**Measuring and Increasing the Effectiveness of the Quality Improvement
Implementation Change Practices of
Front-Line Maternity Physician and Nurse Leaders**

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A dissertation submitted to the faculty of the University of North Carolina at Chapel Hill in
partial fulfillment of the requirements for the degree of Doctorate of Public Health in the
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Abstract

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**Measuring and Increasing the Effectiveness of the Quality Improvement
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Front-Line Maternity Physician and Nurse Leaders**

(Under the direction of Peggy Leatt, PhD, Cheryl B. Jones, PhD, RN, Jeffery B. Gould, MD, MPH, Carol Sakala, PhD, MSPH and Rebecca Wells, PhD)

Measuring and increasing the effectiveness of the QI implementation change practices of front-line leaders offers the promise of saving lives and reducing harm and suffering to patients. Leaders have limited information on how to measure and increase the effectiveness of their QI implementation practices.

Design: Qualitative, non-experimental, retrospective, cross-case study.

Sample: Purposive sample of 7 front-line physician and nurse leaders and 12 QI projects, controlled for multiple context variables.

Conclusions:

The conceptual framework, *Leaders' Expectations of Change Compliance*, emerged based on the analysis of the reasons leaders did not set target dates. The **QI implementation tactics** used by the leaders were determined to be components of three types of **strategies**: education, data and discourse. QI project patterns were identified; there was no single combination of strategies, tactics, and barriers that led to greater QI progress. The five critical determinants of the QI patterns were: 1) Amount of leader persuasion, 2) Whether a leader had fully conceptualized the QI project, 3) Amount of clinician persuasion, 4)

Presence or absence of meaningful data, and 5) How leaders responded to resisters. The patterns are similar for QI projects with the same QI topics and goals. Counting the number of QI implementation tactics the leaders used is not an accurate measure of QI implementation progress.

Four types of **implementation barriers**: Leader, clinician, characteristics of the QI Projects, climate, and resource barriers. There was no distinguishable relationship between the number of tactics used and the number of barriers identified.

Implementation Plan Objective: Increase leaders' abilities to conceptualize their QI implementation strategy and how they choose their QI implementation tactics based on the barriers they anticipate and encounter.

Research Recommendations: Conduct further research on QI regarding: concepts, project timing, health information technology (HIT), setting target dates, discourse and change, creative types of implementation tactics, and multi-hospital and multi-stakeholder collaboratives.

Health Policy Recommendations: Develop hospital-based Rapid Response QI Teams that can be activated during a quality and safety emergency, train new and current clinicians to conceptualize, implement and reach QI goals, increase QI implementation research funding, develop a QI topic-specific implementation registry, and integrate QI and HIT.

Dedication

To My Husband:
Kent Hamilton

To My Parents:
VerNon and Bernice Bingham

To My Children and Their Spouses:
Tara and Shawn Steenson
David Jones and Sarah Sacuto
Lauren and Jeff Wind
Tiffany and Fred Schoppe

To My Grandchildren:
Shawn Curtis, Mariah, Joshua, Caleb, and Katie Steenson
Oslo Wind
Olivia Jones

To My Sisters:
Brenda Anderson and Linda Coy

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There are many people who supported me through my doctoral studies and dissertation. With their support and encouragement the journey has been more rewarding; the end product of higher quality.

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My long-time friends, Zola Golub and Reesa Vaughter inspire me to strive for excellence not only throughout the dissertation process, but through all aspects of my life. I am particularly grateful to Reesa for regularly spending many hours reading very rough drafts of my work, providing me with insightful comments and questions, and helping me see the flaws in my work in such a way that I was not discouraged to keep pressing forward. Reesa's ability to give timely, broad and detailed guidance was invaluable. Zola is my mentor and friend. Words do not adequately describe the gratitude I feel toward Zola for the positive influence she has on the course of my life. As with many other endeavors I have chosen to pursue, Zola provided me keen insight and support every step of the way. Because of Zola, I am more confident and my life is richer and fuller.

I have the good fortune to be the daughter of VerNon and Bernice Bingham. My parents are life-long learners, big dreamers, and hard workers. They have accomplished goals that others told them were impossible. For example, during the years that my father was the High School Spanish teacher in Brigham City, Utah, they organized inexpensive trips to Mexico that thousands of youth participated in. Their trips grew into a phenomenon that changed the cultural landscape of several communities. My parents were raised with minimal means on small farms in small towns. But their humble roots did not constrain or define them. They have lived and worked in many countries in the world and continue in their 80's to seek educational and cultural experiences by continuing to travel the world. Their example and their love sustain me and motivate me in countless ways.

My children, their spouses, and my grandchildren bring me great joy. I look at them and marvel at the miracle of life. In fact, one of the major reasons I have been striving to learn more and accomplish more is to, in my sphere of influence, improve health care for them and my other loved ones. Thus, it was timely and fitting that during the writing of my dissertation two new grandchildren were born; Oslo Wind and Olivia Jones. It is also personally rewarding that my son, David Jones has also chosen to pursue a career in Public Health. Although my studies at the University of North Carolina were begun prior to his starting his Masters of Science in Public Health, I pushed myself harder so that we could graduate on the same day, from the same Department, from the same University.

