic by design (Smith, 1991; Taylor, 1911; in Gittell, 2008). Advantages of this approach included the creation of specialized functional roles that allowed organizations to improve efficiency through simplification (Smith, 1991; Taylor, 1911; in Gittell, 2008). Later theories embraced a psychological approach to job design. This view took into account intrinsic motivation and job satisfaction, later found to be correlated with organizational performance (Ambrose & Kulik, 1999; Likert, 1961; McGregor, 1960; in Gittell, 2008).

However, these traditional approaches to job design failed to take into account the relational aspects of coordination, or how each part related to each other and comprised the larger whole. It was not until the adoption of open systems thinking that organizational leaders began to debate how “open” an organization should be. Contemporary relational theorists such as Jody Hoffer Gittell (2011a) have credited the early 20th century theorist Mary Parker Follett as being one of the first individuals to take a different view of the organization, one that conceptualized the organization as a single functional system, versus many separate functional parts (Gittell, 2011a).

Follett, an American social worker and organizational theorist appears to be one of the first to propose a relational theory of coordination. Follett understood organizations as complex systems influenced by reciprocal interactions of interdependencies (Follett, 1949). She proposed that the coordination of work occurs through reciprocal relationships between all factors within the organization and understood coordination as a continual process of adjustments within and between individuals and roles within an organization (Mele, 2006; Fox, 1968; Schilling, 2000).
In Follett’s seminal collection of essays delivered at the London School of Economics in 1949, she decried the benefit of experts and specialists within a given system noting that the separation of required knowledge at times may help the individual, yet ultimately hinders the greater group and thus the larger whole. She suggested that effective coordination could only occur by bringing together information from across the organization (Follett, 1949). In her writings, Follett spoke of “interlocking responsibilities” and the “development of group responsibility” as keys to successful coordination (Follett, 1949; p. 49). Follett noted that “wherever men or groups think of themselves not only as responsible for their own work, but as sharing in responsibility for the whole enterprise, there is much greater chance of success for that enterprise” (Follett, 1949; p. 50). Follett’s suggestion that organizations were interdependent systems was a radical shift in thinking when compared to the prevailing perspectives of her day. Ahead of her time, Follett proposed that integration, cross-functional design and collective responsibility were key ingredients to successful coordination within the organization (Follett, 1949). Yet, her critique of the separation of knowledge through fragmented structures in organizations was not immediately embraced and traditional bureaucratic organizational designs continued despite their shortcomings.

**Functional Specialization and Fragmentation: A Contemporary View**

Across most industries jobs have become increasingly specialized as new technologies have emerged. In health care for instance, well-funded science drives the development of new technologies, which in turn creates the need for trained technicians capable of performing within these new areas of expertise. The American Board of Medical Specialties, the organization that oversees the majority of physician board certifications in the United States, lists no less than 145 distinctly different specialties and subspecialties of medical doctors within the health care
industry (ABMS, 2013). This number excludes additional specialties found within the non-physician ranks including, nurses and medical paraprofessionals, though when these are taken into account this number can reach to over 300 within a single institution. It is reasoned that the diversity of specialization within the American health care system will only continue to grow as new medical technologies advance (ABMS, 2013). Yet, with increases in specialization comes the need for increased coordination across various functional disciplines.

In all industries the specialization of job design has long been shown to impact metrics such as quality and efficiency (Gittell, 2008). It has been proposed that this improvement of quality and efficiency occurs through repetition and practice, thus enabling the development of skill and expertise within one’s role (Smith, 1991; Taylor, 1911; in Gittell, 2008). Other contributions of specialization include the creation of distinct occupational and practice communities within a given discipline, each with their own sub-culture (Gittell, 2008). In these communities, accreditation and training maintain quality standards within specific disciplines.

Despite the positive contributions of specialization, negative consequences exist as well. Specialization has been linked to fragmentation and the creation of silos around distinct professional communities (Gittell, 2008). When work occurs in a fragmented way the quality of communication between specialties is negatively impacted. For example, in siloed organizations communication is often infrequent, inaccurate and blaming (Gittell, 2009). In contrast, organizations that prioritize cross-specialty or cross-functional communication engender respect between each member’s role which positively impacts the larger system. Silos that result from functional specialization negatively impact the coordination of work between functional roles. In health care, fragmentation, lacking coordination and communication have been shown to
result in poorer health outcomes, worse quality, higher costs, and increased risk to patients (IOM, 1999; 2001; 2013).

**Mediating Processes: An Overview of Influential Theories, Theorists, and Models**

In medical settings physicians, nurses, specialists, medical technicians, and other health care providers must communicate effectively across their specialties to achieve coordination; a prerequisite for safe, high quality care. While under the constraints of time and uncertainty, team performance commonly fluctuates resulting in variations in practice patterns, deviation from protocols, infrequency and inaccuracy of communication and overall, poorer coordination between providers and teams. Ironically, as quickly as medical technology and science have advanced, the science of team training has not. Commonly considered the “soft side” of business, communication and coordination often take a back seat to the concerns of time and cost. Yet, the process dimensions of human work systems, such as communication and coordination, play a critical role in mediating important outcomes such as health status, safety, quality, and provider and patient satisfaction. As a result, these process dimensions must be prioritized when engaging in health care quality improvement.

Within the team performance literature, social process criteria such as task interdependence, organizational sub-cultures, leadership, team cohesion, communication, conflict management, problem solving, and interpersonal trust have been accounted for in various models of team performance (Lewin, 1935; Lewin, 1948; McGrath, 1964; Hackman, 1983; in Goodman, 1986; Driskell, Hogan & Salas, 1987; Tannenbaum, Beard & Salas, 1992; Gittell, 2003; Schein, 1988; Schein, 2010; Bennis & Nanus, 1985; Bennis & Townsend, 1995; Bennis, Spreitzer & Cummings, 2001). In the health care quality improvement literature
analogous models have also focused on these important process dimensions (Donabedian, 1966; Wilson, Burke, Priest & Salas, 2005).

Psychologist Kurt Lewin’s (1935) contribution to the group and team performance literature set the stage for the majority of the models that followed (Lewin, 1935; Lewin, 1948; Johnson & Johnson, 2009). His conceptualization of task interdependencies within organizations and groups marked a shift in thinking when it came to the understanding of how groups of people functioned in relationship to a goal (Johnson & Johnson, 2009). Lewin, a clinically trained psychologist’s perspective was informed by gestalt theory, which helped shape his view of how social systems operated. In his seminal works on personality and social conflict, Lewin argued that groups were made up of individuals who functioned as a single and dynamic whole, while working toward shared goals (Johnson & Johnson, 2009). Within his model when any one member took action, this action was understood have an effect on the entire social system.

Lewin’s model of interdependence within organized social systems continues to inform much of contemporary organizational theory today.

Another author whose work helped shape the field’s understanding of team performance and coordination in organizations is Edgar Schein (1988). Schein’s study of culture and leadership in organizations provided new perspectives on how the influential forces of culture affect individuals, groups and larger organizational systems (Schein, 1988; Schein, 2010). Schein’s work on organizational sub-cultures highlighted how within a single organization, multiple occupational sub-cultures could influence organizational performance. In his popular book Organizational Culture and Leadership, Schein notes that within industries such as health care, different sub-cultures develop within a single organization, each with their own shared language, culturally specific goals, and universal means of solving problems (Schein, 2010).
This phenomena is commonly seen within the ranks of medical professionals within health care institutions, such between doctors and nurses. When sub-cultural goals are in conflict with the goals of the larger organization poorer performance can result. Schein’s clarity about how the processes of cultures impact groups and teams is notable when observing such industries as healthcare, where functional sub-cultures are strong and occupational communities frequently work at cross-purposes ultimately undermining overarching organizational goals.

Theorist Warren Bennis’ (1985) work on leadership and organizations also helped shape the literature on team performance (Bennis & Nanus, 1985; Bennis & Townsend, 1995; Bennis, Spreitzer & Cummings, 2001). While contemplating the question of which organizational functions promote success, Bennis in his work interviewed hundreds of America’s top corporate leaders. Through action-research in organizations and work with their leadership, Bennis was able to form meta-perspectives informed by this work. In his book, Leaders, Bennis reflects on the over ninety interviews he conducted with organizational leaders who shared key insights related to performance. One finding that is particularly notable relates to the concept of shared mental models and their importance in the coordination of work. Bennis writes, “all organizations depend on the existence of shared meanings and interpretations of reality, which facilitate coordinated action” (Bennis & Nunus, 1985; p.39). His perspectives on how leaders influence teams and how team processes influence performance are cited frequently in the organizational behavior literature.

Although Lewin, Schein and Bennis contributed greatly to the general team and organizational literature, others contributed as well, though more focused specifically within medical theory. In his 1966 article, Evaluating the Quality of Medical Care, Avedis Donabedian (1966) proposed a new model for understanding quality in health care, one that conceptualized
care delivery in three separate dimensions: structures, processes and outcomes (see Figure 2) (Donabedian, 1966). In his writings, Donabedian noted that little attention had been paid to the social process dimensions within health care delivery systems (Donabedian, 1966). He argued that research aimed at human process criterion, such as coordination and communication, frequently were deprioritized to research focused on structural or outcomes based criteria (Donabedian, 1966). Attempting to understand these phenomena, Donabedian reasoned that this was the case because structural and outcomes oriented dimensions were more easily standardized and thus, easier to study (Donabedian, 1966). Within his critique, Donabedian proposed a new paradigm for understanding and studying quality in health care, ultimately laying the modern foundation for how health care quality improvement is understood today (Donabedian, 1966).

