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An Ethnography of Care Coordination in an Integrated Practice Unit for Ventilator Dependent Patients

Dianne M. Disser

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An Ethnography of Care Coordination in an Integrated Practice Unit for Ventilator Dependent Patients

by

Dianne M. Disser

A Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree

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ACCEPTANCE

This dissertation was prepared under the direction of the *DIANNE M. DISSER* Dissertation Committee. It has been approved and accepted by all members of that committee, and it has been accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Business Administration in the J. Mack Robinson College of Business of Georgia State University.

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ABSTRACT

An Ethnography of Care Coordination in an Integrated Practice Unit for Ventilator Dependent Patients

by

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The growing complexity of healthcare delivery coupled with the pressures to improve cost, quality, and outcomes has healthcare leaders struggling to prioritize initiatives and programs that provide coordinated patient-centered care. It is generally accepted and most academic studies demonstrate that better care coordination will reduce redundancies, improve clinical decision making and provide patients with better care experiences. Moreover, industry leaders are pushing for reforms and policy makers have regulated structural changes aimed at improving the US healthcare system. However, to implement such changes, healthcare organizations must understand the elements of care coordination at the work flow level and how those elements are impacted by the context in which the care is being delivered. Against that backdrop, this ethnographic research of a pediatric clinic designed as an Integrated Practice Unit as defined by Porter and Teisberg examines the care coordination activities between the providers to understand how they are carried out in this specific context, and how infrastructure changes such as the implementation of an enterprise Electronic Health Record impacts the everyday practices of care coordination. As a result, we contribute to the concept of an integrated practice unit by studying it in an operational context and through the lens of Relational

Coordination Theory. We make observations regarding the extent to which integrated practice units enhance care coordination and patient value. We also contribute to Relational Coordination Theory itself by demonstrating how “non-core” team members, organizational context, and worker outcomes are observed so that these measures can be addressed quantitatively in the future.

INDEX WORDS: Care Coordination, integrated practice units, relational coordination theory

I INTRODUCTION

The process of providing healthcare, from both a treatment of illness and a wellness perspective, grows increasingly complex as technology impacts drugs, devices, and the amount of information available to care givers in treating the population (Kannampallil, 2011). Gone are the days of the single primary care family physician that was the focal point for most health issues for a patient. As the available diagnostic tools and treatment options have become more sophisticated and the knowledge-base about disease states expands, physicians and care givers with greater degrees of specialization are more prevalent today, giving rise to alternative systems aimed at providing coordinated care across these specialties and various physician and care giver stakeholders.

As healthcare itself has become more complex, it has highlighted the quality and efficiency issues that exist in the US healthcare system. Industry leaders and the US government continue to work at efforts to lower costs, improve population health and improve patient outcomes. The Institute of Medicine (IOM) published a report in 2001 called *Crossing the Quality Chasm*. In this report, the IOM calls for a systemic overhaul, from the way care is delivered and the quality of care is measured, to the organization of delivery systems, to the payment structures and underlying information systems tools that are required (Corrigan, 2005). The US Congress has responded by passing a series of legislation aimed at reforming governmental payer systems and providing incentives for the widespread implementation and use of health information technology.

A foundational theme presented by the IOM's report is patient-centered care and care-coordination. When providers unite around the common goal of outcomes that respects and responds to the patient and their needs and values, care can be customized to the person. Various initiatives have grown out of this idea. A patient-centered medical home is a concept by which a

primary care physician is the focal point for all care decision-making in collaboration with the patient and their family. Healthcare institutions may be formed as Accountable Care Organizations (ACO), where the team approach is applied at the organizational level, coordinating care among the various inpatient and outpatient service providers, and managing reimbursement and measuring outcomes. Moreover, health information technology and electronic medical record implementations have increased as a means to enable better care-coordination; three-quarters of non-federal acute hospitals having adopted a system by 2014, up from just over nine percent in 2008 (Charles, King, Patel, & Furukawa, 2013). Care coordination, patient-centeredness, and quality and outcomes measurements are a recurring theme in the research to analyze older care delivery models as well as these newer concepts in an attempt to identify the factors that influence and improve these constructs.

Most recently, the concept of Integrated Practice Units (IPU's) has been introduced as a way for physicians to organize their practices around medical conditions (Porter and Teisberg, 2006). An IPU would have all the providers, specialties, and services required to treat specific patient conditions. This care delivery method would eliminate the need for the patient to have sequential visits to multiple physicians, departments, or service providers; they could receive all necessary evaluations, consults, and treatments appropriate for their condition in one visit to an IPU. The concept of the IPU is strategically aligned with the IOM's recommendation that organizations be built to support change in the outcomes for a targeted 15 priority chronic conditions. IPU's are a practical implementation of patient-centered care. However, to realize such changes, healthcare organizations must understand the elements of care coordination at the work flow level and how those elements are impacted by the context in which the care is being delivered. Against that backdrop, this study utilizes engaged scholarship to connect academics and practice

(Van De Ven, 2007) and seeks to investigate how providers relate to each other and coordinate care in an IPU as part of their everyday practices. Such inquiry will help identify the practical opportunities and challenges of coordinating care and managing care transitions in these types of environments.

Accordingly, the problem of interest for this research is workflow and coordination of care in an integrated practice unit designed to treat specific complex chronic illnesses in pediatric patients. A longitudinal case study in this unique patient care setting documents the process of how care is coordinated between the clinical care team and stakeholders and takes advantage of the opportunity to document how these processes were impacted by the introduction of an Electronic Medical Record (EMR) for clinical care management and documentation. I used an ethnographic data collection approach to allow the observation of formal and informal communication and coordination activities while they were happening and to document conscious and unconscious and verbal and non-verbal behaviors. Engaged scholarship encourages research in a real-world setting, solving real-world problems (Van De Ven, 2007). To this end, ethnography allows for the observation of social interactions and how these interactions are impacted or changed by events as they occur. I can exploit the opportunity of being at a specific place at a moment in time (Barley, 1990). As such, this research will contribute important insights into a health delivery framework for combining care delivery methodologies, care setting, and information technology. Care coordination activities in this integrated practice unit were analyzed through the lens of Relational Coordination Theory. Provider to provider interactions were analyzed to identify the network of relationships between the care team members and their shared goals, shared knowledge, and aspects of mutual respect and how this related network impacted the frequency, timeliness, accuracy and problem-solving components of communication and information exchange in this

care setting (Gittell, 2000). During the course of this study, I was able to observe interactions in the integrated practice unit during the go-live, or first production use of an electronic health record. Hence, this research answers the following research question: *How do the care team members in an integrated practice unit exchange information with internal and external care team members to coordinate care, and how does the event of the first use of of an electronic health record interact with this coordination?*

Following Mathiassen's guidelines for design of engaged scholarship research (2012), we can summarize the approach to this study as follows (see Table 1).

Table 1: Engaged Scholarship Design

P	The problem setting represents people's concern in a problematic situation	How large, multi-disciplinary professional team of healthcare providers organize their activities, communication, and relationships to ensure care that they provide is coordinated
A	Area of concern represents some body of knowledge within the literature	The growing complexity of healthcare delivery, complex disease states, the introduction of EMR's, and ongoing cost pressures challenge the ability to provide coordinated care: care that incorporates a prescribed set of work procedures or processes performed by the care participants to provide services and access to resources with the objective of achieving a unified goal or goals.
F_I	General concepts used to inform independent of A	Relational Coordination Theory
F_A	Specific concepts found in the literature about A	Coordinating a team and teamwork in general around a common goal (serving the customer); team and teamwork in healthcare and coordinating work around the patient; integrated practice units
M	The adopted Methods of investigation	Case Study of an outpatient clinic designed as an integrated practice unit that serves pediatric ventilator-dependent patients to observe the process of care coordination among care providers and non-patient stakeholders. Qualitative research to identify and document the process of information exchange and care coordination in this setting to identify the opportunities and challenges of information exchange as it related to care coordination. Observations before during and after an HIT implementation.
C	The contributions to P, A, F, and M	P: Highlight specific success and or issues for patient-centered workflow, as it exists in an operational environment. A: How well care is coordinated in an integrated practice unit and how did the introduction of an EMR impact that coordination FI: Relational Coordination in an IPU; justification for adding measurement elements to Relational Coordination such as non-core workers, outcomes for the workers themselves, the process of organizational change, and the role of IT in Relational Coordination.

(Mathiassen et al, 2012)

II THE CASE

The context of the current study is the Judson L. Hawk clinic at Children's Healthcare of Atlanta (CHOA). The overriding principles at Children's Healthcare of Atlanta and the clinic are to provide team-based, excellent healthcare with a focus on healing and long-term wellness. Although established over 30 years ago, the Judson L. Hawk clinic fits Porter and Teisberg's definition of an Integrated Practice Unit. An IPU is defined as organized care around medical conditions rather than around physician specialty. "A medical condition is a set of interrelated patient medical circumstances that are being addressed in an integrated way…(and) encompasses conditions as physicians usually define them, such as diabetes, congestive heart failure, arthritis, or breast cancer" (Porter and Teisberg, 2007).

Judson L. Hawk Jr. M.D. was a prominent Atlanta physician who had an idea for a clinic model that houses all the outpatient services together to treat chronically ill children. His vision was a multi-specialty setting where all the services needed by a chronically ill child could be provided in one place, alleviating the children and their families from the burden of making and attending many different appointments in many different locations. The physical and organizational set up of the clinic is such that patients can be seen by many different specialists in one visit and can receive the vast majority of clinical and diagnostic care required during these visits without having to leave the clinic or often even their treatment room. The setting and care is organized "around" the patient, with the intention that the clinic design promotes a patient-centered focus.

Clinics are held based on chronic illness. Currently, clinics are held 5 days per week in two sessions - morning and evening. Clinic schedules and required specialists are coordinated in advance, and each disease-based clinic meets approximately 12 times per month, with many different clinics scheduled at the same time based on caseload and resource availability.

Clinics currently held at Judson Hawk are for wide ranging conditions, all of which require pediatric patients to see multiple physician providers and often include consultation with other providers such as specialized physicians, specialty nurses, respiratory therapists, physical and occupational therapists, social workers, psychologists, nutritionists, and case managers.

The specific conditions for which clinic days are scheduled are shown in Table 2:

Table 2: Judson Hawk Clinic List

Brachial Plexus(Linked Comment) Center for Craniofacial Disorders Cerebral Palsy Pelvic and Anorectal Care Program Spine Care for Kids Technology Dependent Tuberous Sclerosis	Cystic Fibrosis Dermatology Epilepsy Gastroenterology Genetics Hand	Strong4Life MDA Neurofibromatosis Pain Management Physiatry Spasticity Spina Bifida

(Source: CHOA)

The focus of this study is the Technology Dependent clinic. These pediatric patients are ventilator dependent, which means that the patients are unable to breathe without the assistance of a machine that moves the air into and out of the lungs. Some of these children have been dependent on such ventilators (vent-dependent) for long periods of time or even for their lifetime. This clinic was chosen from among the many provided at Judson Hawk as the context for this study because of the number of different providers that typically see these patients. It provides a valuable context for a study of Relational Coordination because of the complexity of care required to monitor and treat these patients and provides a rich environment in which to study the relationships between the caregivers as well as their communication activities as they engage together in the care of these patients. The findings and activities observed in this setting can be generalized into the

implementation of integrated practice unit care settings involving chronically ill patients and will provide insight into how the physical and organizational setting impacts care coordination.