I acknowledge both of my sisters, Brenda and Linda. Brenda died an untimely death during my coursework. However, despite the loss of being able to call her on the phone and visit her in person, I have felt encouraged throughout my studies by how Brenda *lived* her life. When I was the most exhausted, I would think of Brenda. Remembering how Brenda

individually. However, I particularly want to thank Barbara Murphy and Elliott Main for providing me an employment environment that has been both stimulating and flexible; they understood and valued the fact that my studies informed my work. Without Barbara's and Elliott's interest in and support of my doctoral studies, the difficult task of juggling multiple priorities would have been even that much more difficult. For the past three years, Elliott and I have traveled together all over California and to the East coast in order to form the precedent-setting California Maternal Quality Care Collaborative (CMQCC). During these multiple trips and numerous meetings, Elliott has often encouraged me to discuss what I was studying, learning, and thinking about. During these discussions, Elliott offered suggestions and insights. In addition, Elliott made the introductions that paved the way for my research. All of the multiple ways in which Elliott has supported and inspired my work are gratefully acknowledged.

I also want to thank my dissertation chair, Peggy Leatt for the thoughtful and important ways she provided feedback; she was responsive and offered encouragement each step along the way. I am also grateful to all of the members of my dissertation committee. Jeff Gould, Cheryl Jones, Carol Sakala, and Rebecca Wells each took their valuable time to support my learning and contribute to my dissertation in unique and meaningful ways. It is an honor and a privilege to work with each one of them. In addition, my educational experience was largely shaped by Ned Brooks and Sue Havala-Hobbs, the directors of the Doctorate of Public Health Leadership program. They are excellent role models of transformational leaders.

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List of Abbreviations

AHRQ: Agency for Healthcare Research and Quality

FPAD: First Pregnancy and Delivery Multi-Hospital Health QI Initiative

IHI: Institute for Health Care Improvement

IOM: Institute of Medicine

MHQIC: Multi-Hospital Quality Improvement Collaborative

OB: Obstetrics

PI: Principal Investigator

QI: Quality Improvement

Chapter 1: Introduction

Overview

Successful quality improvement (QI) initiatives have been shown to save lives, reduce morbidity, and increase patient safety. (Forster et al., 2006; E. K. Main, 1999; Skupski et al., 2006; D. D. Wirtschafter et al., 2006) QI is defined as a change process that involves identifying problems, trying out improvements, performing on-going assessments and making rapid adjustments to the implementation plan based on the feedback that is obtained. The steps within the on-going rapid QI cycles are often described as: **M**obilize, **A**ssess, **P**lan, **I**mplement, **T**rack (MAP-IT) (Guidry, Vischi, Han, & Passons) or **P**lan, **D**o, **S**tudy, **A**ct (PDSA). (Langley, Nolan, Nolan, Norman, & Provost, 1996) QI is focused on making something better or becoming better at something by improving structures, processes, and outcomes. The Institute of Medicine (IOM), government agencies such as the Agency for Healthcare Research and Quality (AHRQ), private organizations such as The Leapfrog Group, accreditation agencies such as The Joint Commission, and reform organizations such as the Institute for Health Care Improvement (IHI), all promote QI as a methodology to improve health care structures, processes, and outcomes.

Effective QI leaders are needed in order to develop and implement improvement projects. (T. Greenhalgh, Robert, Macfarlane, Bate, & Kyriakidou, 2004; K. J. Klein & Sorra, 1996; Rogers, 2003) *Effective QI leadership* is defined as guiding organizations in a forward-looking way with the motivation and capacity to collaboratively and continuously

improve outcomes, processes, and structures in such a way that improvements are sustained**.**
Implementation practices, defined as the strategies and tactics leaders employ to promote routine use of an innovation, are critical to successful QI projects. ***QI implementation strategy*** is defined as the plan the leader develops to meet the QI project goals. ***QI implementation tactics*** are the actual means or processes the leader uses to execute the strategy. Strategies include the use of a variety of tactics. For example, a leader develops an implementation discourse strategy that includes tactics such as writing a newsletter or making and showing a poster. Discourse is defined as all types of communication vehicles, e.g., conversations, photos, posters, meeting minutes, other written documents. Many studies use the term practices instead of the term tactics when referring to the implementation processes leaders implemented within a broader strategy. For the dissertation, the term practices is defined broadly to include both implementation strategy and the tactics used within the strategy.

Measuring and improving the effectiveness of the QI implementation practices of front-line clinician leaders offers the promise of saving lives and reducing harm and suffering to patients. In addition, QI helps reduce waste and bring more value to health care investments, and reduces the overuse of medical technology, leading to greater value. ***Front-line clinician leaders*** are defined as a physician or nurse who oversees the day-to-day operations of a hospital clinical unit, e.g., Labor and Delivery, and are responsible for developing, implementing, and updating clinical policies and procedures and maintaining quality patient care. Thus, increasing effective QI leadership is needed to orchestrate multi-organization, organization-wide, and point-of-contact improvements in health care. (Daniel et

al., 2004; Pearson et al., 2005; Philipson & Curry, 1994; Wilson, Berwick, & Cleary, 2003; D. Wirtschafter & Powers, 2004)

Maternity patients are one population that has largely been overlooked in the national discussion regarding QI measures and public reporting through the Centers for Medicare and Medicaid Services. Obstetrics is behind other specialties in developing nationally recognized QI measures. (Bailit, 2007) For example, the National Quality Forum (NQF) was formed in 2001, but had only a few perinatal measures of quality until the Fall of 2008, when seventeen new ones were endorsed. ("National Consensus Standards for Perinatal Care," 2008) In addition, there are unique characteristics of the maternity population that require measurements of quality that are sensitive to overuse of medical technology. (C Sakala, 2007) Thus, determining the measurements of the quality of maternity care needs to not only measure underuse (as many current measures of quality do in other populations), but also overuse. (Bailit, 2007) Setting benchmarks that adequately address this tension are more complex to develop and measure. (Gould et al., 2004; E. K. Main, 1999) For example, doing too many or too few cesarean sections is known to cause increased harm to both the baby and the mother. (E. K. Main et al., 2006)