**Figure 2: Team Structures, Processes, and Outcomes**

![Diagram showing Team Structures, Processes, and Outcomes](Adapted from: Donabedian, 2005; Gittell, 2009)

Around this same time another model grew in popularity, one that conceptualized teams in a similar way as Donabedian, though again in the business context. McGrath’s (1964) Input-Process-Output (IPO) Model (Figure 3) argued that since teams were human systems and systems respond or react to inputs in a consistent way, than teams must do so as well. McGrath’s IPO Model viewed the sum of a team’s input responses as processes that ultimately mediate a team’s output and thus, overall performance (McGrath, 1964). Within the IPO Model McGrath
identified input criteria as including individual level factors (i.e. patterns of member skills, member attitudes and personality characteristics), group level factors (i.e. group structure, level of cohesiveness, and group size), and environmental-level factors (i.e. including group task characteristics, reward structures and level of environmental stress) (McGrath, 1964; p. 26). Outputs in the IPO Model were divided into two sub-groups including, performance outcomes (i.e. performance quality, speed to solution, and number of errors) and other outcomes (i.e. member satisfaction, group cohesiveness, attitude change, and sociometric structure) (McGrath, 1964; p. 26).

**Figure 3: McGrath’s Input, Process, and Output (IPO) Model**

![McGrath’s IPO Model](image)

(McGrath, 1964b)

Although McGrath’s model was less detailed in its description of process factors as subsequent team performance models, the Input-Process-Output framing did identify team processes as being comprised by the sum of all group interaction processes, including coordination and communication. Overall, McGrath’s Input-Process-Output and Donabedian’s Structure-Process-Outcomes models provided a solid framework upon which most future team performances models were built.
Another team performance model frequently mentioned in the literature is Hackman’s (1983) Normative Model of Group Effectiveness (Figure 2) (Yeatts & Hyten, 1998). Hackman’s model is an example of one that was greatly influenced by McGrath’s IPO Model, despite their differences. What is notable about the Normative Model of Group Effectiveness is how Hackman understood communication and coordination. In his model coordination and communication are viewed as inputs occurring within the system, as opposed to process criteria (Yeatts & Hyten, 1998). While reviewing Hackman’s perspective of the process components in his model, it becomes clear that he saw these dimensions somewhat differently than McGrath or Donabedian in that he carves out criteria related to group process seeing these as group effectiveness outcomes (Yeatts & Hyten, 1998).

**Figure 4: Hackman’s Normative Model of Group Effectiveness**

(Hackman, 1983; in Yeatts & Hyten, 1998)

Hackman’s model additionally took into account the importance of each member’s ability to see his or her work as it relates to the larger picture. Like Follett, Hackman understood the significance of having each team member understand his or her role in context to the larger system. By understanding one’s role in relation to the larger system, Hackman introduces his
own concept of shared mental models, which have since been found to leverage team performance.

Another notable model is Driskell, Salas and Hogan’s (1987) Group Performance Model (see Figure 5) (Driskell, Salas and Hogan, 1987). This model takes perhaps the most definitive stand on process interactions mediating outcomes. In their model, Driskell, Salas and Hogan utilize the IPO framework to conceptualize how teams function. Here team process factors again are underscored as determinant of outcomes. Outcomes in this model may result in either process losses or gains, with either category resulting based on how a team responds to inputs within the system (Driskell, Salas & Hogan, 1987).

**Figure 5: Driskell, Hogan & Salas’ Group Performance Model**

![Diagram of Driskell, Hogan & Salas’ Group Performance Model](image)

(Driskell, Hogan & Salas, 1987b)

**A Review of General Process Criteria: Team Cohesion**

In McGrath’s model, group cohesion is both a group-level input as well as an outcome. Yet, group cohesion in other models has been conceptualized as a process dimension. Cohesion as a general construct has received ample attention over the years. Group cohesion may be defined as the strength in which one feels compelled to stay a part of their team and degree of
affinity one feels towards that team (Lott & Lott 1961; Mickelson & Campbell, 1975; in Yates & Haden, 1998). Higher levels of cohesion have been found to be positively associated with performance outcomes including effective communication. In review of the team cohesion literature, Jewell and Reitz (1988) concluded that once members of cohesive groups achieve a given threshold of shared understanding, information exchanged becomes increasingly targeted and the effectiveness of communication improves (Jewell & Reitz, 1988).

**Communication**

Communication has been defined in countless ways, though Western Kentucky University’s professor Judith Hoover (2004) has defined it as “a process of creating shared meaning in order to bring people and ideas together” (Hoover, 2004; p. 20). Various communication models have been proposed over the years. Relevant to the team literature is Claude Shannon and Warren Weaver’s (1949) Linear Model of Communication, David Berlo’s (1960) SMCR Model of Communication (sender, message, channel, and receiver model) and Dean Barnlund’s (1970) Transactional Model of Communication (Shannon & Weaver, 1949; Berlo, 1960; Barnlund, 1970). With each iterating and arguably improving upon the next, these three theories laid the foundation for our current understanding of team based communication today.

Shannon and Weaver’s (1949) Linear Model of Communication was developed in the setting of the Bell Labs while exploring telephonic transmission technologies for radio and telephone (Littlejohn & Foss, 2009). Their most substantial contribution to general communication theory was the identification of five key elements of communication. These included an information source (the message), a transmitter, a channel, a receiver and a communication destination (Shannon & Weaver, 1949). In David Berlo’s (1960) later SMCR
Model of Communication (sender, message, channel, receiver model), the channel through which communication was received was introduced (Berlo, 1960). Within Berlo’s model channels included each of the five senses, therefore theoretically allowing for non-verbal communication to be introduced. In Barnlund’s Transactional Model of Communication the concept of feedback was amplified (Barnlund, 1970). This later conceptual development understood communication as a simultaneous process, whereby members of a team were both sending and receiving messages at the same time. This new addition provided the opportunity for mutual adjustments to be considered within a communication model.

James D. Thompson’s (1967) work around this same time also addressed mutual adjustment in organizational communication and conceptualized these adjustments as being informed by whatever information was available within a system at a given time (Thompson, 1967; in Thompson, Scott & Zald, 2009). When considering the role of communication in teams, this concept of mutual adjustment becomes increasingly significant, especially when interdependencies are high and work system tasks complex, such in the health care environment.

Trust

Because interdependencies in work systems result in shared impact when things go wrong, effective communication between organizational members is vitally important. Yet, communicating for the purpose of problem solving is commonly a challenge for teams. Depending on the level of trust and cohesion within the group, communicating with the goal of solving problems requires trust. Trust is commonly defined as a set of beliefs held by a team member about others on one’s team that are influenced by perceived levels of honesty, loyalty, interpersonal and task level competencies, as well as member consistency (Yeatts & Hyden, 1998; p.102). When trust is high, problem solving improves through team collaboration and
compromise. Yet, when trust and cohesion are low, communication and problem-solving patterns break down, later impacting goal attainment and overall team performance. In the organizational and team performance literature one theory that focuses on group cohesion, communication, conflict management, problem solving and interpersonal trust is relational coordination.

Relational Coordination Theory

The term relational coordination was first proposed by Jody Hoffer Gittell (2003) while studying flight departure systems at Southwest Airlines and since her corresponding theory has been widely applied within the healthcare industry (Gittell, 2002a, 2002b, 2003, 2008, 2009, 2011a; Gittell, Weinberg, Pfefferle & Bishop, 2008). Relational coordination is defined as “a mutually reinforcing process of interaction between communication and relationships carried out for the purpose of task integration” (Gittell, 2002b; p.301). Simply put, relational coordination is a model that makes visible the human interactions that underlie the technical processes required while coordinating complex work (see Figure 8) (Gittell & Suchman, 2013).

Figure 8: Relational Coordination

(Adapted from Gittell, Edmondson, Schein, 2011)
Relational coordination suggests that the relationships between functional roles within a work system help “shape the communication through which coordination occurs” (Gittell, 2011b; p.4). As a model relational coordination is comprised of three relational dimensions including, shared goals, shared knowledge, mutual respect; and four communication dimensions including, frequent, timely, accurate and problem solving type communication practiced when problems arise (Gittell, 2011a). This relational theory proposes when these seven dimensions of coordination are present and functioning at high levels, team performance improves.

**Shared Goals**

Relational coordination theory posits that effective coordination requires clearly defined goals that are understood by all members of a work system. In complex work systems, such as those found in health care, individuals working in functional specialties tend to be well versed in their own responsibilities as they relate to the scope of their position, yet do not share this same level of understanding when it comes to other roles within that same system. When members of a work system become functionally focused it comes at the expense of the overall system (IOM, 2001). That is to say, when members within fragmented work systems focus on local or subordinate goals, superordinate or larger goal orientation breaks down (Gittell, 2011). This phenomenon commonly results in misaligned efforts and poorer performance (Sherif, et al., 1961; March & Simon, 1958; in Gittell, 2011). Conversely, when higher-level goals are clear, members within the organization become capable of responding to new information allowing them to adjust to the complexities of their work environment minimizing the impact to the larger system (Gittell, 2011).
Shared Knowledge

The second core dimension of relational coordination addresses shared knowledge. Members who engage in a shared work system benefit from understanding the role and task responsibilities of other members within that system. When members share knowledge about each other’s job function effectively building and sharing mental models, they become capable of anticipating the needs of others and adjusting their behavior in support of their larger goals. For example, team members may change the speed or way they are working based on perceived changes in need (Gittell, 2011a). Or, members within a given work system may reallocate resources at different times in support of efficiency (Gittell, 2011a). Within fragmented organizational systems like health care, it is common for one specialty department to be ignorant to the specific role and task responsibilities of another within a that same system. This myopic view undermines the larger system’s level of functioning leading to decreases in performance.