III LITERATURE REVIEW

To understand where this research fits into the current literature, it is necessary to first examine the existing knowledge regarding Integrated Practice Units. The definition, the proposed impact of this type of care delivery mechanism, and prior research that has been done in this context are all relevant to the study at hand. Next, an examination of teamwork and team coordination in general around the common goal of servicing the customer to establish the foundational knowledge on which teamwork and activity coordination in healthcare is built, differentiated by the unique challenges that healthcare presents and the understanding that the customer, in the case of healthcare, is the patient. We can then continue to examine the ways and settings in which the coordination of care has been analyzed and measured and review the known body of knowledge regarding the implementation of electronic health records and their disruptive impact on care coordination at first use. Finally, by looking at the concept of integrated practice units and the current body of knowledge about care coordination observed in these specific care settings and we will find that there exists an opportunity to contribute to the academic literature.

III.1 Integrated Practice Units

The concept of an Integrated Practice Unit, or IPU, was first introduced by Michael Porter and Elizabeth Tiesberg in 2006 as an alternative way to organize care delivery around disease states as opposed to physician specialty (Porter and Tiesberg, 2006). This organizational structure lends itself to capturing all the activities, and thus the costs, around treating the disease and measuring the outcome of the treatment. Theoretically, this aligns the care pathways and measurements with the value-based reimbursement strategy recommended by the IOM.

An integrated practice unit, or IPU, is a care delivery system in which care is organized around a medical condition, with a call for prioritization of the formation of IPU's around chronic

diseases (Porter and Teisberg, 2006; Porter, 2009). Almost 30 percent of the US population suffers from some sort of chronic condition (Unertl, Weinger, & Johnson, 2006). The IOM report identified that only about 15 to 20 chronic conditions account for the majority of healthcare problems, and that a system designed to coordinate care for chronic disease management will have the biggest impact on overall population health (Corrigan, 2005). In addition to Porter and Teisberg, other researchers in workflow and care delivery methodologies are calling for systems of care that include team-driven care in integrated yet flexible organizations that would not only improve access but also promote provider-provider relationships and develop a community of care around the patient (Bergeson & Dean, 2006; Epstein, 2009).

Since its introduction, most of the academic literature focuses on the conceptual establishment of an IPU and any foreseen challenges rather than a study involving an actual IPU in practice (Kewwani et. al., 2016). There have been some studies of IPU's around certain disease states. An IPU was established to treat COPD patients at the University of Alabama Birmingham with the objective of reducing the 30-day readmission rate for Medicare patients and found no difference in readmission rates for the IPU patients vs the control group (Bhatt et.al, 2016). In another study, a digital IPU was used to monitor and respond to hypertensive patients that had fluctuations in blood pressure requiring intervention. This model did result in better blood pressure control, patient engagement, and better outcomes by a technology-enabled IPU that could continuously monitor the patients in real-time (Milani, 2016). Most studies involving a real or conceptual IPU are focused on measuring generally-accepted outcomes such as readmission rates or care intervention requirements and are focused on aligning care pathways with value-based reimbursement strategies.

There are even fewer studies that focus on how IPU's impact the way work is performed

and the impact on the team members and how the IPU impacts the process for sharing information about complex patients. Nawaz et al (2014) studied orthopedic IPU teams and focused on the leadership role of the surgeon and how the organizational structure makes it imperative that he or she modify their leadership style to encourage effective communication. This paper pulled together research regarding organizational methodologies, conflict resolution, teaming, and learning cycles and discussed these concepts in light of a multidisciplinary team rather than introducing new research or observations in a real-life multidisciplinary setting (Nawaz et al, 2014).

WH van Harteen (2018) documents that there are very few papers that focus on the implementation of an IPU. The author contends the difficulty lies in the implementation obstacles for such a care structure, including management changes, restructuring, and cost and budget implications and calls for organizational studies to fill the evidence gap (van Harteen, 2018).

Both the van Harteen and Nawaz papers highlight the need for observations in a real-life setting for an integrated practice unit in order to validate the impact on communication and care coordination, whether it relates to how leaders change their behaviors to encourage this behavior or to demonstrate the value of such an organizational structure.

III.2 Teamwork and Coordination of Work Activities

Organizational Behavior scholars define teamwork as tasks done by a group of people that are interdependent towards a common goal (Hackman, 1987). There is a great deal of literature that evaluates team structure and formality and how it relates to team performance and task coordination. Sports teams, undersea research teams, and organizational work teams have all been the subjects of such studies. Successful teams generally have better cohesion. The more uncertain

the task that a team undertakes, the more the team coordinates to accomplish the tasks. Research has also shown that tasks that are highly interdependent require the use of a higher number of group coordinating activities (Ven, Delbecq, & Koenig, 1976; Bakeman & Helmreich, 1975; Bird, 2010) .

The quality of team output is also a common research subject. Seers, et al. studied how information is exchanged in self-managed as well as traditional work teams and determined that members of teams that are responsible for managing their own activities have greater group effectiveness through reciprocal behavior, cohesiveness, and group decision making (Seers, Petty, & Cashman, 1995). Team culture and knowledge sharing in the hospitality industry were studied and were determined to positively impact service performance for internal customers (management) and external customers (hotel guests) (Monica Hu, Horng, & Christine Sun, 2009). Countless studies have been done linking the constructs of teamwork to customer satisfaction (Schlesinger, et al. 1991; Hallowell et al. 1996).

In summary, we know that teams responsible for complex, interdependent tasks can be highly successful when they effectively coordinate the completion of those tasks. An understanding and participation in decision making towards a common goal is effective coordination that results in higher satisfaction for the customer.

III.3 Coordination in Healthcare

So how does this relate to team coordination in a healthcare setting? Healthcare is unique because there are two different customer stakeholders. The patient and particularly in the case of children, the patient's family, receives the service. However, a third party pays for most care. Each stakeholder has an interest in improving care coordination but with different abilities to facilitate that coordination. The increasingly complex network of caregivers, technologies, treatment

options, and specializations makes the tasks associated with providing healthcare highly uncertain, interdependent, and complex - all factors that organizational behavior research has shown necessitate effective teamwork and coordination. The recent emphasis on reducing costs and improving outcomes is further being reinforced by value-based reimbursement methods that link payment for services to outcomes. These initiatives, introduced by third party payers, makes care coordination activities increasingly critical to the viability of healthcare institutions.

Care coordination, by definition, is an attribute of patient-centered care, a key success factor presented by the IOM's report. Patient-centered care has been implied in physician training and clinical workflow development for decades (Berwick, 2009). The IOM's report brought it to the forefront as a foundational concept to healthcare delivery reform. Patient-centered care is framed by the IOM as being care that respects and responds to the patient and their needs and values, facilitated by the relationships between the caregivers and the patients and their families as well as between the care team members themselves. The patient is an active participant in their care and requires a coordinated group of care providers that share a common goal (Epstein, et al, 2010; Corrigan, 2005). Measurable constructs for patient-centered care came out of research by the Picker Institute and became the basis for the dimensions of patient-centered care:

1. Respect for the patient's values, preferences, and expressed needs
2. Information and education for the patient
3. Ease of and Access to care
4. Emotional support
5. Family and friends involved in care
6. Care Transitions that are secure and promote continuity
7. Emphasis on the physical comfort of the patient

8. Coordination of care

(Davis, Schoenbaum, & Audet, 2005; Jenkinson, Coulter, & Bruster, 2002)

A meta-analysis of the literature demonstrated a mixed relationship between patient-centered care, as measured by the dimensions of patient-centered care and outcomes (Rathert, Wyrwich, & Boren, 2012). The authors find a "generally positive empirical relationship" between patient centered care and outcome, with almost all studies finding a positive relationship between processes that were patient-centered and the patient's experience and self-reported well-being. While most of the dimensions of patient-centered care are measured via patient surveys and provider self-reporting, the care coordination dimension is perhaps one of the most complex and difficult to measure.

As one of the attributes of patient-centered care, care coordination is defined in the literature as being a prescribed set of work procedures or processes performed by the care participants to provide services and access to resources with the objective of achieving a unified goal or goals. Typically, this is assumed to be high-quality care, improved health outcomes, or even a stable health state and quality of life based on the patient's existing chronic conditions (R. C. Antonelli, Stille, & Antonelli, 2008; Gupta, O'Connor, & Quezada-Gomez, 2004; Malone & Crowston, 1993; Uddin & Hossain, 2012). It has been demonstrated that coordinated care, a process by which care for the patient involves providers performing tasks and exchanging information about those tasks related to how they were completed and the informational outputs from performing those activities, is necessary to achieve cost reductions and quality improvements in many healthcare settings and is a necessary driver for desirable patient outcomes (Malone & Crowston, 1993; Uddin & Hossain, 2012; Goda, 2008).

Quantitatively, care coordination has been studied in specific populations such as

chronically ill children and is shown to optimize their healthcare experience. It has been identified as a factor that reduces hospitalizations and ER visits for those with chronic disease states (Uddin & Hossain, 2012;Goda, 2008;Cooley, McAllister, Sherrieb, & Kuhlthau, 2009; Dobrzykowski & Tarafdar, 2015; Gupta et al., 2004). Instruments that measure the extent to which care is coordinated include tools that capture the complexity of the patient's encounter and illness state, codes for standard clinical activities and the level of care giver required, as well as codes for the outcome of the encounter and have been used to measure costs against outcomes to determine levels of care coordination in various clinical settings (R. C. Antonelli et al., 2008; R. C. Antonelli & Antonelli, 2004). Another approach to measuring the extent to which care is coordinated is through the development of the Relational Coordination theory, which provides a survey instrument that captures the shared goals of the providers, the shared knowledge of the providers, and the levels of mutual respect that the providers exhibit. The instrument also measures aspects of provider/provider communication in terms of frequency, timeliness, accuracy, and problem solving (Gittell, 2014). This theory has been used to quantitatively measure collaboration and outcomes for various chronic illnesses such as HIV and Type 2 diabetes (Manski et al, 2014;Khosla, et al. 2016). In general, these studies acknowledged the use of information technology as a tool in the care coordination process, but an EMR or an information system has not been identified as a sole means to an end where care coordination is concerned.

Care coordination has been studied in many contexts, including hospital settings and between and among traditional clinics as well as in specific patient populations based on illness such as HIV and Type 2 diabetes. The emphasis of these studies has been the coordination activities and patient outcomes themselves without much analysis of the care setting and clinic organization. The context of the delivery system, then, becomes an interesting element to examine

in relation to care coordination.

Electronic Health Implementations Go Lives as a Disruption to Care Activities

There exist many academic studies on Electronic Health Record implementations, focusing on the growing number as well as the impact on the healthcare industry. The majority of these studies focus on the process of implementing and the long-term effects of the system, how readily the system is accepted by clinical staff or the patient, and how these systems are being used.

The actual day that a health system starts using a computer system is often called the "Go-live". Personal observation and experience with many health care systems has suggested that this can be a very disruptive and disorganized event even in the best of circumstances. The impact of the actual go-live on care coordination activities has not been studied in real time. In a case study done at the Dana Farber Cancer Institute in Boston, MA, it was observed that the actual implementation reduced the team's overall performance and eroded their mutual trust (Gross et al, 2016). The team had developed methods and practices of communicating that completely broke down upon the introduction of the EMR, and a post-hoc review of the implementation process revealed gaps in planning, change management, and training that could have lessened the disruption.

III.4 Coordination in Integrated Practice Units

We have noted above that the IPU structure should, at least in theory, promote provider-provider relationships that enhance communication and contribute to a culture of community of care around a patient. This idea of studying care coordination in the context of an integrated practice unit, then, can provide new insights to care coordination processes and activities that have not been previously documented.