The lack of adequate attention to maternal quality care in the United States is particularly troubling given the fact that there are four and a quarter million births a year in the United States. (Russo & Andrews, September 2006) Similar to other populations, there are indications that much of the maternity care provided is not based on research evidence. (McGlynn et al., 2003; C. Sakala & Corry, 2008) For example, the levels of maternal mortality in the United States, a late indicator of quality, are not improving and are currently three times higher than the Healthy People 2010 goal of 4.3 per 100,000. (Hoyert, 2007; E.

M. Main et al., 2008) The World Health Organization previously ranked the United States 39th in maternal mortality, but in 2007, the United States maternal mortality rank was downgraded to 41st among developed countries. (Hill et al., 2007; *Maternal Mortality in 2005: Estimates developed by WHO, UNICEF, UNFPA, and The World Bank*, 2007) Further, the pre-term birth rate and the number of low birth weight infants born each year has been increasing in the United States. In 2006, the pre-term birth rate rose to 12.8 percent, which is a 36 percent increase from the 1980s. (Martin et al., 2009) Thus, in 2006, nearly 543,000 babies were born too soon despite the fact that the number of multiple births has stabilized.   The largest increases in preterm birth rates occurred among the late preterm infants who are born between 34 and 36 weeks gestation. (Martin et al., 2009) The rapid rise in the birth of late preterm infants is most likely due to obstetric practices such as, overuse of medical interventions e.g., inductions and cesarean sections. (Bettegowda et al., 2008; E. K. Main, Bloomfield, & Hunt, 2004)

Statement of Purpose

Since the 1980s there has been wide acceptance of QI within health care. Well documented QI case studies outline QI projects that have improved outcomes and saved lives. (Lagrew & Morgan, 1996; Pronovost, 2008; Skupski et al., 2006; D. D. Wirtschafter et al., 2006) In order to improve the care that patients receive, leaders who are skilled at developing and implementing QI projects are needed. (*Crossing the quality chasm: A new health system for the 21st Century*, 2001) Yet, it is difficult for leaders to read the published QI reports and be able glean enough details from the reports to develop a similar implementation plan or to make strategic implementation decisions regarding how they would apply or possibly alter the implementation plan in their context. (Doumit, Gattellari,

Grimshaw, & O'Brien, 2007) The need for more detailed and consistent reporting and publishing of QI projects has led to the recent release of the Standards for Quality Improvement Reporting Excellence (SQUIRE). (Davidoff, Batalden, Stevens, Ogrinc, & Mooney, 2008) Although SQUIRE begins to address the need for more consistency in how QI projects are reported and published in the literature, they do not go far enough. Specifically, SQUIRE has minimal details on how leaders can more consistently define and report on the practices used to implement their QI projects, or how the leaders dealt with the barriers they encountered. (Ogrinc et al., 2008)

Most of the published QI reports are by leaders who have led successful QI projects. There are fewer publications from leaders who have led less successful QI projects. Therefore, it is necessary to define and measure the most effective and ineffective QI implementation practices (strategies and tactics) at the patient care transaction level. Consistent definitions and measurements of QI implementation are needed in order to systematically increase the QI effectiveness of front-line clinician leaders, and ultimately, improve patient outcomes.

With this in mind the general **dissertation question is:** *How do front-line maternity physician and nurse leaders tailor QI implementation change practices (strategies and the tactics within the strategies) for their most and least successful QI projects?* Many studies use the term practices to mean the implementation strategy or tactic the leader used. For the dissertation, the term practices is used more broadly to mean any processes (both strategies and tactics) leaders use during implementation.

The dissertation was designed to meet four objectives:

1) Develop methods to identify and analyze barriers to change as well as
implementation strategies and tactics used by maternity front-line physician and nurse
leaders.

2) Analyze how physician and nurse leaders tailor the strategies and tactics they
implement based on their self-selected and self-defined most and least successful QI
projects.

3) Identify how to increase the effectiveness of front-line leaders QI implementation
practices.

4) Develop an implementation plan based on the multi-stakeholder collaborative
quality improvement methodology to increase the QI effectiveness of front-line
leaders.

The dissertation is divided into seven chapters. Chapter One is the introduction,
which outlines the background, purpose, and rationale. Chapter Two describes the literature
review, Chapter Three describes the study's methodology, Chapter Four describes the results,
Chapter Five outlines and discusses the study conclusions, Chapter Six presents the
implementation plan, and Chapter Seven outlines research and health policy
recommendations.

Background

Improving hospital systems and the quality of care that patients receive has been
identified by the Institute of Medicine (IOM) in two seminal reports to be a major priority in
the United States. (*Crossing the quality chasm: A new health system for the 21st Century*,

2001; *To Err Is Human: Building A Safer Health System*, 1999) The IOM defines clinical quality of care as care that is: 1) safe, 2) effective, 3) patient-centered, 4) timely, 5) efficient, and 6) equitable. The 2001 IOM report states that there is currently not simply a gap but a "chasm" between the type of health care that is available and the health care people receive. For example, in one review of medical records and phone interviews to determine the care patients received in twelve communities in the United States, it was found that only 55% of the patients who saw a doctor received evidence-based recommended care. (Asch et al., 2006) Five years after the IOM report, limited progress had been made toward further closing the quality chasm. (Leape & Berwick, 2005) In fact, it is estimated that it currently takes an average of seventeen years to translate research findings into clinical practice. (*Crossing the quality chasm: A new health system for the 21st Century*, 2001) Seventeen years is much too slow; especially when patient outcomes are deteriorating, health care costs are rising, and our nation is in financial crisis.