Mutual Respect

Mutual respect within organizations with high levels of interdependencies is critical for high performance. This is again true in health care where organizations are typically hierarchical in nature. When respect between individuals is low, the quality of coordination suffers. As previously mentioned, in work systems with high levels of functional specialization distinct professional communities and sub-cultures are created and maintained (Schein, 1988; Schein, 2010; Gittell, 2008). Membership within a given professional group is commonly seen as a source of pride and serves as a reference point for evaluation between self and other (Gittell, 2011). These professional communities regularly reinforce and breed negative in-group/out-group attitudes within organizations (Gittell, 2009). Negative attitudes form the foundation of the professional biases that exist within fragmented organizations. These entrenched beliefs and
attitudes can breed disrespect within organizations. In health care this is commonly seen within and between the ranks of medical staff and specialties.

**Communication: Frequent, Timely, Accurate & Problems Solving**

Early organizational theorists such as Van de Ven (1976) and Thompson (1967) described coordination within an organization as being informational which allows the organization to adapt and change to improve efficiency (Van de Ven, 1976; Thompson, 1967). Thompson suggested that coordination occurs through communication based feedback whereby mutual adjustments are made as new information inputs occur (Thompson, 1967). In this model, the more inputs and adjustments made, the further the system can optimize. Relational coordination highlights why frequent communication in interdependent work systems is important. If coordination occurs through mutual adjustments informed by whatever available information, than the frequency of the information transferred becomes increasingly important. This communication dimension of relational coordination is also supported by Barnlund’s Transactional Model of Communication (Barnlund, 1970).

Citing findings from complexity theory, Gittell (2011a) notes that the strength of a given relationship within a network is commonly determined by the frequency of transmissions between two points (Gittell, 2011a). Assuming this is true, than the quality of the information transferred and the timeliness in which it is transferred will also improve these relationships. Thus, accurate and timely communication becomes a critical component of coordinating work in interdependent systems.

Practicing problem-solving communication versus blaming-oriented communication allows teams to solve complex problems without digressing to less productive methods of communicating. Placing blame on others within a work system undermines the opportunity for
learning and places in jeopardy the goals of the organization. As such, constructive exchanges between roles, departments, team or individuals within a work system increase the likelihood of goal attainment and builds relational ties within and between entities within that system.

In summary, relational coordination theory proposes that the coordination of work occurs through relationships and that these relationships are based on mutually reinforcing processes of interactions that occur between individual roles within a work system. In light of this, relational coordination introduces itself as a theory well suited for settings where high levels of task interdependence exist; such as in health care settings (Gittell, 2011). Relational coordination has proven to be a useful model in conceptualizing how work may be best coordinated within health care organizations where high levels of functional specialization and task interdependencies exist.

**Measuring Relational Coordination**

Relational coordination is measured using the Relational Coordination Survey 2.0 (RC Survey) (see Appendix I). The RC Survey is a 7-question, secure web based questionnaire that measures team member’s perceptions of how well other roles within a work system are communicating and coordination with them. From these measurements summary relational coordination scores are calculated allowing role and team-based levels of relational coordination to be compared. The RC Survey has been broadly studied and has been found to be a valid and reliable measure of coordination (Gittell, 2000; Gittell et al., 2000; Gittell, 2002a; Gittell, Seidner & Wimbush, 2010; Valentine, Nembhard & Edmondson, 2011; Gittell, 2013).

In high performing health care teams, higher levels of relational coordination have been shown to predict a wide range of performance outcomes including, employee and patient satisfaction, improved safety and quality outcomes, as well as medical cost savings (Gittell, et
al., 2000; Gittell, 2002b; Gittell, Weinberg, Pfefferle & Bishop, 2008; Gittell, 2008). The RC Survey measures the relational strength of coordination within and between functional roles in teams by assessing across the seven dimensions of relational coordination including: shared goals, shared knowledge, mutual respect, estimated accuracy, frequency and timeliness of communication, while also evaluating how blaming versus problem solving oriented communication may be (Gittell, 2000; Gittell et al., 2000). From these data statistical analyses can be completed with results illustrating the relational strength within and between specific job functions within a work system. Although relational coordination focuses on relationships, it is important to note that because the RC Survey aggregates results at either a role or team based level, that the relationships it assesses are those between roles and not between individual members within a given team (Gittell, 2009).

The Burning Platform: Health Care Reform and the Patient Centered Medical Home

Health care reform has been a topic of much debate and interest over the past decade. Many of the nation’s top health policy experts have long identified the United States health care system as lacking in efficiency and quality, while arguing that the fragmented, costly, and dangerous delivery of services must change (IOM, 1999; 2001; 2013). The Patient Protection and Affordable Care Act, popularly referred to as the Affordable Care Act (ACA) or “Obamacare,” is a piece of legislation that was signed into law by President Barack Obama on March 23, 2010. This body of legislation sets out to overhaul the American health care system by systematically increasing affordability, accountability and overall quality of the care delivered in the U.S. (Whitehouse, 2013). One priority of the law includes redesigning and incentivizing the structural delivery system though which health care is delivered. In the case of the ACA, much focus has been directed to Primary Care and the Patient Centered Medical Home (PCMH).
Primary Care is a model of health care delivery whereby the primary care physician (PCP) or general practitioner acts as the chief point of contact for the patient within a health care system. The individual in this role not only provides treatment, but consults and coordinates for patients, while directing care through referrals to specialists, the ordering of tests and tracking of the overall health of their patient over time (Strange et al., 2010). The core components of Primary Care include: a foundation of care built on the relationship between the patient/family and provider over time, the aim of disease prevention, patient accessibility, provider accountability to patients and the organization, and a comprehensive scope of integrated services delivered and coordinated across an array of specialties (Strange et al., 2010). Within the health care literature many have suggested that the best method of delivering primary care is to house it within the Patient Centered Medical Home (Ferrante, et al., 2010; Singer et al., 2011; Strange et al., 2010). The American College of Physicians, the American Academy of Family Physicians, the American Academy of Pediatrics, and the American Osteopathic Association have defined the PCMH as:

A model of care where each patient has an ongoing relationship with a personal physician who leads a team that takes collective responsibility for patient care. The physician led care team is responsible for providing all the patient’s health care needs and, when needed, arranges for appropriate care with other qualified physicians (NCQA, 2013).

This model of care delivery is considered preferable because it emphasizes and prioritizes the coordination and integration of services across the care continuum. Through coordinated efforts, integration between functional medical specialties can be achieved. This is important because integrated and coordinated care has been found to decrease the fragmentation of care delivery, while improving quality, affordability, and health outcomes (IOM, 1999; 2001; 2013). Fragmentation of care delivery has proven to be a difficult and important problem to solve while
addressing health care reform. Efforts to improve coordination and integration have emerged as a promising solution to this problem. One approach that has gained momentum over the past years is cross-functional team training.

**Cross-Functional Team Training**

Cross-functional team training is not new. The term first arose in the business literature of the late 1980’s and by the 1990’s this approach to team training was called a miracle cure for organizations (Andrews, 1995). A cross-functional team is defined as “a group of people who apply different skills, with a high degree of interdependence, to ensure the effective delivery of a common organizational objective” (Holland, Gaston & Gomes, 2000; p. 223). This approach to organizing work has received much praise for its ability to collapse the silos, which frequently inhibit coordination.

Much of the training conducted within medical settings today is focused on individual license types or roles, while most work is conducted in teams comprised of different license types and roles. When group based training is conducted, the team is most often homogeneous by design and geared toward the functional specialty of that independent role (Hamman, 2004). Despite this paradox the tradition of homogeneous team training has continued. When teams train in isolation they are unable to build shared mental models. Shared mental models are important when it comes to understanding the how each role’s behaviors affect the sum of the larger whole. For example to identify when things are going wrong in a medical setting a prerequisite is for team members to identify which action is problematic. Without an understanding of others responsibilities within a given system, this identification infrequently occurs. Cross-functional team training supports the aim of improving the consistency of quality
and safety within the medical context. One model, which has proven useful in reducing risk and improving consistency, is high reliability teams.

**High Reliability Teams (HRTs)**

The application of the concept of high reliability in the health care context came shortly after the initial IOM report addressing lack of safety in the U.S. health care delivery system (IOM, 1999; 2001). Leaders in the fields of health care quality and safety began looking to analogues industries with better safety outcomes including air traffic control systems, the energy sector, nuclear aircraft carriers, and the airline industry (Wilson, Burke, Priest & Salas, 2005; Weick, Sutcliffe & Obstfeld, 2008; Chassin & Loeb, 2013). Despite intermittent accidents, these industries have demonstrated impressive safety records when it comes to deaths as a result of accident.