Contextualization is a principle of interpretive field research that places the subject matter in its a social and historical setting to better understand how the current situation emerged and its meaning for the events, trends, or outcomes being studied (Klein and Myers, 1999). Studying care coordination activities in a specific context provides a lens that can better inform theory and provide engaged scholars with situational applications that they might not otherwise experience with findings or findings where the context is merely a control (Johns, 2006). Rather than shy away from specific contextual research settings, context can actually become part of the models and expand organizational behavior theories (Bamberger, 2008). By incorporating context into the analysis, the researcher can analyze whether the context was punctuated by a specific event, or created a set of boundaries or constraints, and even understand how context itself plays a role in the variability of outcomes as we test management theories.

Pediatrics are a common population for study in academic research, as we strive to improve access to care and improve overall health of children in our nation. Technology improvements and medical advances have led to more children living through conditions that once were life-threatening. This has resulted in a growing population of pediatric patients that requires on-going, specialized, multi-disciplinary treatment (American Academy of Pediatrics, 2005). Research has shown that care coordination has a significant impact on quality for children with special needs. Various organizational and workflow models have been applied and studied to describe the level of care coordination for chronically ill patients in a pediatric setting, including ones set up as an ad-hoc care coordinator model, to practices that have designated care coordination staff, to those that are formally set up as a primary care medical home (R. C. Antonelli et al., 2008). While this literature contributes to the knowledge about care coordination activities for these patients, it treats the care coordination context as background rather than playing a significant role in the care

coordination activities.

As a care context, clinical and administrative thought leaders are promoting integrated practice units but very few organizations have incorporated them into their care delivery systems to date. There is limited academic research describing IPUs at Kaiser in the larger context of a study of the Kaiser system (Albers Mohrman & Kanter, 2012). Practitioner journals describe processes at MD Anderson and the Cleveland Clinic as examples of IPU's around the treatment of specific cancers (Bolwell & Khorana, 2016). The literature gap that emerges is qualitative research that studies an integrated practice unit and the constructs of a proven theory of care coordination to describe care coordination activities in this context.

As a contribution, studying care coordination in an integrated practice unit will provide insights into how coordination activities can be impacted positively or negatively by this design, both organizationally and structurally, to promote patient-centered care and coordination among care givers. It also can demonstrate how specific events, such as the implementation of an EMR, can impact care coordination in this setting and better inform organizations on how EMR implementations can be conducted to have positive impact on care coordination in an integrated practice unit.

IV THEORETICAL LENS

Relational Coordination Theory (Gittell, 2000) has matured out of prior organizational behavior theories attempting to explain how work is coordinated in organizations to achieve outcomes, with the intent of measuring how the coordination of work impacts the quality and efficiency of those outcomes (Graham, 2003). Originally, theorists looked at the coordination of specific tasks and their outcomes, but soon the theory became more complex as researchers incorporated the feedback loop of outcomes from a group of tasks actually coming back into those tasks and creating new information or different coordination requirements (Thompson, 2011). Eventually, Relational Coordination became a way to describe and measure how relationships and communication interact to create the integration of tasks that produce outcomes. The model evolved and is used to explain how routine coordinating activities are impacted by the relationships and communication between the participants (Gittell, 2000).

Relational Coordination examines three dimensions of relationships among roles that are tied together to accomplish a set of tasks. Those three dimensions are 1) Shared Goals: the degree to which the participants understand and share in the goals of the work being performed; 2) Shared Knowledge: the degree to which the participants know and understand each other's tasks and responsibilities and how they all work together; and 3) Mutual Respect: the degree to which the participants respect the competence and reliability of each other's work product (Gittell, Seidner, & Wimbush, 2010).

Relational Coordination also measures communication dimensions between the participants. The frequency, timing, accuracy, and problem-solving nature of communication impact the relationships and the ties between participants. The basis of the theory is that the interaction between the communication and the relationships reinforce each other - the nature of the communication influences the relationships and vice-versa. Quantitative measurements tools

have been developed and tested that evaluate communication and relationships between participants in work settings. Specific measures of the outcomes or work products in the setting being evaluated are also determined, and the relationships between the measures are analyzed. (Gittell, 2011). The constructs for Relational Coordination have also been used in qualitative settings to identify and explain coordination networks and patterns of activities that promote or block coordination (Schölmerich et al., 2014; Solberg, Hansen, & Bjørk, 2015).

As healthcare has become increasingly complex, physicians and caregivers within the healthcare sector have become increasingly specialized, resulting in the emerging importance for coordinating care across settings. The Relational Coordination model is useful in healthcare settings to measure care coordination. Various studies apply this model to measure both the dimensions of Relational Coordination and patient care quality and outcomes, demonstrating that there is a positive and significant relationship between the measures of communication and relationship and patient care outcomes. This suggests that Relational Coordination attributes can be predictors of improved outcomes and decrease hospital acquired infections, errors, and other adverse events (Havens, Vasey, Gittell, & Lin, 2010).

Given this fact, many studies focus on the Relational Coordination measures themselves and understanding the impact of one or more of the characteristics of the participant relationship and communication characteristics. For example, one such study assesses the effectiveness of multidisciplinary teams and workflow in a specialized patient setting for geriatrics in order to understand the relationship between the providers as well as the nature of their communication. The goal was to determine which activities have the most impact on improving Relational Coordination, given evidence that a higher degree of coordination has a positive impact on the quality of care for these patients (Hartgerink et al., 2013). This quantitative study identified cultural

and operational activities such as enhancing the team climate and conducting multidisciplinary team meetings with full discipline participation would have a direct impact on Relational Coordination.

Qualitative studies have applied the theory to analyze roles and relationships between providers in multi-disciplinary care settings (Schölmerich et al., 2014; Solberg et al., 2015). The constructs of Relational Coordination have been used to develop analytical themes to identify coordination and collaboration factors in the management and treatment of Type 2 Diabetics. These themes better informed how these providers could improve their Relational Coordination and thus improve the quality of care provided to these patients (Manski-Nankervis et al., 2014). Another study analyzed data from care providers in a neonatal intensive care unit (NICU). Observations of care provider interactions are coded utilizing the constructs of Relational Coordination to organize the results into units of meaning and abstracted into categories from the theory. The caregivers recommended changes in the way NICU treatment could be managed specifically for ventilator patients, and observations were made regarding shared goals, knowledge and mutual respect between the team members. Researchers analyzed communication activities for frequency, timeliness, accuracy, and problem-solving attributes and made suggestions as to how the proposed ventilator treatment management can be coordinated along these dimensions (Solberg et al., 2015).

Relational Coordination will provide a rich theoretical lens to analyze the care coordination and communication exchanges between caregivers in the context of the specialized pediatric clinic in this study. The dimensions of the participant relationships as well as the nature of the communication and information exchange activities will provide insight into how Relational Coordination exists or emerges and how it is shaped, constrained, or impacted by the context of an integrated practice unit. It will be a framework to analyze the contextual events such as the

implementation of the EMR and its impact on the coordination of care and the relationships between the providers and the nature of their communication activities. While no one has addressed EMH implementations using the lens of Relational Coordination, the case study noted above (Gross et al) illustrates the potential for an EHR implementation to influce the dimensions of participant relationships.

The following Table 3 summarizes the dimensions of Relational Coordination Theory and a description of observable activities based on their definition:

Table 3: Relational Coordination Theory Constructs with Observable Activities

RC Dimension	Definition	Sample Observable Activities
Communication Frequency	Number of times participants communicate or interact; creates familiarity	Number of Interactions between team members
Communication Timeliness	Timing of communication interactions	Delays between sharing of information that causes care coordination issues or impacts the patient or care team
Communication Accuracy	Communication that is without error	Exchanges between care team members that involve inaccurate information
Communication Problem Solving	Communication activities where the participants are solving problems together	Discussions between care team members regarding patient treatment plans or patient social issues
Relationship Shared Goals	Participants have a high level of shared goals for the wok process	Articulation of shared goals for patient outcomes
Relationship Shared Knowledge	Participants have a high degree of shared knowledge about each other's tasks and how they fit together.	Care team members articulations of other team members roles and tasks
Relationship Mutual Respect	Respect between team members	Observe team members avoiding communication with other team members, body language; outright articulations of disrespect

(Gittell, 2012; Gittell, 2000)

V RESEARCH DESIGN

This research is an ethnography of a single qualitative case study (Yin, 2013). Ethnography has grown out of anthropological studies but is now widely used in the disciplines of sociology and psychology as a means of data collection (Hammersley & Atkinson, 2007). Ethnography allows for sustained observations that allow the researcher to document interactions as well as their recurrence and consistency over time (Barley, 1990). This allows for meanings to be interpreted from the individual observations as well as the whole story as it unfolds (Klein and Myers, 1999). This method enables the researcher to identify not only the processes but also how those processes became embedded in the environment (Barley, 1990). Because of the time and intensity of observation in this method, one case or setting is typical and the researcher must justify the trade-off between breadth that multiple settings or cases would provide and versus the depth of a single case (Hammersley & Atkinson, 2007). Similar healthcare workflow qualitative studies have used this method, including one that studied the use of paper records as tools (Bang & Timpka, 2003) and a 10-month observational study that was done to develop clinical workflow and information flow models (Unertl, Weinger, Johnson, & Lorenzi, 2009). This research draws on the strength of the ethnographic method demonstrated by these studies: information seeking and exchanging behaviors are best observed through “careful observation and questioning” and observing participants while they perform their work provides a more accurate picture than asking them to describe their work (Reddy and Spence, 2006). By observing care interactions between providers in the integrated practice unit setting, I am able to incorporate the environment, the context and the impact of external disruptions or events and embed myself in the care setting as a way to best observe coordinated care interactions.

As ethnography is a written account of a culture, it requires that the researcher understand the concepts, practices, rules and beliefs inherent in that environment (Van Maanen, 2011). For

this study, I am uniquely qualified to conduct this research based on a professional career of over 25 years in the health care information technology industry. As the researcher, I have had the opportunity to design, implement, and support information technology implementations in a variety of clinical and administrative settings. I have spent a great deal of time working with stakeholders to understand their workflow and processes as a basis for implementing technology solutions to support their activities. I entered into this research setting with an intimate understanding of clinical tasks and roles and how information technology is often used as a tool for clinical documentation and information sharing. I have a keen interest in understanding how patient-centered care is delivered from a workflow and coordination perspective as well as how information technology is positioned to support care that is organizationally designed to be this way.

VI DATA COLLECTION AND ANALYSIS

I was introduced into the research setting first and foremost as a student, with my professional experience lending to my credibility to be able to observe and understand the terminology, environment, and other characteristics that are unique to healthcare.

The study consisted of in-clinic observations of the caregiver and staff processes from the scheduling through post-visit provider documentation. As I made observations, I conducted informal and semi-structured interviews with clinic staff involved in the scheduling, management, provision, and coordination of care for the children seen in the clinic. The staff that was observed and interviewed included the clinical managers, physicians, social workers, therapists, multi-disciplinary team members, nurses and support staff. I utilized a "snowballing" technique to identify other members of the care team and community that assist or have a role in providing and coordinating care. In this way, I gained an in-depth and first-hand understanding of the workflows and technology that is used to coordinate care in the integrated practice unit setting so that I could describe and analyze the relationships between providers and the communication activities and tasks conducted to support this purpose (Myers, 1999).