QI has been shown to be an effective way to implement evidence-based improvements in multiple types of settings, e.g., multi-hospital quality improvement collaboratives, single system multi-hospital collaboratives, individual hospitals, and hospital units. (Flamm, Berwick, & Kabcenell, 1998; Forster et al., 2006; J. D. Horbar, Rogowski, J., Plsek, P.E., Delmore, P., Edwards, W.H., Hocker, J., Kantak, A.D., Lewallen, P., Lewis, W., Lewit, E., McCarroll, C.J., Mujsce, D., Payne, N.R., Shiono, P., Soll, R.F., Leahy, K., Carpenter, J.H., 2001; Lagrew & Morgan, 1996; E. K. Main et al., 2004; Mazza et al., 2007; Philipson & Curry, 1994; Skupski et al., 2006; D. D. Wirtschafter et al., 2006) Although successful QI implementation has been shown to save lives and improve health care structures, processes, and outcomes, there is evidence that the success of QI efforts can vary

widely. (Huq & Martin, 2001; Ovretveit et al., 2002; Pearson et al., 2005) Even with the potential for under-reported failure rates and the propensity for primarily publishing successful QI efforts, there have been published reports of QI efforts having a high failure rate of up to 60-67 percent. (Butz, 1995; Shin, Kalinowski, & El-Enin, 1998) In addition, hospitals with a reputation for having leaders who have successfully improved outcomes by implementing QI projects have limited and inconsistent use of QI on other units within these hospitals. (Lozeau, Langley, & Denis, 2002; Waring, 2004) Thus, even in hospitals where some leaders appear skilled at implementing QI, other leaders may not be.

QI and Front-Line Clinician Leaders

Physician leaders with a knowledge of QI, have been shown to have a positive or negative influence on the success of health care change projects and the adoption of clinical guidelines. (Cabana et al., 1999; T. Greenhalgh et al., 2004; Weiner & Alexander, 1998) Nurse leaders have also been shown to improve or impede the diffusion of innovation within health care. (Fink, 2003; Funk, Champagne, Wiese, & Tornquist, 1991; Walczak, McGuire, Haisfield, & Beezley, 1994) Research has confirmed the pivotal role leaders play in diffusing complex innovations, such as QI within organizations. (Helfrich, Weiner, McKinney, & Minasian, 2007; Katherine J. Klein, Conn, & Sorra, 2001; K. J. Klein & Sorra, 1996) Based on these studies, leaders who oversee the work of clinicians taking care of patients are in key positions for improving patient care outcomes.

QI Knowledge of Front-line Leaders

The lack of formal leadership training in general and the lack of formal and informal training specific to implementing QI has been identified as a major reason for the lack of

progress toward closing the quality chasm in hospitals and the large variation in the success of QI initiatives. (Leape & Berwick, 2005) For example, in the United States, most of the leaders in hospitals are promoted into leadership roles from clinical positions. Most medical and nursing schools, at entry-level and advanced levels, do not include QI in their curriculum.   Front-line hospital leaders, such as nurse managers and medical directors, are usually promoted to positions of leadership and authority within hospitals without being required to obtain or being provided with formal QI education or basic organizational leadership skills. This is so despite the fact that the skills that make an excellent clinician are not the same or the only skills needed to make a successful change leader and manager.

When a nurse or doctor is promoted to a position of authority and leadership, their mentor, if they have one, is often another nursing or medical leader who has management experience but who nevertheless also most likely lacks formal education in QI. Some nurses and doctors individually decide to study business administration and QI. Other hospital leaders may decide to attend a leadership institute. It is true that some clinical master's degrees include some component of leadership training, and some large hospital systems may provide leadership training for nurse and medical leaders. However, despite these individual and organizational efforts to improve the leadership skills of nursing and medical leaders, it is highly likely that in the United States most front-line and upper management leaders within hospitals have minimal to no formal training in QI. For example, the majority of front-line management positions in US hospitals are held by nurse managers. Since over 60% of nurses do not have a baccalaureate degree and approximately 10% of nurses have a Master's Degree or higher, it is highly likely that most front-line Registered Nurse leadership

positions, key positions for leading change at the patient-care level, are held by non-degreed nurses with no formal education in leadership and QI implementation.

The quality chasm in health care is unlikely to be closed without highly skilled leaders at all levels within the health care system who recognize the importance of QI and have the requisite skills to successfully lead QI initiatives. In order to increase front-line leader QI effectiveness, it is necessary to identify how leaders with QI experience implement QI projects. An analysis of the QI implementation strategies and tactics of front-line physician and nurse leaders who have led QI initiatives will provide important insights into increasing QI effectiveness.