In the United States commercial airline industry for example, between 1990 and 2001 the industry averaged a total of 9.3 million flights annually, reported an average of 129 deaths per year secondary to accidents, thus resulting in a death rate of 13.9 deaths per million flights. Within the decade that followed this average dropped 88 percent to reach a total of 1.6 deaths per million flights (U.S. Department of Transportation, 2012 in Chassin & Loeb, 2013, p.468). These statistics reflect a remarkable level of reliability when it comes to organizational and team safety. Focusing on these highly reliable organizations, researchers proposed a model of reliability, which has since been applied to health care organizations, team design and training.
High reliability teams are defined by five characteristics (see Figure 6) including a preoccupation with failure, a reluctance to simplify interpretations, demonstrate sensitivity to operations, a commitment to resilience and deference to expertise (Wilson, Burke, Priest & Salas, 2005). When teams practice behaviors that are consistent with these characteristics over time, practice patterns that promote increased quality and safety result (Weick, Sutcliffe & Obstfeld, 2008; Weick & Sutcliffe, 2001; Wilson, Burke, Priest & Salas, 2005). Yet, developing these practices does not come easily. In order for teams to reach high reliability status members must coordinate and communicate effectively. One high reliability team training program TeamSTEPPS® (Team Strategies and Tools to Enhance Performance and Patient Safety) has

**Figure 6: Characteristics of Highly Reliable Teams**

<table>
<thead>
<tr>
<th>Characteristics of Highly Reliable Teams</th>
<th>Team Behaviors Exhibited</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preoccupation with Failure</td>
<td>The management of errors is demonstrated by encouraged error reporting, feedback is given and received, team self-correction occurs routinely whereby members monitor and categorize their own behaviors focused on effectiveness and safety.</td>
</tr>
<tr>
<td>Reluctance to Simplify Interpretations</td>
<td>A commitment to understanding the full complexity of a situation (the complete picture) keeping interdependencies in mind, adapting team behaviors to reallocate resources, practicing “back-up”, demonstrated planning including identification of shared goals, shared knowledge and role clarification.</td>
</tr>
<tr>
<td>Demonstrated Sensitivity to Operations</td>
<td>Closed-loop communication is practiced whereby teams exchange and share available information as it becomes available within the work system. Communication is accurate, clear, timely and members acknowledge when information is received. Teams develop and share situational awareness which contributes to shared mental models about their environment and work.</td>
</tr>
<tr>
<td>Commitment to Resilience</td>
<td>Ability to identify, control and recover from errors is achieved by back-up behaviors, performance monitoring and the development of shared mental models. These models are the sum of all parts of the work system and all members within the team understand their role and others in relation to the larger whole.</td>
</tr>
<tr>
<td>Deference to Expertise</td>
<td>Because work occurs on the frontline, decisions are made on the frontline. Members are encouraged and practice assertive, clear and direct communication with deference to hierarchical roles, while orienting themselves effectively with the aim of high performance teamwork.</td>
</tr>
</tbody>
</table>

(Adapted from: Weick, Sutcliffe & Obstfeld, 2008; Weick & Sutcliffe, 2001; Wilson, Burke, Priest & Salas, 2005)

10/29/2013
shown much promise for its ability to improve coordination, communication, and develop the specified behaviors that are consistent with high reliability teams.

**Team Strategies and Tools to Enhance Performance and Patient Safety**

In response to the IOM’s report *To Error is Human* (1999), the Department of Defense (DOD) and the Agency for Healthcare Research and Quality (AHRQ) in 2003 joined forces to address patient safety in the American health care system. In light of the IOM’s key finding that improving health care team’s abilities to collaborate, communicate, and coordinate across the care continuum, the DOD and AHRQ sought to identify a team training curriculum capable of building competencies these areas. What resulted was Team Strategies and Tools to Enhance Performance and Patient Safety or TeamSTEPPS®, an evidence based team training program designed to build skills to improve team functioning in support of high reliability health care delivery.

The DOD and ARHQ collaborative first began their efforts with a wide spanning literature review exploring research on team training and patient safety in both health care and other related fields. In the aviation industry for example, the collaborative recognized that highly reliable teams produced increased and consistent safety through standardized training and simulations. From this industry the group identified a handful of existing team training models, including crew resource management as promising models for health care (Henriksen et al., 2008).

The collaborative next reviewed medical team training programs within the DOD (Henriksen et al., 2008). At the time of their review there were only a handful of programs in use including, Dynamic Outcomes Management®, Medical Team Management, and MedTeams® (Henriksen et al., 2008). The DOD and AHRQ conducted a series of case studies.
comparing the efficacy of these programs and concluded that despite there being positive aspects of each program, the development of a new single evidenced based team training program would be optimal (Henriksen et al., 2008). What resulted from these efforts was TeamSTEPPS®.

Team Strategies and Tools to Enhance Performance and Patient Safety is a high reliability team training curriculum that focuses on four core competency areas of team performance (see inner circle of Figure 9). The curriculum incorporates 15-tools and strategies delivered in an experiential and multi-modular design (Figure 10). Using a train-the-trainer model, health care teams engaged in this training program start with an organizational assessment, geared towards their specific health care setting. These may include rapid response, long-term care and ambulatory primary care settings (AHRQ, 2013).

Once representatives from the health care system have been trained in the TeamSTEPPS® model and an initial assessment has been completed, cross-functional teams participate in focused trainings where tools and strategies are taught using didactic, interactive and experiential simulation education methodologies targeted toward identified areas of required development. Teaching strategies include the use of video, PowerPoint presentations, case studies and experiential role-plays to leverage learning (AHRQ, 2013). Teams who participate are made up of members who work together are involved in the delivery of direct patient care. In an ambulatory setting these may include primary care physicians (PCPs), nurse practitioners or physician assistants (NPs or PAs), registered nurses (RNs), team service coordinators (TSCs) and licensed practical or vocational nurses (LPNs or LVNs). Through cross-functional team training and practice, teams who learn the core TeamSTEPPS® competencies of leadership, communication, mutual support and situational monitoring are expected to improve in the areas
of performance, knowledge and attitudes (outer circle in Figure 9) (AHRQ, 2013a; Henriksen et al., 2008).

The TeamSTEPPS® curriculum assumes that certain barriers to effective coordination exist within teams (see the first column in Figure 10). Conversely, the program also assumes that if learned and practiced each competency dimension will translate into learned skills capable of overcoming these barriers (Gittell, Beswick, Goldman & Wallack, 2013). Leadership for example, is seen as a skill that when practiced directs the actions of others with the aim of achieving desired outcomes (AHRQ, 2013a). Shared mental models within the TeamSTEPPS® curriculum are defined as the “perception of, understanding of, or knowledge about a situation or process that is shared among team members through communication” (AHRQ, 2013b). Mutual support on the other hand is defined as actions that prevent workload overload, which has been linked to decreased effectiveness, quality and safety (AHRQ, 2013c). Effective communication within the TeamSTEPPS® curriculum is understood from an information processing perspective and is defined as information exchanged between a sender and a receiver which is brief, timely and to the point (AHRQ, 2013d). Teams who learn and practice these four core competency areas are expected to improve as measured by their attitudes, knowledge and overall performance.

Figure 9: TeamSTEPPS® Four Core Areas

![TeamSTEPPS® Four Core Areas](AHRQ, 2013a)
Running head: A test of TeamSTEPPS® to improve relational coordination in ambulatory care teams

Figure 10: Overview of TeamSTEPPS® Curriculum

<table>
<thead>
<tr>
<th>Barriers to Coordination</th>
<th>Structural Interventions</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inconsistency in Team Membership</td>
<td>Team Briefing</td>
<td>Shared Mental Model</td>
</tr>
<tr>
<td>Lack of Time</td>
<td>Team Huddles</td>
<td>Adaptability</td>
</tr>
<tr>
<td>Lack of Information Sharing</td>
<td>Team Debriefing</td>
<td>Team Orientation</td>
</tr>
<tr>
<td>Hierarchy</td>
<td>STEP</td>
<td>Mutual Trust</td>
</tr>
<tr>
<td>Defensiveness</td>
<td>Cross Monitoring</td>
<td>Team Performance</td>
</tr>
<tr>
<td>Conventional Thinking</td>
<td>Feedback</td>
<td>Patient Safety</td>
</tr>
<tr>
<td>Complacency</td>
<td>Advocacy &amp; Assertion</td>
<td></td>
</tr>
<tr>
<td>Caring Communication Styles</td>
<td>Two-Challenge Rule</td>
<td></td>
</tr>
<tr>
<td>Conflict</td>
<td>CUS</td>
<td></td>
</tr>
<tr>
<td>Lacking Coordination &amp; Follow-up with Co-Workers</td>
<td>DESC Script</td>
<td></td>
</tr>
<tr>
<td>Distractions</td>
<td>Collaboration</td>
<td></td>
</tr>
<tr>
<td>Fatigue</td>
<td>SBAR</td>
<td></td>
</tr>
<tr>
<td>Workload</td>
<td>Call-Out</td>
<td></td>
</tr>
<tr>
<td>Misinterpretation of Cues</td>
<td>Check-Back</td>
<td></td>
</tr>
<tr>
<td>Lack of Role Clarity</td>
<td>Handoff</td>
<td></td>
</tr>
</tbody>
</table>

(Henriksen, Battles, Keys et al., 2008)

Methods

The purpose of this study is to examine whether the team training program TeamSTEPPS® is associated with relational coordination changes in ambulatory health care teams. Given that this is the first study of its kind, a second aim is to contribute to this nascent area of research by beginning to explore which aspects of relational coordination may be affected by this popular team training program. In teams, higher levels of relational coordination have been shown to predict a wide range of performance outcomes including employee and patient satisfaction, improved safety and quality outcomes, as well as medical cost savings.