Table 4: Data Sources – Care Team Members

Care Team Member (Abbreviation)	Role/Description	Core or Non Core
Nurse Practitioner 1 (NP)	TECH Clinic Dedicated Nurse Practitioner, Job Shares	Core
Nurse Practitioner 2 (NP)	TECH Clinic Dedicated Nurse Practitioner, Job Shares	Core
Case Manager 1 (CM)	Case Manager, splits time between JH Clinics and hospital, job shares	Core
Case Manager 2 (CM)	Case Manager, splits time between JH Clinics and Hospital; job shares	Core
Nutritionist (Nutr)	Nutritional Counseling, splits time between JH and Hospital	Core
Respiratory Therapist 1 (Resp)	Administers respiratory therapy procedures, splits time between JH and Hospital	Core
Respiratory Therapist 2 (Resp)	Administers respiratory therapy procedures, splits time between JH and Hospital	Core
Respiratory Therapist 3 (Resp)	Administers respiratory therapy procedures, splits time between JH and Hospital	Core
Social Worker 1 (SW)	Manages social and home life issues, splits time between JH and Hospital	Core
Social Worker Intern (SW)	Manages social and home life issues, splits time between JH and Hospital,	Core
Dedicated Clinic Staff (3 people)	Check in, triage, room prep. Full time JH employees	Non Core
Lab Tech	Come to clinic as needed from hospital	Non Core
Nurse (NUR)	Dedicated Full Time Nurse for Technology Clinic	Core
Doctor (8 rotating) (MD)	Physician responsible for seeing patient; from outside offices; rotates through MD list each month	Core
Clinic Manager	Full time Manager of JH responsible for all clinic admin activities	Non Core
(Find label for Sec/Tech in core)	Provided administrative assistance in core – faxing, copies, etc.	Non Core

As required in all ethnographic case studies, data collection included the collection of documents and artifacts and field notes taken during in-clinic observations of the activities of the participants as they coordinated care for their patients (Hammersley and Atkinson, 2007). I made observations regarding the tools, techniques, participants, methods, duration, verbal and non-verbal cues that are demonstrated by the care team as clinic activities are conducted.

After obtaining appropriate IRB approvals from both my academic institution and the hospital, I was introduced to the Judson Hawk clinic as a researcher/student specializing in hospital information systems, since implementing and supporting computer systems in hospitals has been my life's work. I explained that the focus of my research was to study how this team of caregivers exchanged information and worked together to care for these patients in this unique setting. My

presence was generally accepted very rapidly; there are often many caregivers present at one time in this clinic, including a variety of administrative people, and often clinical students and interns, so I soon became part of the background during clinic activities, particularly in the center of the treatment rooms where the care team members gathered (i.e., the "Core"). I attended 12 full total clinics over the four-month course of my fieldwork, totaling approximately 60 hours, and partially observed 6 more clinics for an additional 15 hours to get clarifications and fill data gaps. I also met with clinic staff outside clinic hours to familiarize myself with their clinic preparation processes and other patient centered activities, for a total of another 25 hours. My observations included all caregiver activity except those conducted inside the treatment rooms. 20 of the 75 hours of observation took place during the Epic implementation, where I could observe and follow up on how the flow and process of care was impacted by the introduction of the EMR.

These observations took place over a 3-4-month period in a single clinic that meets approximately 12 times per month. During the data collection period, the clinic underwent a transition to an enterprise-wide electronic health record (EMR) system. I conducted observations before, during, and immediately after the system implementation to collect data on the coordination of care and nature of communication and how it was impacted by the EMR.

Table 5: Summary of Clinic Observations

	Full Clinic Observations			Core Team Members Present						
	Clinic Date	AM/PM	#Patients	NP	CM	Nutr	Resp	SW	NUR	MD
Pre EMR	23-Apr	PM	5	x	x	x	x	x	x	x
	24-Apr	AM	not noted	x	Left early	x	x	x	x	x
	24-Apr	PM	2	x		x	x	x	x	
	27-Apr	PM	7	x	late		x	late	x	x
	6-May	AM	5	x	x	x	x	x	x	x
	7-May	PM	8	x		x	x	x	x	x
	8-May	AM	6	x	x	x	x	x	x	x
	9-May	PM	4	x	x	x	x	x	x	x
	15-May	AM	not noted	x	x		x	x	x	x
	15-May	PM	3	x	x	x	x	x	x	x
	28-May	AM	3	x	x		late	x	x	x
	3-Jun	AM	3	x	x	x	x	x	x	x
	Partial Clinic Observations									
	20-May	AM/PM	Questions on workflow							
	22-May	AM/PM	Follow Up Questions for Nurse							
	12-Jun	AM/PM	Research Wrap up questions for Nurse and Nurse Practitioner							
	Non-Clinic Observations									
	Research Prep	23-Sep	Met with Clinic management and research management to learn about clinic							
	Research Prep	9-Apr	Met with Clinic Nurse Practitioners and Nurse to get introduction to clinic and processes							
	IT/Infrastructure	23-Apr	Met with IT management to understand scope and schedule for EMR implementation for clinic							
	Clinic Prep Review	30-Apr	Met with Nurse to understand how clinic works behind the scenes							

Data collection was done in the form of written field notes taken based on provider interactions observed in the clinic as well as any information gathered from semi-structured interviews with the care team members. These notes did not include any information that identified the clinicians by name; a shorthand identification system was developed to identify care team members by their role in the clinic. I did not include any observations about the patients or the caregivers' direct interactions with the patients, as these interactions were not in scope for this study.

These field notes were reviewed immediately after each clinic to clarify any shorthand and additional notes were made as soon as possible at the end of each clinic to document stories or situations observed. These notes included my thoughts, feelings, and comments about the activities observed in the clinic session. In this way, the field notes became a sort of dairy (Myers, 2013). At the end of each clinic, the notes were organized and indexed to insure clarity and to facilitate analysis.

Field notes were transcribed for coding in NVIVO. Software-based coding allows for streamlined and reliable analysis of theoretical constructs and emerging themes in the unstructured data. To answer the question of how care team members coordinate care, the initial codes used included the constructs of Relational Coordination, including coding observations for examples of shared goals, shared knowledge and mutual respect in provider-provider relationships (or lack thereof). Because these relationship dimensions are demonstrated and strengthened by team member communication, codes were also applied to highlight communication activities and their frequency, timeliness, accuracy, and problem-solving context. Additional codes were identified and applied to the data as I conducted my analysis and data was grouped into categories both as they related to Relational Coordination and integrated practice units as the concepts became evident to me (Barley, 1990). These codes included conversation content codes, core vs. non-core staff, IT Impact, and IPU characteristics. Event analysis was coded to identify significant planned and unplanned events and their observed impact on the care team interactions. Finally, I looked critically at the structure of the integrated practice unit and how it seemed to facilitate the care coordination activities, as well as the alignment of the IPU with the organizational structure at CHOA.

Analysis of ethnographic data is a continual process and was done throughout the data collection as I identified themes and structures in the data. Evidence is presented here in the form of stories that illustrate and contribute to the theme of care coordination and Relational Coordination theory constructs (Hammersley & Atkinson, 2007; Barley, 1990).

VII EMPIRICAL ACCOUNT

The Ethnographic method presents an opportunity to describe a credible empirical account of the social setting under observation so that the reader can join the researcher, even if only momentarily, in that culture (Van Maanan, 2011). Per Klein and Myers' Principle of Contextualization for Interpretive Field Research, this allows the reader to understand the social and historical background of the setting (Klein and Myers, 1999). To further describe the social interactions, Klein and Myers also propose the Principle of Abstraction and Generalization, in which the ethnographic findings are examined through a theoretical lens (Klein and Myers, 1999). Drawing on the strength of this principle, Manski, et al described their observations of caregivers responsible for initiating insulin for type 2 diabetics using Relational Coordination. They presented their findings regarding the relationship dimensions (shared goals, knowledge, mutual respect), with communication observations described where appropriate that supported a particular relationship dimension. Specific quotes and researcher field notes were referenced to add credibility and clarity (Manski-Nankervis et al., 2014). While Rowlands and Scholmerich do not specifically use Relational Coordination, the findings in these ethnographic healthcare studies are presented similarly; the characteristic of communication between team members are described as the role of the team member and the doctor's dominance, as well as shared knowledge and respect; and then observed communication activities are described that support these themes (Rowlands & Callen, 2012; Schölmerich et al., 2014).

Based on these examples, I use the following framework for presenting the findings for this research. I will provide an overview of my experiences and observations in the clinic to both expose my role as a researcher and to immerse the reader in the clinic (Schultze, 2000). I then utilized the relationship and communication themes of Relational Coordination to specifically identify how they emerged in the data. Observations, or examples, will be documented from the

ethnographic data collected as “stories” to support the relationship construct and the communication activity dimensions. Per Myers, this will allow for portions of the story, relevant to the reader around care coordination, to be told without telling the “whole” story in the research report (Myers, 1999).

VII.1 General Observations

The Technology Dependent Clinic (aka Tech Clinic) meets at Judson Hawk 12 times per month, either in the morning half of the day (9-12) or the afternoon half of the day (1-4). The scheduled days and times are dependent on the pulmonologists that staff the clinic and their availability. The schedule is done up to 3 months prior by a permanent scheduling manager that works at CHOA. This manager coordinates all the clinic schedules for all the disease category clinics that are conducted throughout the month at the facility. This coordination is largely a manual process and is quite complex; the only fact that simplifies this activity is that the schedules are kept mainly the same throughout the month, with physician specialties being swapped out and clinics traded to accommodate vacations and other anomalies. Otherwise, to schedule the clinics from a blank calendar would be a very difficult task. On any given day, Judson Hawk will be conducting 4 or 5 clinics at one time depending on the number of patients being seen by that clinic and the number of treatment rooms required.

The pulmonologists that staff the Tech Clinic are all in private practice either on their own or as part of a larger group of physicians. None of them are employed by the hospital; this is part of the tradition of the founding of the clinic. While this may not hold true for the other disease category clinics, it remains true for the Technology Dependent Clinic. These physicians bill applicable insurance for care provided to patients seen in the clinic, but otherwise they are not compensated by the hospital or the patient for providing this care in this setting.

The remaining staff assigned to the clinic is a mixture of permanent clinic employees or hospital employees that are scheduled to work the various disease category clinics. The Tech Clinic has a full-time Nurse and two part time Nurse Practitioners assigned to these patients. They work the scheduled clinic hours, and during non-clinic times, they are managing their patient population, coordinating care with other care givers, evaluating new patient candidates that may be eligible for the clinic, and preparing for or wrapping up documentation and follow up for each scheduled clinic. In addition, the Tech clinic is assigned staff that also provides services to other Judson Hawk clinics and other areas of the hospital. This includes two Case Managers, a Social Worker and, at times, a Social Worker Intern, a Nutritionist, and a team of 3 Respiratory Therapists.

The Judson Hawk Clinic has permanent staff that handles patient registration, scheduling, check-in, triage, and maintenance and preparation of the physical rooms. There is also a part time unit secretary that positions himself or herself in the "Core" to assist the team with any clerical or administrative tasks. These individuals provide service to all of the different condition specific clinics, not just that Tech Clinic that was the focus of this study.