Based on the current review of the literature, we do not have a clear understanding of the QI implementation strategies and tactics used by front-line physician and nurse leaders in hospitals in the United States. (Doumit et al., 2007) Thus, we cannot adequately ascertain and describe the root causes of the documented variation in QI success. In their systematic review, Grimshaw, Thomas, MacLennan, Fraser, Ramsay, Vale, et al., conclude that "further research is required to develop and validate a coherent theoretical framework for health professional organizational behaviour and behaviour change" in order to guide the choices of health care leaders, and to more effectively "estimate the efficiency of dissemination and implementation practices in the presence of different barriers and effect modifiers."(J.M. Grimshaw et al., 2004) In addition, E. Rogers, after more than half a century of studying the diffusion of innovations in multiple settings, has suggested that within the diffusion of innovation research field there is a need for "process research" to supplement the knowledge gained from "variance research." (Rogers, 2003) Rogers defines variance research as "a type of data gathering and analysis that consists of determining the co-variances (or correlations)

among a set of variables, but not their "time order" that usually utilizes quantitative research methods.   Process research is defined as "a type of data-gathering and analysis that seeks to determine the sequence of a set of events over-time."   Rogers states that dynamic process research is needed in order to enhance understanding of whether there are stages of implementation. He further argues for the need to increase understanding of the processes of diffusion in order to more fully "explain the causes and sequences of a series of events" through the use of "less structured" data gathering research techniques that utilize "in-depth personal interviews" and qualitative research methods. (Rogers, 2003) Berwick, an international physician QI leader of the Institute for Health Care Improvement, agrees that QI research needs to utilize other methodologies beyond the gold standard of randomized control trials. In fact Berwick states that approaches such as "ethnography, anthropology, and other qualitative methods … are not compromises in learning how to improve; they are superior." (D. Berwick, 2008)

Significance

Front-line physician and nursing leaders with QI skills are needed in order to improve patient care outcomes. (*Crossing the quality chasm: A new health system for the 21st Century*, 2001) Indeed, there is a great deal of evidence that the role of leaders is critical to the adoption and translation of research into clinical practice. (Chaillet et al., 2006; E. K. Main et al., 2004; Pronovost, 2008; D. D. Wirtschafter et al., 2006) In addition, no studies were identified where change at the patient care level occurred without the active involvement of front-line leaders.

Roger's work and Greenhalgh, Robert, Macfarlane, Bate, and Kyriakidou's systematic review of the literature on the implementation of complex innovations in service

organizations substantiate these findings. (T. Greenhalgh et al., 2004; Rogers, 2003) Rogers and Greenhalgh, et al. showed that change champions who are most similar to the target group where the desired change or diffusion of innovation is needed are the ones who are the most successful in leading change and diffusing innovations. (T. Greenhalgh et al., 2004; Rogers, 2003) Buchanan, in a qualitative study of the implementation of hospital change projects, identified the key role of front-line "change drivers" who were skilled at moving a change initiative through a specific organizational maze, obtaining the needed support, and driving the change around or through the various road blocks the "change drivers" encountered along the way. (Buchanan, 2003) Driving change forward requires both knowledge and a desire or attitude that sustains the effort over time.

Chaillet, et al. in a systematic literature review of the change practices used within obstetrics, documented that there is variation in the effectiveness of change practices. (Chaillet et al., 2006) Chaillet, et al. found that education, which is often the first and only change strategy used, was the least effective method of all. The most effective method for leading change was a multi-faceted and targeted strategy to address identified barriers. (Chaillet et al., 2006; Chaillet & Dumont, 2007b)

There is a need to gain additional insights into the QI implementation practices of front-line maternity physician and nurse leaders. This dissertation analysis of the QI implementation strategies and tactics used by maternity physician and nurse leaders for their self-selected and self-described most and least successful complex QI projects builds on previous research. Specifically, the type of QI implementation strategies and tactics the leaders used and the barriers they encountered. Thus, the study findings are a contribution to the current body of QI implementation research.

Chapter 2: Literature Review

Literature Review Overview

The literature review is divided into three sections.

> **Section One** outlines and discusses the two organizing conceptual models that guided

> the literature review, the dissertation study, and the implementation plan.

> **Section Two** outlines and discusses the relevant research and background information

> on the introduction of quality improvement into businesses and hospitals, health care

> leaders and QI, QI resources, QI policies and practices, and the overall health care QI

> climate.

> **Section Three** presents the conclusions developed from the literature review.

Section 1: Description of the Organizing Conceptual Models

Overview

There are two empirically-based organizing conceptual models that guided the dissertation

literature review, the dissertation study, and the implementation plan:

> 1) The Conceptual Framework of Complex Innovation Implementation, which is a

> modification by Helfrich, Weiner, McKinney, and Minasian of the conceptual model

> developed by Klein and Sorra. (Helfrich et al., 2007; Katherine J. Klein et al., 2001)

> The Conceptual Framework of Complex Innovation and Implementation primarily

> guided the literature review and dissertation study.

2) The Discursive Model of the Collaboration Process was developed by Lawrence,

Phillips, and Hardy and primarily lends guidance to the implementation plan.

(Lawrence, Phillips, & Hardy, 1999) The implementation plan is based on a multi-

hospital QI collaborative methodology to improve one QI discourse or change

strategy used by the front-line leaders in the study.

The description of the application of the two organizing conceptual models to the dissertation

outlined in Section One is divided as follows: 1) the Conceptual Framework of Complex

Innovation Implementation, 2) the Discursive Model of the Collaboration Process, 3)

synthesis of the conceptual organizing models, and 4) summary and application of the two

conceptual frameworks.