TeamSTEPPS® is an evidence based high reliability team training curriculum that was developed to improve team performance in medical settings.
The adoption of TeamSTEPPS® has expanded and now is widely used in an array of health care settings. Because both TeamSTEPPS® and relational coordination theory share many of the same constructs they appear to be complementary, yet to date no identified studies have assessed TeamSTEPPS® possible impact on relational coordination. As a result, the objective of this study is to measure the possible impact of the team training program on relational coordination in an ambulatory health care team.

**Participants and Setting**

The setting for this study will be an ambulatory primary clinic housed in a medical office building (MOB) located in an urban city in the Southeastern United States. The ambulatory clinic is affiliated with a large health maintenance organization (HMO) with the current distinction as a Patient Centered Medical Home (PCMH). The HMO has over 28 other medical office buildings both in and around this Southeastern location. The HMO insures and is responsible for providing care for over 238,000 lives and was chosen for its interest in improving the care for their members and willingness to participate in the study.

Participants in the study will include approximately 25 health care team members, who work together in the ambulatory clinic of interest. The team will include representative roles and specialties all from the same site including Physicians, Nurses, Team Service Coordinators, Licensed Practical Nurses, Patient Service Representatives, and Customer Service Coordinators. Based on rough demographic estimates, it is expected that approximately 40% of the participants will identify their gender as “Male” and 60% as “Female.” Ethnic identification is expected to reflect the general makeup of the HMO staff and community in which the HMO is located.
Sampling Procedures

Administrators at the research site will provide a list of training dates for the team training which will occur on the premises of the MOB. Eligible study participants will also be identified by research site administrators. Names and emails of participants will be provided to me by research site administrators via secure electronic transmission. Equitable selection of participants is not foreseen to be an issue seeing that the population from which participants will be sampled is narrowed based on the identified inclusion criteria stated below. A “kick-off” meeting will be held whereby the research site leadership will introduce the training and the study emphasizing that participation is strictly voluntary. Following this meeting, I will contact each prospective participant by email. This introductory email message will also include the study’s Letter of Consent (see Appendix II). I as the Principal Investigator will be available by both phone and email to answer any questions participants have about the study.

Inclusion and Exclusion Criteria

Inclusion in the study will be limited to participants who are employees of the HMO that have been identified as eligible to participate in the TeamSTEPPS® training. Participants will include members working within the same primary care team who have consented to be surveyed and included in the study. Once identified as eligible for inclusion, I will recruit all eligible participants. Participants will represent a cross-section of functional specialties found with the research site. Exclusion criteria for participation in the study will include any participant who elects not to participate in the research, any participants identified as not being an eligible member of the identified participant group, and any member initially included, yet who did not participate or complete the TeamSTEPPS® training.
Study Design

This proposed study will use a pre-experimental, one-group, pre-test/post-test study design and focused semi-structured qualitative interviews. This exploratory design was chosen for its ability to evaluate possible changes in relational coordination scores in care teams following their participation in the team training program, while also operating within the organizational confines of the research site, i.e. training schedules and availability of funding etc. (Campbell & Stanley, 1963). Despite its wide use in educational research, there are limitations to this design such as multiple threats to internal validity (Campbell & Stanley, 1963). The variables examined will include perceived quality of coordination and communication ratings between and among the functional roles within an ambulatory outpatient setting as measured by the Relational Coordination Survey 2.0 (RC Survey).

Instrumentation and Data Collection Procedures

For this study an online demographic questionnaire, online survey and telephone interviews will be used. The questionnaire will be administered at baseline (T1) and is designed to gather demographic information pertinent to the research including: age, gender, race/ethnicity, license type, years practicing, current employment status (full time, part-time, hourly), average number of hours worked per month, additional employment, number of years in current position and as part of current team, number of times attending specific training, primary language and primary language spoken at home (Appendix IV).

Relational Coordination Survey 2.0

The Relational Coordination Survey 2.0 (RC Survey) will also be used and administered at baseline (T1) and again 90-days after the conclusion of the team training (T2). The study will use an online version of the RC Survey, which is owned by Relational Coordination Analytics.
(see Appendix II) (RC Survey 2.0, 2013). The survey includes 7 Likert scale questions with a rating scale between 1-5, is web-based, secure and takes approximately 10-minutes to complete. The Relational Coordination Survey 2.0 is a valid and reliable measure of coordination that measures the relational strength of coordination within and between functional roles in an organizational work system (Gittell, 2000; Gittell et al., 2000; Gittell, 2002a; Gittell, Seidner & Wimbush, 2010; Valentine, Nembhard & Edmondson, 2011; Gittell, 2013). The reliability of the RC Survey is well established in the literature. Examples of the survey’s reliability and validity have been demonstrated consistently over time. For example, in a nine-site hospital study relational coordination among surgeons, nurses, physical therapists, and social workers, the RC Survey was shown to predict increased quality outcomes, reduced postoperative pain, and increased postoperative functional status (Gittell et al., 2000). In another study of work group cohesion and relational coordination, the RC Survey predicted higher levels of patient satisfaction in registered nurse and patients from 268 nursing units at 141 hospitals (Bae, Mark & Fried, 2010). As a result of the broad evidence in support of this instrument the RC Survey 2.0 will be used.

The RC Survey assesses seven different dimensions of coordination including: shared goals, shared knowledge, mutual respect; and communication dimensions including accuracy, frequency and timeliness of communication; as well as problem solving vs. non-blaming communication (Gittell, 2011a). When launched, respondents receive a unique email link that takes them to their survey. Each participant will receive the same invitation/reminder email (Appendix II). These emails will outline information including goals and objectives of the training. Reminder emails will be sent out weekly starting three-weeks prior to the training and will increase to daily email reminders or until the individual participant has completed the
baseline survey. Reminder emails will be then be sent out weekly starting two-weeks prior to the post-test follow up and will increase to daily emails or until the individual participant has completed the post-test survey. Upon completion survey data will be available for the Principal Investigator to analyze. The survey results will be used to create summary reports of the findings including a relational coordination matrix that provides reciprocal impressions of relational coordination across provider groups, and a relational network-map, which is a graphic representation of the quality and level of coordination.

In addition to the 7 questions on the RC Survey, the research site’s administrators will be conducting their own general review of the training. Questions slated for inclusion at T2 will reflect the administrator’s interest in the training’s overall quality, participant’s perceptions of the training, and whether it was believed to be helpful in addressing teamwork. These questions have yet to be confirmed by the research site; though will be included in my final proposal as soon as they become available. In addition, I too will be including an additional question aimed at addressing exploratory research question Q2.

**Use of Training Question**

Participants will be asked: *To what extent do you use in your daily work what you learned in the team training?* Responses will be collected on a Likert type scale (1-5; with 1 as “Not at All” and 5 as “Completely”).

The RC Survey has been designed to reduce the phenomena of social desirability response when answering the survey questions by asking respondents to evaluate the behaviors of others versus reporting on their own behavior (Gittell, 2012). Social desirability bias commonly results when respondents overvalue how well they perform in relation to other employees, while at times underestimating the behavior of others (Gittell, 2012). Thus, for this
study each role will rate how well each other role relates to them, versus solely reporting on their
own performance.

**Participant Interviews**

Focused semi-structured phone interviews will also be utilized. These will occur following the second administration (T2) of the RC Survey and will include a representative from each of the roles surveyed. The goal of these interviews will be to have participants elaborate on their subjective views and to see whether these help to explain the significant or insignificant findings that will be obtained. This interview approach was chosen for its success in identifying and making meaning of organizational and behavioral phenomena as perceived by team members. All questions will be open-ended to allow participants to share fully their subjective experiences. Follow-up questions will be used to help flesh out or clarify aspects of a participant’s responses to allow for the fullest understanding of their perspectives. I as the interviewer will take handwritten notes capturing pertinent information with the aim of expanding my understanding of the survey results.

**Example of Anticipated Interview Questions**

1. To what extent do you use what you learned in the team training in your daily work?
2. Prior to the team training, how well do you believe your team was functioning overall?
3. To what extent do you believe the training helped your team improve its overall teamwork?
4. How has your work changed, if at all, following the team training?
5. In what ways have you or your team changed in the way you communicate or coordinate your work?
6. Of the training modules reviewed in the team training, which ones were the most helpful and why?

7. If your team were to take one action to further improve your communication and coordination what would that be?

8. Is there anything else that you would like to add?

**Data Analysis Plan**

Statistical analysis of the survey results will be conducted using a standard statistical software package such as SPSS. This type of software is capable of evaluating and indexing the RC Survey results and substantiating the significance of relational coordination ties as reported by the various roles within the study. The first step of data analysis will include entering all survey responses into SPSS. Following this step, a preliminary calculation of descriptive statistics will be run to provide a summary of counts, means, standard deviations, and percentages for each of the variables. Respondent-level demographic statistics will also be calculated during this step. These respondent-level characteristics will include descriptive statistics addressing age, gender, race/ethnicity, license type, years practicing, current employment status (full-time, part-time, hourly), average number of hours worked per month, additional employment, number of years in current position and as part of current team, number of times attending specific training, primary language and primary language spoken at home.