The clinic is laid out in a bow shape, with the clinical care rooms positioned along the "loops" and the patient waiting, check-in and triage areas at the "knot". The centers of the loops on each end are closed off work areas for staff and are each called the "Core". It is in the Core where each clinic day is kicked off; staff convenes here to review the schedule, the room assignments, and to share any relevant news or gossip. The following is a sample layout of one side of the "loop" so that the setting can be better visualized:

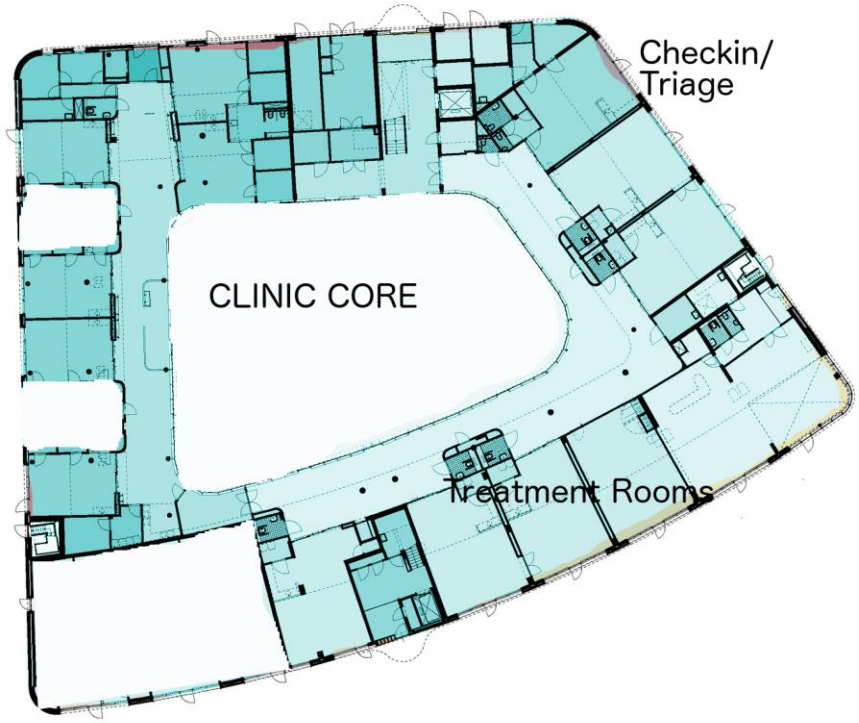

Figure 1: Clinic Diagram (Researcher Rendition – not exact):

To understand the flow of the clinic, it is important to understand the activities that go into preparing for a scheduled clinic. Patients are referred to the clinic as a result of inpatient stays, usually at CHOA but also other children's hospitals around Atlanta when it becomes evident that they are going to be ventilator-dependent (sometimes referred to simply as "Vent" or "Vent-dependent) for an extended period of time or even for their lifetime. These patients could be prematurely born infants or babies born with lung or breathing issues or lung-related birth defects, they could have other diseases that are under control or even cured but have left them without the ability to breath on their own. The Nurse Practitioners work with all the referrals to determine if

the Tech clinic is the proper care setting for their Vent management, and if not, will refer them to another clinic more suited to their primary illness.

Once a patient becomes part of the Tech clinic, the Nurse Practitioner will enter the patient's data into an Access database that was built specifically for this clinic to utilize to manage their patient population. The database contains all the demographic information about the patient as well as detailed information on their family and home setting, detailed information on their home care and home caregivers, and a history of their medications, hospitalizations, and other clinical data relevant to the maintenance of their Vent. This database also contains information about the education and training that the clinic provides to the home caregivers and other Tech-clinic specific activities. The Nurse Practitioner or the Nurse works with the family to schedule the new patient to the next available Tech clinic on the calendar.

About a week prior to a scheduled clinic, the Nurse will pull the list of patients and confirm the appointments. She also prepares a folder for each patient. The folder consists of a patient profile printed out of the information from the Access Database and any recent clinical notes, medications, or hospitalizations that are documented in the hospital EMR. She first spends a great deal of time making sure that the data in the Access database is formatted correctly and contains the most recent clinical information about the patient. This data is obtained by looking in the prior EMR computer system, McKesson STAR, which was the being replaced by or EPIC, the EMR implemented during the study. She manually types any corrections into the Access database before printing the record for the folder. Once the profile is printed out, she also hand writes new prescriptions on prescription pad paper, leaving dosage and other details to be filled in by the doctor. She also writes a list of vital signs that need to be collected at the top of the profile:

Temp: *(Temperature)*

HR: *(Heart Rate)*

RR: *(Respiratory Rate)*

BP: *(Blood Pressure)*

WT: *(Weight)*

Ht: *(Height)*

O2: *(Oxygen Saturation Level)*

The permanent clinic staff that triages the patient will fill out this information.

A folder is prepared anew for each subsequent visit, because the hospital keeps all data in electronic format. There is no secure location for these folders to be stored long term. The only time a prior folder is used is if the patient did not show up or cancelled their prior appointment after the Nurse prepared the folder. In these cases, she reschedules them for a future date and keeps the folder she has prepared, updating it as needed prior to the rescheduled visit.

The day of the clinic, the Nurse brings the folders and a print out of the schedule into the clinic core (the Tech Clinic is always assigned to the left side of the "bow"). The permanent clinic staff has identified the clinics that are taking place on that end of the hall as well as the room assignments via a white board in the Core. For example, it will say:

AM TECH Rooms 8-13

MS Rooms 5-7 (Multiple Sclerosis)

PM CP Rooms 8-13 (Cerebral Palsy)

CF Rooms 5-7 (Cystic Fibrosis)

Each of the clinic treatment rooms are numbered, with small white boards mounted outside each one and a panel of colored lights. The panel of lights has an overlay taped on them to indicate the meaning of each one, for example “MD in room”, or “Waiting for Lab”. Each disease specialty has their own overlay that assigns meanings to the colored light system. The intent is for care team members to press the buttons to turn on the lights to indicate the current status of the patient in the room.

There is also a paper strip, about the size of a ruler, taped to each white board:

DONE	RT	CM	RDN	MSW	NP	MD	RN

RT – Respiratory Therapist

CM – Case Manager

RDN – Nutritionist

MSW – Social Worker

NP – Nurse Practitioner

MD – Doctor

RN – Nurse

The process, as told to me by the Nurse, is that as each caregiver sees the patient, they are to check off below their designation, and either the Nurse Practitioner or the Nurse will check off under ‘DONE’ when the patient is ready to be discharged by the clinic staff.

The nurse delivers the folder charts she has prepared to the permanent clinic staff and as patients arrive, they note the patient’s arrival time on the profile and on the schedule in the computer system. They bring the patient into a triage room where their vital statistics (height, weight, heart rate, respiratory rate, blood pressure, and oxygen levels) are documented on the

patient profile sheet. The patient is then brought to one of the Tech clinic assigned rooms and the patient's first name and the time they entered the room is written on the white board outside the room. The folder is placed in a pocket outside the room.

Once the patient is in the room, the care team processes begin. The general flow is the nurse starts off the visit, and the care team members file in and see the patient, one caregiver at a time. They often talk to the team member exiting the room before they enter, and time is spent debriefing with the next team member as they themselves exit. Different caregivers use different tools to document their time with the patient – pen and paper, copies of the profile or chart, or notes they have prepared. At the onset of my fieldwork, clinical notes were not done in the hospital EMR. It was not set up to handle clinical documentation for Judson Hawk clinics, mainly due to configuration shortcomings with the vendor software. All documentation was done by caregivers in standalone charting software or WORD, and then the documents were printed out, signed, and then faxed to the Medical Records department to become scanned electronic documents in the electronic medical record. The paper documents are then sent to be shredded once it has been confirmed that the visit documents are attached electronically.

Activities in the Core included dialoging about patients and sharing information between care team members. Computer workstations in the core were used by team members to look at existing charts or create new documents for visits, check email, or check up on other patients not related to the Tech clinic. Most team members typed their own documentation, but there were several telephones in the room that two different physicians were observed using to dictate their notes. This Core was also where telephone calls to other care givers or providers were conducted. There is a fax machine/printer that was used to scan all the paper documents for inclusion in the

chart as well as to send and receive clinical information to and from external sources or providers. The Core was often a chaotic and loud place, with lots of different conversations going on at once.

In the hallways, the care team members often lined up to wait their turn to see the patients and would dialogue with each other about the patient as they entered and exited. While there was no prescribed order, and even the Nurse said it did not matter to them what the order was, I did see that they tended to follow the same general progression for each patient: Nurse, followed by Nurse Practitioner, then Doctor, then the other care team members in random order – Case Manager, Social Worker, Respiratory Therapist, and Nutritionist. Sometimes the information reported out by a care team member would warrant a return to the room for another team member. Clinics prior to the EMR implementation averaged 18.6 hallway conversations per clinic, with an average patient load of 4 patients per clinic.

I did linger in the hallways, observing the team members coming in and out of the rooms and dialoging with each other about the patients, treatment plans, or other topics, which did make me more noticeable. These times provided me opportunities to ask questions or get clarifications from the care team members about activities I had observed or other items of interest. Occasionally, they used these hallway moments to relate to me a story or an issue that I missed. The patients often noticed me; since children are naturally curious, my presence, with my notebook and pen, often prompted friendly questions from patients or their siblings about my role.

The hospital recently transitioned to Epic as their EMR vendor, and the Judson Hawk clinic was scheduled to implement Epic during the months of my scheduled fieldwork. While this event was not the sole purpose of my research, my background and presence made the impending implementation a common topic of discussion brought up to me by the care team. Throughout my fieldwork, each clinic brought new reminders of the upcoming event. Additional workspace built

out in the core one week, new workstations the next. Dictation machines were installed on the computers. Over a weekend, large monitors were installed against the ceiling on either end of the core and in the hallway. We arrived in the clinic one day to find elaborate locking workstations installed in the hallways of the treatment area. Workstations were installed in each patient treatment room, often crammed into a corner and positioned in such a way that a caregiver at the workstation would have their back turned completely to the patient and the door. State of the art printers were installed in the Core and in the treatment area hallways. Every change brought speculation about the use of these tools, the computer system, and how the workflow would be impacted.

The pace and flow of the work was such that while care team members were often seen waiting in the hallway to see a patient, the patients themselves were rarely waiting for a caregiver as long as the whole care team was present. On the occasion where lab tests were ordered, the patient might wait for a laboratory technician to come to the clinic or wait on a new piece of equipment or other supply to be delivered from central supply if it was not available in the clinic.

When care team members were not waiting to see a patient, or discussing a patient with other team members, most of them could be found in the Core on a computer, typing their notes. A few of the physicians dictated their notes using the telephone dictation system, while others typed theirs directly. I did observe two occasions where the physicians took copies of the chart and hand written notes with them to do their dictation later from their own offices.

When it came time to activate the Epic EMR in the clinic, both the vendor and the Information Technology department of the hospital supported the implementation with staff, adding no less than 10 additional people in the Core. These resources were there to answer

questions about how to use the system, where data was to be charted, when, and by whom, and to provide technical support should the system appear to not be working correctly.

On the day of the Epic implementation, the clinic set up had been altered such that the light templates and the paper check off list were no longer on the treatment room doors. The large monitors in the Core and the treatment hallways now had a list of patients and their status, including their arrival time, their in-room time, their current status, and the caregivers that were to see the patient. I noticed that instead of waiting in the hallway to do care transitions and visit each patient as they became available, the care team members were huddled around the large monitors, waiting for it to indicate a status change or the next care team member. Conversation in the Core revolved around how to use the computer, or what data to enter and on what screen, rather than around the patient and their status or treatment plan.

Hallway conversations virtually disappeared altogether. The clinics I observed during the Epic implementation averaged 4 hallway conversations per clinic (down from 18.6), with an average patient load of 3 patients per clinic (down from 4).

Patients were affected as well. There were many times, post-Epic, where there were NO caregivers in any room. They were either in the Core or absent from the Clinic entirely.

For the first clinic post-Epic, the Nurse had prepared the paper charts and folders as always. In a meeting prior to the clinic start, it was indicated that this would be the last clinic where this paper documentation would be available. By the end of the clinic day, the entire care team was requesting that the Nurse continue to prepare the folders. She continued to do so for the 3 subsequent clinics that I attended as I completed my fieldwork.