Organizing Conceptual Model #1: Conceptual Framework of Complex Innovation Implementation – Focusing on Leaders

The discussion of the application of the Conceptual Framework of Complex

Innovation Implementation to the dissertation question is divided into the following sections:

1) summary and visual representation, 2) limitations, 3) strengths, and 4) application of the

conceptual framework to the dissertation question.

Summary and Visual Representation of Conceptual Framework of Complex Innovation Implementation

The four components that constitute the Klein and Sorra conceptual organizing model

that was slightly modified by Helfrich, Weiner, McKinney, and Minasian are: 1)

Management Support, 2) Financial Resource Availability, 3) Implementation Policies and

Practices, and 4) Implementation Climate. (Helfrich et al., 2007; K. J. Klein & Sorra, 1996)

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A visual representation of the modified Klein and Sorra conceptual organizing framework is illustrated below in Figure 1.

Figure 1: The Conceptual Framework of Complex Innovation Implementation
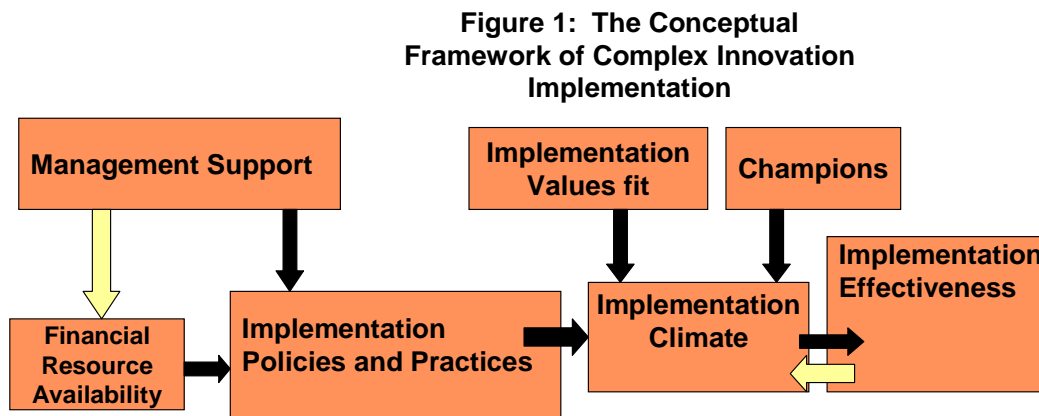
Helfrich, et al.'s modification to the Klein and Sorra Framework

Helfrich, Weiner, McKinney, and Minasian's modification of the Klein and Sorra Framework. "Determinants of implementation effectiveness: Adapting a framework for complex innovations," Med Care Res Rev 64(3): 279-303.

Limitations of the Application of the Conceptual Framework of Complex Innovation Implementation to the Dissertation

A potential limitation of applying the Conceptual Framework of Complex Innovation Implementation conceptual model to the dissertation is that the modified Klein and Sorra conceptual framework has not been studied in hospitals. Because of the structural differences in work flow, size, and organizational complexity, it is possible that the cancer research centers studied by Helfrich, et al. and the factories studied by Klein and Sorra are different from hospitals for the implementation of complex innovations. However, after decades of diffusion of innovation research Rogers and other have shown that diffusion of innovations follows predictable patterns regardless of the context.

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Strengths of the Application of the Conceptual Framework of Complex Innovation Implementation to the Dissertation

The modified Klein and Sorra conceptual framework was chosen to organize the dissertation literature review, guide the dissertation study, and inform the implementation plan because it is the only conceptual framework identified in the literature review that has been studied, and shown to be applicable, in health care settings.

Another strength of the application of Helfrich, et al.'s conceptual framework to the dissertation is that the original research by Klein and Sorra was done in organizations with multiple departments. Specifically, the innovation Klein and Sorra studied was the implementation of computerization in entire factories. The attempt to computerize the factory failed in some of the organizations studied. The variation identified that explained how the diffusion did or did not occur in different factories and the reasons why is informative for this dissertation study. This is so since this dissertation will analyze the barriers identified and the processes of implementing QI within clinician leaders' most successful and least successful QI projects.

Summary of the Application of the Conceptual Framework of Complex Innovation Implementation to the Dissertation Question

The Conceptual Framework of Complex Innovation underscores the pivotal role that leaders play in the diffusion of innovation within organizations. (Helfrich et al., 2007) Currently, significant variation in the number and type of QI activities that have been adopted among hospitals in the United States has been documented. (Lammers, Cretin, Gilman, & Calingo, 1996; Shortell et al., 1995; Weiner, Alexander, Baker, Shortell, & Becker, 2006; Weiner, Alexander, Shortell et al., 2006) Research also shows that within hospitals with leaders who have adopted QI as an organizational priority, there is variation in

how QI is implemented at the departmental or unit level. (Huq & Martin, 2001; Lozeau et al., 2002) The Helfrich, et al. conceptual model underscores the necessity to study front-line leaders' QI implementation practices within hospitals.

Organizing Conceptual Model #2: Discursive Model of the Collaboration Process - Assessing the Effectiveness of Collaboration

The Discursive Model of the Collaboration Process was primarily used to guide the implementation plan (refer to Chapter Six) based on a Multi-Hospital Quality Improvement Collaborative methodology. The Discursive Model of the Collaboration Process underscores the role of discourse within quality improvement collaboratives when the leaders are working to diffuse improvements to multiple groups. The discussion about the Discursive Model of the Collaboration Process is organized into the following sections: 1) Summary and Visual Representation, 2) Limitations, 3) Strengths, and 4) Application of the Discursive Model of the Collaboration Process conceptual framework to the implementation plan.