Although all seven dimensions of relational coordination (e.g., Shared Goals, Shared Knowledge, Mutual Respect; and Frequent, Accurate, Timely and Problem Solving Communication) are interesting, the primary variable of interest here is the team level summary relational coordination score. This variable is of most interest because team level relational coordination scores have been shown to predict significant team performance and patient
outcomes while also being comprised of all seven of the relational coordination dimensions. Additionally, if I were to run the large number of tests required to evaluate each of the seven relational coordination dimensions separately, the Type II error rate would increase and therefore compromise the interpretability of the results. Therefore, the seven dimensions of relational coordination will each be examined in an exploratory manner but will not be part of the main hypotheses tested.

**H1:** Team participation in the team training will produce positive changes in the overall team-level relational coordination scores from T1 to T2.

**H2:** Some roles, compared to other roles, will experience significant change in relational coordination from T1 to T2.

The model will have one between subjects factor (Role) and one within subject’s factor (Time, T1 vs. T2). The main effect of Time is the primary test for H1. Differential changes as a function of role (H2) will be tested by the Role by Time interaction. If this interaction is significant, roles will be compared in their changes using a multiple-comparisons procedure such as the Tukey test. Residuals from the ANOVA model will be examined for normality. In the event of serious non-normality bootstrap methods will be used estimate the errors in the repeated measures ANOVA.
**H3:** Intra-professional role ratings (i.e. MD to MD, RN to RN) will result in significantly higher RC scores both at T1 and T2 when compared to inter-professional role ratings (i.e. MD to RN).

For hypothesis H3 each time point (T1 and T2) difference scores will be constructed separately for each participant. For an MD participant for example, the difference score will be the mean of this participant's ratings of other MDs minus the mean of this participant's ratings of non-MDs. Evidence in support of H3 will be a significant positive mean difference across all participants. Here one-sampled t-tests will be used. In the event of a non-normal distribution, a Wilcoxon Signed-Ranks test will be utilized to account for non-normality.

**Exploratory Research Questions**

**Q1:** Are there any individual-level demographic variables that correlate with relational coordination scores at T1 and T2, or with the degree of change in relational coordination between T1 and T2?

**Q2:** Is there a relationship between a professional group’s reported level of training use and group level relational coordination scores at T2? As measured by the question: "To what extent do you use in your daily work what you learned in the team training?" (Likert scale 1-5 where 1 = “Not at all” and 5 = “Completely”)

Hypotheses H1 and H2 will be tested in the context of a repeated measures ANOVA. The two exploratory research questions will look at the association of relational coordination scores and changes in relational coordination scores with the demographic measures and the
reported use measure. For Q1 since some of the demographics are dichotomous (e.g. gender),
nominal (e.g. ethnicity), and others continuous (e.g., age or experience), different analysis
techniques will be required. These will include Mann-Whitney tests, Kruskal-Wallis tests, and
Spearman correlations. Each will be employed depending on the specific type of variable (i.e.
dichotomous, nominal or continuous) associated with that demographic question. If meaningful
patterns or relationships emerge, these will be noted and identified for discussion and may be
used to inform future research. For Q2 means will be calculated at the role level for the reported
use of training measure. These results will be used to inform interview questions targeting
accuracy of aligning training content to perceived level of need.

**Ethical Considerations**

Because human subjects will be used, this research proposal will be submitted to two
institutional review boards including the Alliant University Institutional Review Board (IRB)
and the Research Site’s IRB (Kaiser Permanente – Georgia) who will conduct a thorough ethical
review prior to granting approval. All participants will be briefed prior to engaging in the study
to ensure informed consent procedures are established and administered. Additionally, the
availability of debriefing will be offered post-study to ensure all ethical considerations are
maintained. Permission for the use of the RC Survey 2.0 will be obtained from its author prior to
its use. Last, confidentiality and anonymity agreements will be drafted, reviewed and signed by
each researcher and participant (APA, 2010).

As identified in the ethical literature on research in the health services, four potential
risks have been identified for participants in a proposed study of this design (Richards &
Schwartz, 2002). These include:
i. Anxiety and distress

ii. Exploitation

iii. Misrepresentation

iv. Identification of the participant in published papers

Potential benefits of participating in this research study may include:

i. Improved understanding of team dynamics within the participant’s organizational setting

ii. Through self-reflection the opportunity for future behavior change may increase

iii. Increased understanding of the overall change process through prompted reflection

iv. Increased team functioning has the potential of improving quality, safety, employee and patient satisfaction, health outcomes and medical costs

To protect against possible harm resulting from these four categorical areas, the following steps will be taken to address each of the four potential risk categories:

**Anxiety and Distress**

Debriefing will be offered to all participants within the study following each point of contact. Debriefing if requested will take the shape of a semi-structured conversation, whereby perceived distress is addressed and responded to. Since this study does not include deception by design and no risk to any participant is foreseen.

**Exploitation**

Exploitation may result when there is a power differential within the relationship between a researcher and a study participant. In light of the status of the participants, a perceived power differential between researcher and participant is not anticipated. Although, if at any point a participant reports any information that leads me to believe that exploitation is a concern, immediate cessation of the survey or interview will occur and debriefing will be offered to that
individual. Again, in light of the status of the participants and the nature of the study, it is not anticipated that feelings of exploitation will result.

**Misrepresentation**

To address any concerns of misrepresentation, all participants who so choose may request a summary of the study’s findings. All data shared will be aggregated at the team and/or role based level and will not include any information about other participants.

**Identification of the Participant in Published Papers**

All dissertations currently are electronically published. As a result, this fact will be included in the consent process in a stand-alone section on the consent form.

**Informed Consent**

To ensure that all ethical considerations are established and maintained, a thorough informed consent processes will be followed.

- A letter of consent will be electronically sent to all participants to sign and return prior to the start of the study

- At the beginning of each follow-up interview, the consent form will be reviewed and any questions/concerns will be addressed

- Each member will be reminded that participation is strictly voluntary and that they may elect to discontinue participation at any time

- Because all participants will be over the age of 18 and not members of a vulnerable population, a standard adult consent form will be used and no assent forms will be needed

- All Letter of Consent forms will be held for at least three years after the study’s completion
Confidentiality and Anonymity

To ensure confidentiality and anonymity of participants, the following steps will be taken:

- All shared survey data will be aggregated at the role and team based level thus, protecting individual responses from being revealed

- Only the Principal and Co-Investigators will hold the list of corresponding names to survey responses

- All electronic information will be stored on a password locked computer and all files will be encrypted

- The computer will be kept behind a locked door when not in use within the Principal Investigator’s home office

- The Principal Investigator will be aware of any/all people who will have access to the data

- The study will not include Protected Health Information (PHI) and thus, will not be required to adhere to Health Insurance Portability and Accountability Act (HIPAA) requirements

- Only the Principal and Co-Investigator will have access to the data

- Once the study ends, any documented information (notes etc.) from participant surveys and interviews will be deleted and/or erased by the Principal Investigator

- All steps will be taken to ensure compliance with my University’s Systemwide Guidelines for the Protection of Human Participants in Research, including the section titled “Researcher Records”
Biases and Assumptions

Biases are fundamentally human. One’s prior experience shapes the lens though which we perceive and understand the world. In light of this, understanding one’s own biases is both important and responsible when approaching research. One key bias that I as the Principal Investigator must be mindful of is the fact that I work for the health maintenance organization in which I am studying. Understanding that my relationship to the organization could influence how I interpret the results demands a continual awareness when making interpretations throughout the research process. I am also aware that there commonly is a pull when in the role of researcher to identify that which may be favorable for the cause. In this case, I understand that in my roles of Principal Investigator and doctoral student that I have an interest in concluding significance and completing my research, thus managing these biases is of the upmost importance. In light of this possible conflict of interest, the Principal and Co-Investigators will participate and complete the HMO’s Conflict of Interest Training. The Principal and Co-Investigators along with the HMO’s IRB will keep this certificate of completion on file.

With regard to assumptions, one key assumption is that of interdependence within the team and work system of interest. Relational coordination and its accompanying survey presume interdependencies exist within health care systems. The theory proposes that through improved coordination and communication performance will improve. Despite the evidence that exists in support of the RC Survey, the survey itself does not assess for levels of interdependence. Thus, one assumption inherent to its use is that of interdependence. Through interviews and analogues observations I have determined that a requisite level of interdependence exists within the systems
of work practiced by the ambulatory care team within the study. Therefore I too hold the assumption that the work system of interest is interdependent by design.