The large monitors that listed the patient status changed each time I came back to the clinic post-Epic. Fields would be added, or reordered, or deleted as the Epic and IT support team worked

to find a presentation format and content that communicated all the necessary information to support the clinic workflow. As of the clinics I attended post-Epic, none of the Tech Clinic team members were asked about their thoughts on how these monitors might be modified to support the workflow.

VII.2 Relational Coordination Observations[1]

As an organizational setting, the Judson Hawk clinic is an integrated practice unit, designed to coordinate care around chronic disease management. The constructs of Relational Coordination present a lens through which the activities and interactions can be observed. The foundational principle of Relational Coordination is that the relationships between providers, as described by demonstrations of mutual respect, shared goals and shared knowledge, are enhanced by the frequency, timeliness, accuracy and problem-solving nature of their communication exchanges. The reciprocal nature of the theory is such that the more accurate, frequent, timely, and problem-solving the communication exchanges, the more the relationships are enhanced. Higher Relational Coordination has been related to better patient outcomes and lower costs in many quantitative studies (Gittell, 2000).

VII.2.1 *Shared Goals*

The concept of shared goals is such that the team involved in coordinating care is highly dependent on shared goals for their work activities (Gittell, 2000). Independent practice units that bring together specialties and services for the treatment of a specific condition are thought to enhance the value to the patient because the focus is on the overall impact that the combined care has on the patient's outcome (Porter and Teisberg, 2006).

[1] Observations are noted as "BE" – "Before EMR" and "AE" – "After EMR".

When providers communicate often and in ways that are consistent with workflow and patient care needs as they each, individually visit with them, goal alignment (or even misalignment) becomes apparent. To determine if the providers at Judson Hawke expressed shared goals, I made it a point to observe the exchanges as they took place and not only make note of the frequency of the exchange, but how these exchanges were done around real-time care of the patient.

While exchanging data frequently and in a way that can impact the care to the patient in real-time, the quality of that interaction also plays a factor. Exchanging information that does not advance the care plan of the patient is not viewed as problem-solving in nature and thus does not truly demonstrate shared goals among providers. I noted in particular exchanges that were focused on tangential topics around the process of care, the environment, the computer system or other factors not directly related to the patient's outcome.

> "Case Manager stated: 'It is rewarding feedback when the patients stay out of hospital from month to month.' "(BE)

VII.2.2 *Communication Frequency and Timeliness*

Communication between the team members was constant prior to the Epic implementation. Team members met in the hallways before and after each patient was seen by an individual team member to review and discuss the patient's condition and their observations. I noted, on average 18.6 hallway interactions per clinic before the EMR implementation. These communication activities were both frequent and timely; the workflow of the care process had integrated these activities seamlessly and effortlessly.

> "Dr to Care team waiting in hallway: asks for any news and concerns. Respiratory Therapist indicated that the patient does not attend clinic often enough to keep their supply orders and medications

current. They have a distance problem; they have a long way to travel to visit the clinic. Nurse adds some other patient concerns to the conversation. Dr enters patient room". (BE)

"Care team is huddled in the hallway" (BE)

"Each care team member is touching base with other members as they go in and out of rooms. Constant flow of verbal and non-verbal interactions – raised eyebrows in a questioning manner, nod of the head, etc." (BE)

"Observed NURSE sharing patient concerns verbally with other team members in hallway." (BE)

Communication timeliness and frequency from non-core team members is not as timely or frequent and can impact the patient care goals. In one case, a lab result came back well after the patient had left the clinic, forcing the care team to re-evaluate their care plan, orders, and medications. These changes would not be implemented for several days due to delays in obtaining signatures and then scheduling the communication with the patient and the patient's family. Often, the clinic schedule was provided in a print out that was manually changed with names crossed out and overwritten. There are a frequent amount of "no shows" in each schedule. This information was communicated verbally or via hand written notes and usually after the care team had assembled and prepared for the visit.

The reliance on the paper chart can also cause timeliness issues as it related to meeting shared goals. Prior to the EMR implementation, the paper chart was often a hindrance to a team member transitioning to see a patient. The chart would often get broken apart with pages separated and spread throughout the clinic. On more then one occasion, I observed the Nurse rummaging through papers in the Core to reassemble a patient's chart.

Once the EMR was introduced, the frequency and timeliness of these team interactions drastically reduced. The hallway interaction dropped to 4 per clinic. It appeared that the care team members were relying on the EMR to facilitate care communication activities. Verbal and non-verbal communication and postures were oriented to and around the EMR display. I observed

staff members standing around watching the monitor in the Core instead of standing in the hallway. They were all waiting for the patient status to change as an indicator that it was their turn to see the patient. The board was often showing the incorrect status for the patient and thus not providing proper cues for care transitions. The team seemed to have forgotten all of their previous verbal and non-verbal communication habits.

> "Staff watching monitor instead of standing in the hallway. Waiting for the status to change" (AE)
>
> "Social Worker waiting on NURSE. Doesn't usually do this but board seems to be dictating the flow." (AE)
>
> "Nurse Practitioner Waiting on Patient 2. Doesn't know who is in there… Social Worker in with patient 2 but board shows that the MD is in the room." (AE)
>
> "Losing body language and check boxes. Focus is computer." (AE)
>
> "No check marks on door tags – not using them even though they took the time to make them and put them up." (AE)

Post-EMR, timeliness from non-core team members did not seem much improved. The cancellations and no-shows were still verbally and manually communicated and managed.

In summary, before the implementation of the EMR, the timeliness and frequency of communication between core team members was high, with some gaps in timely and frequent communication with non-core team members noted. After the implementation of the EMR, the timeliness and frequency of core-to-core team member communication fell sharply, and there was no improvement in the non-core to core team member communications.

VII.2.3 *Communication Accuracy and Problem Solving*

Participation in shared goals is reliant upon interactions being accurate and of a problem-solving nature. Team members reviewed their discussions with each other as they left the room. These conversations often consisted of not only what the patient said but also the care team

members observations and thoughts. They often discussed differences in what they were each told by the patient and used these conversations to gain consensus in their care planning.

> "Care team info sharing in hallway – Respiratory and Social Worker – sharing education of patient care givers/language (understanding of questions and answers)/ education level/ did they receive training on caring for child. Reviewed patient caregiver compliance clues – both what patient caregiver says they do, condition of patient, other verbal and non verbal queues and notes from other visits." (BE)

> "Social Worker assessment of patient 3 – social issues shared with DR - Anxiety etc. Things parents did not share with Dr but shared with Social Worker. Contacting outside counseling." (BE)

> "Dr and Nurse Practitioner in patient room together after reviewing status. Dr and Nurse Practitioner found out something from patient that all caregivers were not told. 'When do you think she was going to tell us that?'" (BE)

Communication activities with outside providers were observed to be of a problem-solving nature and geared towards patient-centered goals. I observed the physician on the phone with an outside physician discussing a patient's social and medical issues to gain some outside advice on a particular concern.

> "Dr to another Dr – verbal via phone – care transition. Patient social, medical issues. Employment situation, school situation. Will he chart that he had that conversation? No he will not. Believes this is Munchausen syndrome. Won't be charted because patient no showed. Time he spent working on another doc with this – won't count – cannot bill. Patient was a not show – patient is mainstreaming – psychology – assessment of parent relationship." (BE)

Post-Epic, accuracy because a potential issue due to problems with the EMR (configuration, user errors, and loss of process). Interactions reflect a shift from a focus of the goals of patient care to the computer system. Care team members stopped using the lights on the treatment room walls, and the white boards outside each room were no longer labeled with the patient information. The only way to determine where a patient was located was to look on the monitor in the Core.

Conversations were computer or system or process focused, rather than patient-focused. During the implementation, there were many side conversations about the computer and how to use it. The morning clinic staff was still in the Core at the start of the afternoon clinic complaining about the computer system and trying to determine where to get support from IT, and conversations about "who does what" in the EMR to document the visit. It was clear that the staff felt unprepared for the implementation, as they were demanding additional support and workflow review. The Respiratory Therapy section of the chart, one of the main sections for this clinic, was not built correctly in the system and thus was not available to be completed.

> "Nurse Practitioner and Epic person in hall waiting. Discussion: Re – online in clinic infrequently. So they will need more handholding for longer. Assumption was because many of these providers work in the hospital which is already on epic, they would NOT need handholding." (AE)
>
> "Social Worker and Hospital Software support person conversation in core – Social Worker is providing a process description of how care is delivered in the clinic." (AE)
>
> "Nurse exits patient room – I asked how that went. Heavy sigh. Paper in hands. HNUR frustrated over fields not filled in on the computer." (AE)
>
> "DR went in without Epic Support Person to help. Exited twice to ask questions about the computer system." "He has a paper cheat sheet and seems very focused on system." (AE)
>
> "Technical issues vs. workflow issues – difficult to determine" (AE)

The most observable impact of this situation was the fact that the patients were not being seen. Throughout the day, I observed times when no care givers were in patient rooms, and other times when the Nurse had to back track to figure out the visit status for each patient.

> "2:30 pm – (question to myself) - who is in with the patients?
>
> 2:47 pm – no one is with any of the patients, yet not all care givers have seen both patients." (AE)
>
> "Nurse has to manually check who has seen patient 2. Screen is not correct or current." (AE)
>
> "Patient 3 is probably a no show. 'Thank goodness'. " (AE)

In summary, prior to the implementation of the EMR, communication exchanges between core team members were accurate and of a problem solving nature. Post implementation, these exchanges focused on the accuracy of computer use rather than the accuracy of findings. Communications between non-core and core team members suffered from accuracy issues throughout, as demonstrated by inaccurate schedules and other information errors.

VII.3 Shared Knowledge

A second key component of Relational Coordination is shared knowledge. Care team members must clearly understand and have a high degree of knowledge of each other's tasks and how they work together in the process of delivering care to their patients (Gittell, 2000). Through the implementation of integrated practice units, Porter and Teisberg contend "physicians can broaden and deepen their expertise through understanding the interdependencies across specialties and across the care cycle" (Porter and Teisberg, 2006).

It was important that as I made observations in the clinic that I seek out observations demonstrating existing shared knowledge. This would be observable as providers discussed individual tasks and task outcomes and performed care transitions. Gittel's model has demonstrated that the more providers have a shared knowledge, the higher the care coordination. In order to gain an qualitative understanding of the degree of shared knowledge that existed in the clinic, I needed to seek out and document exchanges between providers that included team members actively assisting each other to increase shared knowledge.

VII.3.1 *Communication Frequency and Timeliness*

The frequency and timeliness of communication, as caregivers entered and exited the rooms, particularly prior to the EMR implementation, was focused primarily on sharing

information and knowledge about the patient's condition as it related to both the exiting care givers observations and how that knowledge may impact the entering caregiver.

Care team knowledge about their roles and expectations were clearly demonstrated as it pertained to each individual's tasks and responsibilities and how they fit together to deliver timely care to the patient.

> "Dr has determined that Patient 1 needs a new, downsized tracheotomy tube. Nurse Practitioner updates the paper chart and prepares the care order. Shortly thereafter, Respiratory Therapist arrives and puts the new trach in the pocket on the treatment room door and enters the room to prep the patient for the equipment change. Dr sees her enter room and takes Trach from the pocket and enters room to show the patient and the family the new Trach and discuss and do the procedure. Finally, the Nurse and the Case Manager enter room to review with patient how the supply company for the new trach works and how the downsized trach works, needs to be cared for, etc. All done without much verbal interaction – each care team member knew what they needed to do and when they needed to do it." (BE)

The reliance on care team members knowledge and the role that each person plays in the care delivery process was best demonstrated when a care team member was missing from the clinic, impacting the team's ability to communicate and provide care in a timely way. During one clinic, both the Case Manager and Social Worker were not present in the clinic, causing the Nurse Practitioner to make additional notes and alter her current and scheduled workflow to accommodate getting the proper information to these care team members. The patient also experienced their absence as they had expressed a desire to meet with these team members but could not.