Summary and Visual Representation of the Discursive Model of the Collaboration Process

Multi-Hospital Quality Improvement Collaboratives (MHQIC) represent a relatively new strategy being utilized in an effort to more rapidly diffuse QI within health care. Despite the wide acceptance of MHQICs for the more rapid diffusion of QI, there is still much to be learned about how to form and evaluate the outcomes of MHQICs. For example, Schouten et al., systematically reviewed 72 out of 1,104 articles that evaluated the effect of multi-hospital QI collaboratives for improving both processes and outcomes. (Schouten, Hulscher, van Everdingen, Huijsman, & Grol, 2008) Nine of the 72 studies used a controlled design, and overall there were mixed results. "Seven out of the nine, including one

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randomized controlled trial, reported some effect, and two studies, including one randomized

controlled trial, did not show any significant effect." (Schouten et al., 2008) These types of

findings leave leaders and researchers wondering about the utility and measurements of a

MHQIC approach and how to ensure better returns on investments of both time and money.

(Auerbach, Landefeld, & Shojania, 2007; Mittman, 2004; Ovretveit et al., 2002; Pearson et

al., 2005; Schouten et al., 2008; Wilson et al., 2003) Lawrence, Phillips, and Hardy have

studied the formation and outcomes of two non-health care collaboratives and developed a

conceptual framework based on their research called the Discursive Model of the

Collaboration Process that adds insight to this issue. (Lawrence et al., 1999) Lawrence et al.,

defined a collaborative *as, "a cooperative, inter-organizational relationship that relies on*

neither market nor hierarchical mechanisms of control." (Lawrence et al., 1999)

Lawrence et al. found variation in the two collaboratives they studied; one

collaborative facilitated the open exchange of ideas and inclusiveness, while the other

collaborative used its collective power to control and dominate the ideas and actions

implemented. The conceptual model provides explanatory power in assessing how different

ideas develop within the two collaboratives formed to address the same issue in nearby, but

independent communities. The model does so by tracking how the discourses held among

members of the collaboratives generated ideas, as well as concepts and action. In addition,

the model helps explain that one possible reason some collaboratives may be less effective

than others, is that they may have different governance structures and processes in place.

Thus, the variation in MHQIC collaborative outcomes may be due to both the types of

interventions that are being implemented (these were compared by Schouten et al.), and the

type of collaborative governance structure that the various QI collaboratives have (this was not reviewed, reported, or compared by Schouten et al.). (Schouten et al., 2008)

Lawrence et al.'s research also points out how powerful the ideas generated by collaboratives can be for leading change within communities. In addition, the study shows how vital governance decisions can be in determining the collaborative's effect on idea generation and implementation. For example, who the collaborative decided to include in the discussions affected the discourse. The discourse in turn affected the ideas that were considered. The ideas considered became the ideas enacted. (Refer to Figure 2)

Figure 2:

Discursive Model of the Collaboration Process

Draws Upon

Which Affect

Antecedents

Dynamics

Outcomes

| Concepts Objects | Issues Interests Representation | Concepts Objects Action |

Lawrence, T.B., Phillips, N., Hardy, C., "Watching whale watching," The Journal of Applied Behavioral Science, 35, 4 (December 1999)., 479-502.
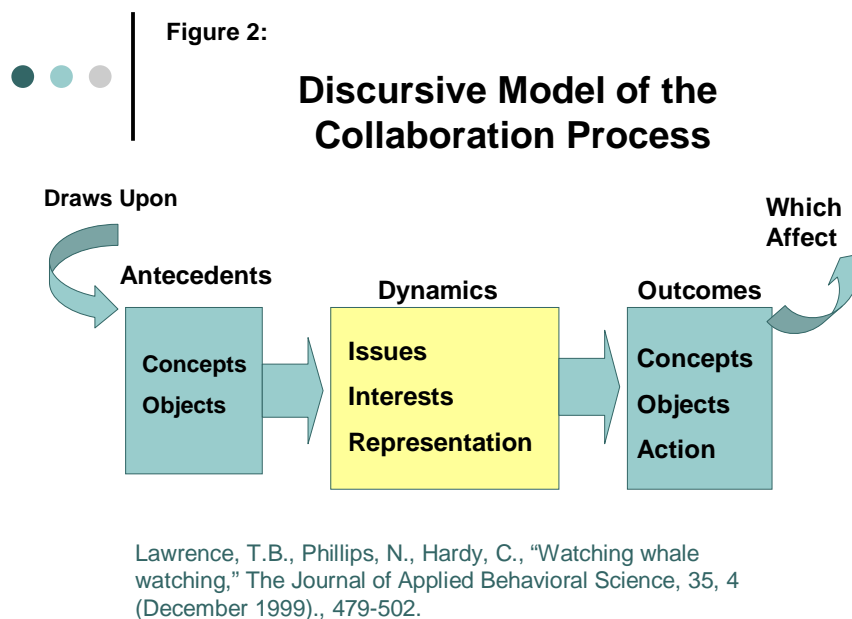
As previously noted, the dissertation implementation plan utilizes a Multi-Hospital Quality Improvement Collaborative methodology. The objective of the implementation plan is to improve the QI effectiveness of the maternity physician and nurse leaders who participated in the study. The discursive model of the collaboration process outlines three key points, 1) that the collaborative outputs are dependent on the relationships and actors

involved, 2) that the discourse that results from the collaboration can be tracked and analyzed, and 3) the main products of collaboration are the ideas that are generated and acted upon by the members of the collaboration.