Limitations

This proposed study uses a pre-experimental, one-group, pre-test/post-test research design to evaluate changes in relational coordination scores in health care teams following their participation in the TeamSTEPPS® training curriculum (Campbell & Stanley, 1963). One of the strengths of this design is that it is an excellent method to employ when random assignment of participants is unpractical. In the case of this proposed research, intact teams are being studied and thus, true random assignment is not practical. Limitations to this approach include the fact that the number of proposed participants is a somewhat small. Therefore the study is limited by size and scope. Since small sample sizes are a challenge to external validity it may be difficult to generalize outside of the population studied (Howell, 2010). Additional limitations of the proposed study design include the chosen recruiting process in that administrators will provide the list of eligible participants. The proposed design is also limited by the fact that it is only studying the relationships between those roles included within the study, when in fact many other professionals and paraprofessionals are included in the health care delivery system. Additionally, generalizability from a HMO to a PPO or public health care delivery system may be difficult.
References


Richards, H. M., & Schwartz, L. J. (2002). Ethics of qualitative research: are there special issues for health services research. *Family Practice,* 19(2), 135-139.


Appendices

Appendix I: Relational Coordination Survey
Appendix II: Letter of Consent
Appendix III: Kaiser Permanente IRB Communications
Appendix IV: Demographic Questionnaire
Appendix I: Sample Relational Coordination Survey

**RCS: Relational Coordination Survey Questions: Web Sample**

Organization Name: RCRC RCS Web Sample

Welcome!

Thank you for taking the time to fill out this brief survey. Please fill it out from your perspective as a member of the [team/unit/department/organization]. Be sure to consider all forms of communication, including in-person meetings, phone calls, e-mails, etc.

The survey takes less than 10 minutes to complete. Your responses will be kept strictly confidential.

We ask that you complete the survey by February 1, 2013.

---

* All workgroups/individuals are shown on the preview document; however, those identified as individuals will not be asked to self-rate during an actual survey.

**Frequent Communication**

How frequently do people in each of these groups communicate with you about [focal work process/client population]?

When answering this question, be sure to consider all forms of communication, including in-person meetings, phone calls, e-mails, etc.

<table>
<thead>
<tr>
<th>Insert Workgroup 1</th>
<th>Not Nearly Enough</th>
<th>Not Enough</th>
<th>Just the Right Amount</th>
<th>Too Often</th>
<th>Much Too Often</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insert Workgroup 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insert Workgroup 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insert Workgroup 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insert Workgroup 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>etc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Timely Communication

Do they communicate with you in a *timely* way about [focal work process/client population]?  
When answering this question, be sure to consider all forms of communication, including in-person meetings, phone calls, e-mails, etc.

<table>
<thead>
<tr>
<th>Insert Workgroup 1</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Insert Workgroup 2</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Insert Workgroup 3</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Insert Workgroup 4</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Insert Workgroup 5</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>etc.</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

### Accurate Communication

Do they communicate with you *accurately* about [focal work process/client population]?  
When answering this question, be sure to consider all forms of communication, including in-person meetings, phone calls, e-mails, etc.

<table>
<thead>
<tr>
<th>Insert Workgroup 1</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Insert Workgroup 2</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Insert Workgroup 3</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Insert Workgroup 4</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Insert Workgroup 5</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>etc.</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Problem Solving Communication

When there is a problem with [focal work process/client population], do people in each of these groups blame others or work with you to solve the problem?

Insert Workgroup 1

Insert Workgroup 2

Insert Workgroup 3

Insert Workgroup 4

Insert Workgroup 5

etc.

Shared Goals

Do people in each of these groups share your goals for [focal work process/client population]?

Insert Workgroup 1

Insert Workgroup 2

Insert Workgroup 3

Insert Workgroup 4

Insert Workgroup 5

etc.
### Shared Knowledge

Do people in each of these groups **know** about the work you do with [focal work process/client population]?

<table>
<thead>
<tr>
<th>Insert Workgroup 1</th>
<th>Nothing</th>
<th>Little</th>
<th>Some</th>
<th>A lot</th>
<th>Everything</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insert Workgroup 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insert Workgroup 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insert Workgroup 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insert Workgroup 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>etc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Mutual Respect

Do people in each of these groups **respect** the work you do with [focal work process/client population]?

<table>
<thead>
<tr>
<th>Insert Workgroup 1</th>
<th>Not at all</th>
<th>A little</th>
<th>Somewhat</th>
<th>A lot</th>
<th>Completely</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insert Workgroup 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insert Workgroup 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insert Workgroup 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insert Workgroup 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>etc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
RCS: Relational Coordination Survey Questions: Web Sample

Thank you for completing the survey. Your answers have been recorded and you can be assured that your submission will be held strictly confidential.

If you are finished with the survey, you can close your browser window. If necessary, you can review or modify your feedback by clicking the Back button below, or by clicking on the survey link you received in the email invitation.

Survey Response Rates

This table summarizes your survey response rates. It shows the total number of participants sampled in each work group and the percent of surveys completed for each workgroup. The data in this section can be used to help you decide when to close your survey or whether to modify or increase recruitment for your survey.

<table>
<thead>
<tr>
<th>Workgroup Name</th>
<th>Sample Size</th>
<th>Surveys Completed</th>
<th>Completion Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attending Physician</td>
<td>6</td>
<td>4</td>
<td>67%</td>
</tr>
<tr>
<td>Registered Midwife</td>
<td>4</td>
<td>4</td>
<td>100%</td>
</tr>
<tr>
<td>Registered Nurse Birthing Unit</td>
<td>22</td>
<td>20</td>
<td>91%</td>
</tr>
<tr>
<td>Registered Nurse Nursery</td>
<td>13</td>
<td>6</td>
<td>46%</td>
</tr>
<tr>
<td>Anesthesiologist</td>
<td>7</td>
<td>2</td>
<td>29%</td>
</tr>
<tr>
<td>Pediatric</td>
<td>3</td>
<td>2</td>
<td>67%</td>
</tr>
<tr>
<td>Unit Support</td>
<td>3</td>
<td>1</td>
<td>33%</td>
</tr>
<tr>
<td>Maternal Infant Child Management</td>
<td>4</td>
<td>1</td>
<td>25%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>62</strong></td>
<td><strong>40</strong></td>
<td><strong>65%</strong></td>
</tr>
</tbody>
</table>

Legend

The report uses abbreviations for the work groups and/or individuals. Below is a legend to provide the full names that correspond to each abbreviation:

- MD: Attending Physician
- RM: Registered Midwife
- RNBI: Registered Nurse Birthing Unit
- RNNY: Registered Nurse Nursery
- ANES: Anesthesiologist
- PED: Pediatric
- US: Unit Support
- MGT: Maternal Infant Child Management
Section 2: Relational Coordination Matrix

The relational coordination matrix is another visual display of the data collected in your survey. It shows the strength of ties within and between the work groups and individuals who are involved in Patient Care in the Labour and Birthing Unit, with greater detail than we saw on the relational coordination network graph. The matrix allows us to see how Work Group 1 rates Work Group 2 on relational coordination and vice versa, rather than combining both perspectives together as we did on the lines of the network graph.

Specifically, the matrix shows the strength of relational coordination as rated by the work groups listed in each row, about the work groups shown at the top of each column. The shaded boxes on the diagonal show the strength of relational coordination ties within work groups, just as we saw in the bubbles on the network graph.

Note how Work Group 1 rates relational coordination with Work Group 2 compared to how Work Group 2 rates relational coordination with Work Group 1. Sometimes these scores are similar but sometimes they are substantially different—typically the "more powerful" work group views relational coordination in a more positive light than does the "less powerful" work group.

As before, typical scores are:
- Within work groups: 4 to 4.5 (less than 4 is weak, greater than 4.5 is strong)
- Between work groups: 3.5 to 4 (less than 3.5 is weak, greater than 4 is strong)
- Between organizations: 3 to 3.5 (less than 3 is weak, greater than 3.5 is strong)

Your Relational Coordination Matrix results are presented below.

<table>
<thead>
<tr>
<th></th>
<th>Attending Physician</th>
<th>Registered Midwife</th>
<th>Registered Nurse Birthing Unit</th>
<th>Registered Nurse Nursery</th>
<th>Anesthesiologist</th>
<th>Pediatrician</th>
<th>Unit Support</th>
<th>Maternal Infant Child Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attending Physician</td>
<td>4.25</td>
<td>3.50</td>
<td>4.00</td>
<td>3.57</td>
<td>3.93</td>
<td>3.96</td>
<td>3.64</td>
<td>3.43</td>
</tr>
<tr>
<td>Registered Midwife</td>
<td>3.79</td>
<td>4.66</td>
<td>3.93*</td>
<td>3.86</td>
<td>2.96</td>
<td>3.54</td>
<td>3.86</td>
<td>3.61</td>
</tr>
<tr>
<td>Registered Nurse Birthing Unit</td>
<td>3.69</td>
<td>3.16*</td>
<td>4.34</td>
<td>3.95</td>
<td>2.81</td>
<td>3.09</td>
<td>3.41</td>
<td>2.78</td>
</tr>
<tr>
<td>Registered Nurse Nursery</td>
<td>3.29</td>
<td>3.36</td>
<td>3.83</td>
<td>4.31*</td>
<td>2.21*</td>
<td>4.02</td>
<td>3.10</td>
<td>3.43</td>
</tr>
<tr>
<td>Anesthesiologist</td>
<td>4.64</td>
<td>2.36</td>
<td>3.79</td>
<td>3.00*</td>
<td>4.79</td>
<td>4.36</td>
<td>3.86</td>
<td>3.86</td>
</tr>
<tr>
<td>Pediatrician</td>
<td>4.21</td>
<td>4.21</td>
<td>3.79</td>
<td>4.07</td>
<td>3.29</td>
<td>4.36</td>
<td>3.86</td>
<td>3.93</td>
</tr>
<tr>
<td>Unit Support</td>
<td>3.29</td>
<td>2.14</td>
<td>3.14</td>
<td>2.43</td>
<td>2.57</td>
<td>2.71</td>
<td>4.14</td>
<td>4.14</td>
</tr>
<tr>
<td>Maternal Infant Child Management</td>
<td>1.57</td>
<td>1.57</td>
<td>1.71</td>
<td>1.71</td>
<td>1.57</td>
<td>1.57</td>
<td>1.43</td>
<td>2.00</td>
</tr>
</tbody>
</table>