VII.3.2 *Communication Accuracy and Problem Solving*

For knowledge to be shared successfully, the communication must be accurate and of a problem-solving nature. Care team members will understand the impact of their role and the roles of others to the whole when it is presented in the context of solving a particular problem that has

presented itself. In one particular instance, both the Social Worker and a Respiratory Therapist had difficultly communicating with a patient's caregiver as they were concerned about this person's knowledge and ability to care for the patient. A second Respiratory Therapy team member was able to meet with the caregiver and was successful in getting them to demonstrate their training and at-home care practices. The team met in the hallway afterwards and debriefed on the method the second Respiratory Therapist used to facilitate the communication. Often, the physician would invite the Nurse Practitioner, Nurse, or other team members to join him in the room while he provided care, and he later explained to me that he liked to invite team members into "good learning cases". Cross-team education activities we observed often, particularly in clinics prior to the EMR implementation.

> "Team member education – Dr, Nurse Practitioner, Social Worker, Nurse all seem to be educating each other." (BE)
>
> "Verbal hallway interaction – Social Worker and Dr discussion regarding techniques on how to verify patient caregivers have been trained or may need additional training:
>
> Patent compliance
>
> Keeping tabs on patient
>
> Visual assessments" (BE)

Care Team member absences from the clinic impact communication accuracy and problem solving as well when it comes to sharing knowledge. The care team member's presence is missed, and it appears unclear if the missing team member realizes their impact on the clinic workflow. On more than one occasion, I observed the Nurse Practitioner asking other team members for the whereabouts of absent team members. There did not appear to be consistent processes for patient documentation for absent team member care domain issues.

> "Nurse Practitioner asks Nutritionist if she has anything for the Case Manager or Social Worker; she has some forms. Nurse Practitioner is not sure if she will leave it on their desks or in the chart. When

> asked if she would chart the absence of the social worker, I got a hesitant "yes – or maybe I will just call her and leave the forms on her desk." (BE)

Communication activities with outside providers were observed to be of a more problem-solving nature and geared towards knowledge sharing. I observed physicians contacting outside physicians quite often in preparation for a patient's visit or as a way to transition care follow up.

Interestingly, if a patient has more than one disease that is treated by a Judson Hawk clinic, they do not share charts, information, or care processes between clinics. I was told that clinic disciplines do not cross coordinate. A patient was seen by the Physiatry Clinic one morning and had scheduled himself or herself to be in the Tech Clinic in the afternoon. This was coordinated completely by the parent. The Physiatry Clinic Nurse prepared a chart, and the Tech Clinic Nurse prepared a chart. The Clinic Staff had to triage the patient twice, and document on both charts. The Tech Clinic staff was adamant that they document their own information. The patient was left in the morning clinic Physiatry Room, and the entire organization of the afternoon clinic was disrupted. Rooms were reassigned, patients were moved around, and care team members were overheard complaining.

> ."We don't share information from the physiatry chart". (BE)

In general, care team members demonstrated an understanding of each other's roles in the care team process. Team members worked together to further each other's knowledge not only of the patient at hand but also with ways to enhance the care process. Unfortunately, knowledge sharing and coordination across clinic specialties was not observed in the workflow and this disrupted the flow of the clinic as well as the patient experience.

VII.4 Mutual Respect

Respect between care team members is necessary to avoid disruptive relationships that may impact the coordination of patient care. It is common for care team members to define their status

by occupational role, particularly in a hospital setting. This could include relationships between specialties, or between doctors and nurses, or between clerical/administrative team members and clinical team members. Team based care presents the opportunity for caregivers of various occupations to experience first-hand each team members contribution to the care process (Gittell, 2000; Gittell, 2012). Within the context of an integrated practice unit, providers would foster mutual respect as patient value increases with physician and team experience. As physicians share and grow their knowledge, patients benefit through their outcomes. "Experience allows learning, and learning leads to faster and fuller recovery, fewer errors, and a better patient experience…Physicians can broaden and deepen their expertise through understanding the interdependencies across specialties and across the care cycle". This will lead to truly excellent teams made up of many different providers from various care occupations and specialties (Porter and Teisberg, 2006). During my time at the clinic, I documented communication exchanges in order to analyze them for aspects of mutual respect, including body language, politeness, tone of voice, body language and other non-verbal cues that demonstrate degrees of respect.

VII.4.1 *Communication Frequency and Timeliness*

Frequent communication fosters respectful relationships according to research done by Gittell and others. On the other hand, relationships that lack adequate respect are often fraught with the untimely or infrequent sharing of information.

The very nature of the frequency and timeliness of the hallway conversations and other interactions as caregivers entered and left the rooms demonstrated respectful relationships between the care team members. Care Team interactions were always courteous and team members seemed to often be mindful of not "holding up" other team members workflow, both through their actions, i.e., sharing portions of the chart, and their verbal communications.

When care team members were absent from the clinic for unknown reasons or are not following prescribed or necessary processes, however, it was seen as disrespectful to the timeliness of communication either between team members or with the patient. Case Manager and Social Worker absences caused other team members to be visibly irritated, and on one occasion, the Nurse Practitioner shared her irritation with me.

> "Nurse Practitioner appears in Core, walks thru and leaves. Walks back in to talk to Social Worker and states that she needs to talk to her. Seems uncomfortable and irritated. Social worker clinical notes are not done. Chart notes must be done in 2 days from patient visit. After 5 days it gets escalated. Otherwise charts not closed and billing cannot continue. After the interaction, Nurse Practitioner pulls me aside and tells me that the Social Worker activities are not part of the bill so its ok, but she takes weeks and months to get her documentation done. This is not acceptable, and Nurse Practitioner is getting reprimanded for Social Workers non-compliance." (BE)

The introduction of the EMR brought new non-core team members temporarily to the clinic. Gittell defines non-core team members as those that are non-clinical but still play an integral role in the coordination of care for the patient. These non-core team members were the IT support staff and even the EMR itself, and communication timeliness distinctly reflected a level of disrespect between these team members and the existing Tech clinical team members. I observed a great deal of confusion in the Core around the status of the patients and what care team members had seen them. The Core was loud and chaotic, and many team members were frustrated with the system and current state of process in the clinic. The physician expressed verbal frustration about how long the patients had been kept waiting.

VII.4.2 *Communication Accuracy and Problem-solving*

High quality communication that is problem-solving focused encourages respect between caregivers. Engaging and open body language, non-verbal communication, and frequent eye

contact between team members were observable behaviors. Before the EMR implementation, communication topics focused on patient care and demonstrated a high level of respect. In describing the flow prior to the EMR implementation, the Nurse indicated that the order that the care team members visit the patient's room does not matter.

In the processes prior to the EMR implementation, the paper chart that is prepared in advance of the patient's visit is an integral artifact. The Nurse that prepares it is very focused on the quality and contents of the chart. She meticulously transfers data to the Access database to make sure that the printed profile is complete and consistently documented. The care team relies heavily on this paper chart. Throughout a patient's visit, care team members do not proceed with delivering their services until they have seen the chart. Reference to the physical location of or handling of the patient's paper chart were documented 94 times. The post-EMR continued reliance on the paper chart demonstrated a high level of respect for the creation and contents of this documentation.

Mutual respect (or the lack thereof) between Tech Clinic team members and outside caregivers was observed on several occasions. Previously documented interactions between clinic doctors and outside providers to gain advice or collaborate on patient care issues also demonstrate mutual respect.

Other examples were observed where outside providers do not understand the Tech Clinic teams roles and responsibilities. In one situation, a patient brought in a surgery short form that needed to be completed. He was scheduled for dental surgery at another facility. It took the Nurse Practitioner and the Physician multiple phone calls over several hours to the other facility to get an appropriate person on the phone that understood why the Tech Clinic staff could not complete this form.

Even before the EMR was implemented, clues were provided as to the respect the care team would have for the system itself and the projected impact on their workflow. These included staff comments, “mysterious” physical changes to the Core, and the “sudden” appearance of new equipment.

> “Care Manager is “scared” to do EPIC here because they are so paper driven.” (BE)
>
> “Over weekend – workstation mounts installed in hallways. Workstations installed in rooms – not all active yet. Lots of fiddling and fidgeting with the new equipment. Not a lot of respect for the fact that they might not know how to use the equipment properly”. (BE)
>
> “The environment has changed – computers on desks. Nuance dictating machines on each computer. No one expected them or knows what they are for.” (BE)
>
> “Computers on treatment hall area walls installed and live. Monitors very visible. No one knew these were going in according to team members there today. All very concerned about how big the screens are and how visible the patient data will be on the screens for anyone walking by. Many team members coming to ME to ask these questions. Have to remind them I am not IT and not a CHOA team member, officially, other than a researcher. Asked my opinion on all this. Had to remind them of my neutrality.” (BE)

Follow-up interviews with IT support staff revealed that all new equipment and physical changes were announced to the staff well in advance, and that they all attended rigorous training sessions for the new system.

The introduction of the EMR presented many challenges that eroded professional accuracy and respect, both between care team roles, non-core team members, and with the EMR system itself. New protocols regarding medication orders and signatures created communication barriers between core staff members. Team members that just days before demonstrated open communication between roles now were hesitant to interrupt each other or point out omissions.

One of the Respiratory Therapists started acting as an “Epic Expert” during the implementation, and was answering questions regarding system use and charting as they were

brought up in the Core despite the fact that there were IT resources present to fill that role. Other team members were openly frustrated with her and the IT support person did not manage the situation well.

Even though the pre-EMR order of care by each team member "did not matter", the conversations overheard in the Core now that the EMR was in production was that the team needs to "come up later" and that the process is "not efficient – we have to figure out the flow. We need to be more formal with the order." Some degeneration of role relationships was observed:

> "Nurse Practitioner, to me: Case Manager does not really coordinate everything". (AE)
>
> "Lots of questions around clinical sign offs and communications." (AE)

Finally, the relationship between non-core and core team members continued to be negatively impacted post-EMR implementation. Two patients with the same name were scheduled for the Tech Clinic on the same day. The Clinic Triage staff arrived and roomed the wrong patient in the EMR. All the care was charted against the wrong patient. It took several Epic support staff and the Nurse and Nurse Practitioner most of the clinic time (3+ hours) to get the clinical documentation charted to the correct patient record. A great deal of frustration was expressed over the processes that allowed this to happen during patient intake with the Clinic Staff and the inability for the EMR to facilitate the correction. These types of issues degraded the relationship between the care team, the permanent clinic staff, and the IT and EMR support staff.

> "I overheard the Dr say 'The Epic people do not know what they are doing'". (AE)

In summary, core team members demonstrated a high level of mutual respect between each other but problems with respect existed between non-core and core team members both before and during the EMR implementation. During the EMR implementation, both types of relationships suffered. Outside providers often struggle with the clinic setting at Judson Hawk, causing observable respect issues between Judson Hawk and outside care providers.

Throughout my clinic observations, I could document demonstrable evidence of verbal and non-verbal communication activities that reflected the level of shared goals, shared knowledge, and mutual respect between and among the care team members that participate in the Tech Clinic IPU. Events such as care team member absences, outside provider and non-core team member coordination activities, and the implementation of the EMR provided observable changes in the frequency, accuracy, timeliness, and problem-solving aspects of these communication activities. These observations provided me the ability to analyze the level of Relational Coordination in this setting and reflect on the implications of an Integrated Practice Unit as a vehicle for enabling care coordination**.**

VIII DISCUSSION

The current research used Relational Coordination Theory to study communication and the relationships between the care team members for care activities that take place at the Judson Hawk Clinic. Based on the Porter and Teisberg definition, the clinic structure is that of an integrated practice unit that focuses on pediatric chronic illnesses and thus offered an opportunity to study an IPU embedded in a traditional care setting and make observations regarding the structure and function of the IPU itself. Through the research of Gittell and others, care coordination can be measured and observed in this IPU setting as evidence ot the impact this care structure has on observable frequent, timely, accurate, and problem-solving communication activities that foster shared knowledge, shared goals, and mutual respect. Because the researcher was able to observe both day to day activities as well as planned disruptions such as the introduction of a new EMR, much can be said about both the structure and activities and their impact on care coordination and ways to advance Relational Coordination Theory in a context-based setting.

Porter and Teisberg have introduced the concept of an "integrated practice unit" that is designed around medical conditions and care cycles, bringing together all the care givers necessary to treat a patient's condition in facilities tailored for this purpose (Porter & Teisberg, 2006). Porter and Teisberg propose that this organization of care will provide better coordination and value to patients. With its current structure, the Judson Hawk clinic represents the implementation of an IPU within the Children's Healthcare larger organization. Patients are scheduled into chronic disease-centric clinics that bring together all clinicians needed to monitor and treat chronic childhood conditions such as the vent-dependent patients involved in this study.

In practice, however, the integrated practice unit faces organizational challenges that affect the ability of the care team to sustain shared goals, knowledge, and mutual respect. Judson Hawk is the only clinical setting in CHOA organized in this way, and because of costs and logistical

issues, shares infrastructure and clinical support services with the rest of the health system. Managing and conducting the 21 chronic illness clinics takes a great deal of administrative coordination and planning. Cross-clinic coordination for patients with multiple chronic conditions, or even setting up an IPU for multiple chronic conditions is very complex and difficult to implement in practice. While care is patient-centered and outcomes driven, reimbursement and billing are not. The patients still receive a multitude of bills from various providers based on their visit to the clinic. This echos van Harten's observation that the implementation of IPUs faces complex management restructuring (van Harten, 2018).

With respect to core participants, care team member responsibilities are fractured for those that work in other parts of the hospital because Judson Hawk is the only care area organized as an IPU. Their workflow and care responsibilities in non-Judson Hawk care areas go back to being focused on their own specialty or role and the goals based on these roles as opposed to coordinated patient care goals. This causes workflow conflict as well as culture conflict for the employees themselves and impacts the expression of shared goals and mutual respect.

Scheduling conflicts and resource shortages manifest in the care team member absences, thus causing communication failures and workflow disruption. The organizational policies at CHOA do not include a way to substitute team members when one is absent. Furthermore, absences were most often due to care team members having responsibilities in other non-Judson Hawk care areas that either took them away from the clinic during scheduled hours or did not allow them to attend the clinic because of overtime restrictions. This manifested itself in expressions of goal conflicts for Judson Hawk vs. other patients. Team members easily lost site of the significance of their role as part of the whole care team and mission at Judson Hawk with managing these conflicts.

Observed through the constructs of Relational Coordination, the presence of all required care team members around an illness as well as the clinical workflow at the Judson Hawk IPU encourages care coordination. As theorized by Porter and Tiesberg, working alongside patient pathways eliminates specialist silos (Porter and Tiesberg, 2006). Just as van Harten observed first hand with IPU development and its subjective improvement in patient-centered care, professional boundaries were non-existent and care team members at Judson Hawk were in almost constant communication as they took turns delivering care to their patients. Utilizing Relational Coordination constructs as observable definitions of coordinated care, the communication was timely, accurate, and frequent, and often of a problem-solving nature. Caregivers expressed common goals for their patients, both at a macro level when describing the Clinic and its purpose, as well as at a micro level when discussing individual patient care plans. Team members shared knowledge and understood each person's role on the team as it related to the team goals. Care team members demonstrated high levels of respect for each other through their verbal and non-verbal interactions. These observations imply a high level of Relational Coordination between the core caregivers in the Tech clinic. This supports Porter and Teisberg's implication that an Integrated Practice Unit will enhance patient value, reduce fractured hand-offs, and improve patient outcomes by facilitating care coordination (Porter & Teisberg, 2006).

This research highlights opportunities for organizational improvements to support patient-centered, coordinated workflow as it exists in an operational environment. Even though the focus is on a specific patient population, the observations of provider workflow and activities that enhance or inhibit care coordination can be generalized to the consideration of redesigning healthcare delivery into integrated practice units in many different care settings.

Due to the ethnographic design of the study, I was able to observe not only day to day interactions but also how planned disruptions impacted those interactions. The IOM study in 2005 emphasized healthcare delivery reform toward patient-centered care and indicated that this reform requires an overhaul of the information technology infrastructure for providers (Corrigan, 2005). Because information technology is introduced to alter, and presumably enhance, clinical workflow, its impact on care coordination activities and care team relationships is important. It is interesting to note how the implementation of an electronic medical record system impacted the Judson Hawk TECH clinic.

Little to no communication with information technology support team members was observed prior to the implementation of the EMR. Equipment and facility changes would "appear" overnight or over a weekend, with no prior notice and no explanation. The first day of implementation, clinic staff was observed explaining their workflow to information systems team members; a task that should have been done months prior when the information system was being configured for the clinic.

The EMR implementation was initially disruptive to communication between the care team members themselves. Communication activities became very minimal. Everyone was relying on the computer system to manage their handoffs; both as to when a clinician was to be ready to go into the room as well as the information exchange that needed to occur. Degradation in relationships was also observed, as each care team member approached the information system with different degrees of training, confidence, and experience. While this research ended immediately after the post-implementation phase of the EMR, it makes a case for future research to examine how workflows evolve and/or make corrections in the setting of an IPU for information system implementations as people and processes adapt to the system capabilities.

The integrated practice unit structure, however, maintained the patient-centered nature of care delivery even though there was an observed decline in the Relational Coordination constructs of communication and relationship. Concern was expressed for the impact that the information system implementation was having on the patient's experience. Team members adapted to "work arounds" or fell back to prior work processes to keep the care delivery as smooth as possible. The burden of correcting the systemic issues with the EMR were pushed back to information services because the integrated nature of the clinic did not allow for drastic workflow changes to accommodate the way the EMR functioned.

This research contributes to Relational Coordination theory by applying these constructs to describe the nature and quality of care coordination in an integrated practice unit. This research also provides future directions for the theory as proposed by Gittell. It highlights a setting by which Relational Coordination can be extended to include other "non-core" participants - workers that have key supporting roles - and study their effect. This research also demonstrates a context in which the impact of organizational change on Relational Coordination can be incorporated into the measures and makes a case for the inclusion of worker outcomes (Gittell, 2011).

While the patients seen at Judson Hawk experience care driven around their medical needs across multiple specialties, the structure had an observable impact on the workflow and work pace of the care givers themselves.

Team members spend a great deal of time "waiting" to see their patients at Judson Hawk. This wait time is not part of the clinical workflow outside of Judson Hawk. Care team members often expressed some frustration over how inefficient this seemed, most often at the beginning of an afternoon clinic or at the end of a morning clinic, when they were feeling pressure from outstanding non-clinic work responsibilities.

An Integrated Practice Unit, by definition, is meant to be most efficient for the *patient*. This means that the care team members may wait for the time when the patient is ready to see them as opposed to the traditional care setting where the patient waits on the care team member. This is a fundamental cultural difference in a patient-centered setting. It is stressful for care team members to move back and forth between the two settings, where efficiency is defined and labeled so very differently.

The success of an Integrated Practice Unit, then, is dependent on expressions of **shared goals, shared knowledge**, and **mutual respect** at the **organizational level** that embodies the concept of patient-centered care. CHOA scheduling and human resource practices must be in place to provide resources for each required role in the clinic so that all care activities can be conducted at a patient's given appointment time. This may mean changing overtime policies and providing resources that can backfill for primary team members through more cross-training or contract labor. CHOA must work to define efficiency and value as patient-centered experiences, rather than care team member experiences. Focusing measurements on the lapses, delays, errors, and redundant tasks that take place in Judson Hawk versus other clinical areas will highlight the value received by the patients in this setting. CHOA can consider dedicating team members to the clinic as their primary work location and measuring the change in employee satisfaction for these workers. This supports Gittell's suggestion that Relational Coordination theory can be extended to include outcomes for workers and the process of organizational change (Gittell, 2011).

Judson Hawk utilizes the same centralized infrastructure as rest of the facility. These infrastructure services include laboratory services, central supply, and scheduling. While clinic communication was timely, frequent, and accurate between the core team members, these attributes were less noticeable with infrastructure team member interactions. Schedule changes

and cancellations were often not communicated to the care team in a timely way; the team often prepped for patients that had cancelled. Tests requiring lab technicians were difficult to order and the patient often waited an extended period of time for test to be conducted. This often led to results being returned to the clinic long after the patient had left, sometimes causing care plan changes. To truly effect change, the Integrated Practice Unit must have access to infrastructure and non-core services in a timely way to support the clinical workflow. Relational Coordination Theory could highlight the impact of these services and their integration, or lack thereof, into the IPU by extending the measurements to include these non-core team members as Gittell suggests (Gittell, 2011).

IX LIMITATIONS

As in any research study, there are limitations. Due to the ethnographic nature of this research, it is limited to the study of one clinic (Myers, 1999). Future research could include observations of different clinics at Judson Hawk or even other documented Integrated Practice Units to study the differences in care coordination in the same physical and organizational setting for different disease states. Furthermore, the EMR implementation occurred at the end of the observation phase of the study. Opportunities exist to observe not only how EMR implementations initially disrupt care coordination in a similar setting, but how long these disruptions exist and how and when they improve over time. A longer study period would have allowed such an evaluation at Judson Hawk.

This study is a qualitative study and thus no real measurements of Relational Coordination are being made per Gittell's method. Numerous prior studies have demonstrated a positive relationship between Relational Coordination and patient outcomes or costs. This study assumes a positive relationship: activities that are more coordinated are resulting in better outcomes and experiences for the patient. A quantitative study of this clinic using the methods described by Gittell can certainly be used to explore this assumption and is an opportunity for future research in this setting.

X CONCLUSION

Healthcare organizations are challenged to deliver patient-centered, coordinated care while keeping up with medical technology advancement as well as industry and regulatory pressures to improve outcomes, decrease costs, and improve quality and have a long-term impact on population health. At any given time, an organization can be amid a care re-design, various infrastructure improvements such as building initiatives or information technology implementations, and organizational changes. This can create a difficult environment for healthcare leaders to determine priorities and strategic goals that can show immediate impact on their patient-care mission.

This research demonstrates the value of using a Relational Coordination model to evaluate care coordination and consider workflow, organization, or environmental changes that can be implemented. We demonstrate the use of an integrated practice unit to enhance care coordination and the patient experience, while identifying potential organizational barriers for providers participating in such a unit, such as lack of physical dedicated infrastructure and misaligned organizational goals.

This research also provides insights for industry leaders and policy makers on the effect of information technology on care delivery processes and care coordination in an IPU. While designed to promote communication, the EMR itself does not promote shared goals, shared knowledge, and mutual respect. These are key components to true care coordination. Implementations must be planned and the impact on workflow coordinated with care providers to validate that the communication activities facilitated by the EMR enhance the existing care communication processes, instead of replacing them all together.

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