*p<.05, **p<.01
Appendix II: Sample Consent Letter

Letter of Consent

Thank you for agreeing to participate in this research study conducted by Kaiser Permanente, Georgia and Dylan Ross, MA (hereby referred to as the primary researcher). The primary researcher is currently a doctoral candidate who has earned a Master’s Degree in Organizational Psychology and has been an employee of Kaiser Permanente since 2006. This research is being conducted as part of the primary researcher’s doctoral dissertation at the Alliant International University, California School of Professional Psychology in San Francisco, California. The objective of this Letter of Consent is to provide an outline of the research study and to review your rights as a study participant. Your participation in this research is strictly voluntary and you may withdraw your participation at any time. If you choose to withdraw your participation, all collected information regarding your participation up until that point will be appropriately disposed of and kept from inappropriate disclosure. Either your participation in, or withdraw from this study will have no bearing on your employment or status. The dates that the study will take place are as follows: (INSERT DATES HERE).

Description of the Research:
This study seeks to understand the effectiveness of the TeamSTEPPS® training curriculum on team member’s perceptions of coordination within ambulatory care teams over time. By signing below, you are giving your consent to voluntarily participate in a research study measuring your perception of team functioning before and after your participation in the TeamSTEPPS® training curriculum.

Publication of Research:
As described above, this research is a part of a graduate dissertation. All dissertations are electronically published. As a result, the findings from this study will be published and may be available online, though no specific identifiable data (your organization’s name, participant’s names or medical office buildings name or locations) will be included in this publication.

By agreeing to participate you are consenting/agreeing to the following:

1. To understanding that your voluntary participation in this research will result in no compensation, payment or reward.
2. To complete a demographic data collection form. The purpose of this information is to gather general information about you and your background. This information will be helpful when analyzing the data once it is collected. The form should take no longer than 2-minutes to complete.
3. To understanding that study information will be exchanged via Internet including email communication between the research staff and you. Some risks exist when transmitting or storing information electronically, though every effort will be taken to protect against breaches in privacy, confidentiality and anonymity. These efforts will include: 1) storing all electronic information on a password locked computer with all files encrypted 2)
storing all computers behind locked doors when not in use 3) limiting access to this data by maintaining control of access 4) committing to deleting/erasing/shredding all notes from participant interviews once the study ends.

4. Depending on level of identified need, to take part in a brief follow-up individual phone interview to better understand the dynamics of your team. The length of the phone interview would likely range between 10 and 20 minutes and would take place via telephone or by videoconference (WebEx etc.). The interview would be scheduled at a mutually convenient time. The objective of the follow-up interview would be to clarify any questions that I as the primary research might have about the team’s survey responses. All responses to any questions would be optional, thus if you did not feel comfortable answering a question you would have every right not to answer.

5. You are consenting to allow any/all information communicated between you and the primary researcher between the dates of the study to be used. This includes both formal and informal correspondence with the primary researcher.

6. If at any point you feel that the data collected may identify you in any way, please communicate this to me, the primary researcher, and it will be removed from use.

As the primary researcher I make the following commitments to you as a willful participant:

1. To maintain respect and consideration for you as a person and as a colleague in this research

2. To make every effort to protect against inappropriate disclosure of any and all information, including all electronic, written and recorded materials. To ensure this, I commit to coding all names and using a master list that will be kept separate from all other documents. This list will always be stored in a separate locked filing cabinet, kept behind a locked door within my home office.

3. To provide you with: copies of aggregated data if/when requested, though following the summary copy being sent to the Alliant International University Human Participants Committee (HPV) for their approval.

4. To follow all legal and ethical requirements for research as set forth by the Institutional Review Boards of both your institution and the primary researcher’s academic institution. That said, there are limits to protected information including those outlined by law.

5. Upon completion of the study, all data will be stored for 5-years to conform to requisite ethical standards of research and practice.

6. To be as responsive to questions concerns and/or comments as I possibly can as dictated by my schedule and availability.

7. To support your involvement in the process of research including but not limited to: making all survey results available for your review; to make changes to documented data to improve accuracy or correctness when appropriate; to be candid in my responses; and to maintain the highest level of professionalism throughout the research process.

8. If at any point you have questions or concerns regarding your participation, please call me at any time at (707)-287-2629 or by email at: Dylan.ross@kp.org

9. Participating in this study presents no particular risks to you beyond those experienced in your daily work life. Additionally, no particular benefits are promised to you as a participant, though your participation is truly appreciated.
If at any point you have concerns which you do not feel comfortable sharing with me as the primary researcher, please know that you are welcome to contact my Dissertation Chairperson and Doctoral Program Director, Dr. Rebecca Turner, Ph.D. by calling (415) 602-0304, or by emailing her at: rturner@alliant.edu. You may also contact the Alliant International University, California School of Professional Psychology Institutional Review Board (IRB) to obtain general questions regarding rights of participants taking part in university sanctioned research. You may reach the IRB by contacting the main university office by calling (415) 955-2100.

By signing below I acknowledge that Dylan Ross has explained in full the possible risks involved with participating in this research study; has informed that my participation is voluntary; that I have the right to withdraw my consent or discontinue participation at any time without penalty or loss of benefits to which I am otherwise entitled; that the alternative is not to participate; and that I have the right to refuse to answer any questions for which I am uncomfortable answering. I also acknowledge that the results of this research study may be presented at scientific or professional meetings or published in scientific journals.

PARTICIPANT SIGNATURE _____________________________     DATE __________

Please return the above letter of consent in one of the two following ways:

1) Electronically sign the above and return it via email to Dylan.Ross@kp.org

2) OR, please mail a hard copy to:

Dylan Ross
Care Management Institute, Kaiser Permanente
1 Kaiser Plaza, 16 Floor
Oakland, CA 94612
Appendix III: Kaiser Permanente IRB Communications

09/04/13
10:22 AM

***************OFFICIAL RESEARCH COMMITTEE COMMUNICATION***************

Dear Mr. Ross,

Thank you for presenting "Building High Performance Medical Teams in the Era of Accountable Care: The Use of TeamSTEPP to Improve Relational Coordination in Primary Care Teams " to the Research Committee (RC) on September 4, 2013. The committee has approved the project; therefore, you may proceed with submitting it to the IRB for review.

If you have any questions or if I can be of assistance, please feel free to contact me.

Sincerely,
Natalie

Natalie Thurman, CIP, CIM
IRB Administrator
Kaiser Permanente Georgia / The Center for Health Research Southeast
Phone: (404) 504-5543 / Fax: (404) 364-7316
natalie.j.thurman@kp.org

NOTICE TO RECIPIENT: If you are not the intended recipient of this e-mail, you are prohibited from sharing, copying, or otherwise using or disclosing its contents. If you have received this e-mail in error, please notify the sender immediately by reply e-mail and permanently delete this e-mail and any attachments without reading, forwarding or saving them. Thank you.
12:46 AM

Hi Dylan,

I spoke with one of the senior reviewers who confirmed that your project can be reviewed via expedited review which means that there is NOT a submission deadline since it does not need to be reviewed by the convened Board (which meets only once per month). Expedited reviews are typically reviewed and responded to within 48 hours to one week after submission.

If the information above puts you at ease with regards to your timetable, then I would wait to submit your application until the proposal is final.

If you make any changes to your proposal once the IRB has granted approval, you will need to modify your study and submit that to the IRB for review and approval. This is called the modification process and is done through the eIRB in your study workspace. Changes made to your proposal will NOT be required to be reviewed again by the Research Committee.

I hope this information is helpful. I am available today until 11:00 your time. I then have a conference call that will last until I leave for the day at 4:00 my time.

Thanks,
Natalie

Natalie Thurman, CIP, CIM
IRB Administrator
Kaiser Permanente Georgia / The Center for Health Research Southeast
Phone: (404) 504-5543 / Fax: (404) 364-7316
natalie.j.thurman@kp.org

**NOTICE TO RECIPIENT:** If you are not the intended recipient of this e-mail, you are prohibited from sharing, copying, or otherwise using or disclosing its contents. If you have received this e-mail in error, please notify the sender immediately by reply e-mail and permanently delete this e-mail and any attachments without reading, forwarding or saving them. Thank you.
Appendix IV: Demographic Questionnaire

1. Age:____________________
2. Gender:____________________
3. Race/ethnicity:____________________
4. License type:____________________
5. Years practicing:____________________
6. Current employment status (full time, part-time, hourly):____________________
7. Average number of hours worked per month:____________________
8. Additional employment:____________________
9. Number of years in current position:____________________
10. Number of years as part of current team:____________________
11. Number of times you have attended this specific training:____________________
12. Primary language:____________________
13. Primary language spoken at home:____________________