Limitations of the Application of Discursive Model of the Collaboration Process to the Dissertation

Lawrence et al. developed the Discursive Model of the Collaboration Process based on a qualitative analysis of two newly forming whale collaboratives in nearby, but separate communities. (Lawrence et al., 1999) The major limitation of applying the model to a health care setting is that the framework was based on improving the whale industry, not on improving health care.   However, no research was identified to show that the formation of a collaborative to improve one type of industry would be substantially different from a collaborative formed to improve another.

Strengths of the Application of Discursive Model of the Collaboration Process to the Dissertation

The Discursive Model of the Collaboration Process is the only empirically-based conceptual model of collaboratives that was identified in the literature review. The model guides the dissertation implementation plan, which will use a multi-hospital collaborative approach for increasing the QI effectiveness of leaders. One strength of applying the Discursive Model of the Collaboration Process to the implementation plan is that the model points out differences in how the two collaboratives functioned, and the effect of those differences on ideas and actions. In other words, the model shows the correlation between the organizational and governance choices, over which the leaders have control, that ultimately affect the ideas and actions the collaborative generates.   For example, both

collaboratives were formed in nearby communities to address the same complex issue: how various interest groups, including scientists, tour guides, government officials, and community leaders, would collaborate to decide how to balance all interests, including those of the whales. One collaborative was designed with wide representation, which allowed for multiple perspectives to be discussed in an open, inclusive manner. Thus, new ideas could be readily explored. The other collaborative strictly controlled membership and used the collaborative to dominate the ideas discussed and the actions generated. The fact that collaboratives have been shown to both speed up and slow down the generation and diffusion of new ideas, and to control (or not to control) the ideas that are explored and discussed, is an important and relevant result from this research and model. The components that affect the generation and flow of ideas which lead to action will be applied to the development of the implementation plan.

The discursive conceptual framework is consistent with the research on the social psychology of organizing that was outlined by Weick. (Weick, 1979) Weick summarized how ideas lead to actions when he wrote, "I will see it when I believe it." Discourse among people who normally do not interact with each other, such as inter-organizational collaboration, has the potential to expand the visual field of individuals and change how we enact our realities. This in turn will affect the following cycle described by Weick. (Refer to Figure 3)

Figure 3:

Retention
(What we selected
affects our experiences
which reinforce our beliefs
and what we retain)

Enactment
(Act on our beliefs)

Selection
(What we enact affects what we see)
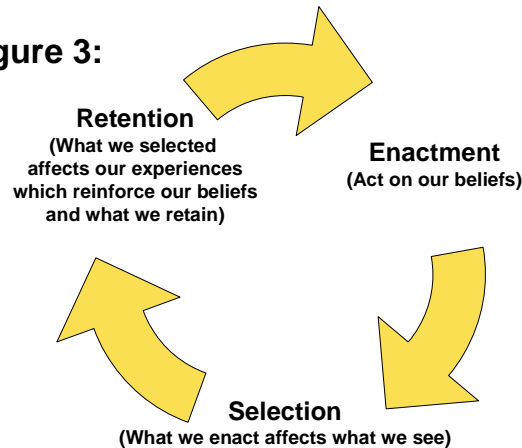
Weick, K.E., *The Social Psychology of Organizing*. 2nd Edition ed.
1979: McGraw-Hill, Inc.

The discursive conceptual framework is also consistent with systems research that outlines the various levers in a system that orchestrate the speed and flow of change. (Meadows, 1999) According to the systems research done by Meadows, the most powerful lever for bringing about rapid change is a paradigm shift. A paradigm shift occurs when enough people adopt a new idea and change what they believe, which causes them to change how they behave. Other very powerful levers for change include the alternative strategies of changing the rules and designing new organizations that can potentially add more or different feedback loops within a system. Multi-Hospital Quality Improvement Collaboratives are a new organization type that can change the rules and the paradigms by bringing about inter-organizational exchanges of ideas. These group ideas have the potential to change the flow of feedback and interaction, which in turn can change the external environment. This in turn can affect multiple levers for bringing about large system changes.

Summary of the Application of the Discursive Model of the Collaboration Process to the Implementation Plan

The implementation plan is based on the Multi-Hospital Quality Improvement methodology and used the Discursive Model of the Collaboration Process, as a guide. It is, however, not part of the dissertation to measure the effectiveness of the implementation plan or the collaborative effort.

Synthesis of The Conceptual Organizing Models

The empirically-based conceptual models outlined above are used to guide the literature review, the dissertation study, and the implementation plan. A visual representation of the how the Conceptual Framework of Complex Innovation Implementation guided the dissertation study is illustrated in Figure 4.

Legend:

☐ Study Variables

☐ Areas **Not** Included in the Study

☐ Helfrich, et al.'s modifications

Figure 4: Visual Display of the Dissertation Study Variables within The Conceptual Framework of Complex Innovation Implementation

Management Support

Financial Resource Availability

Implementation Policies and Practices

Leaders' Behaviors:
1. Baldrige Communication Criteria
2. QI Change Strategies and Tactics

Implementation Values fit

Champions

Implementation Climate

Implementation Effectiveness

Self-Defined Most Successful and Least Successful QI Projects

Self-Determined QI Project Progress Score

Self-Identified Barriers

Helfrich, Weiner, McKinney, and Minasian's modification of the Klein and Sorra Framework. "Determinants of implementation effectiveness: Adapting a framework for complex innovations," Med Care Res Rev 64(3): 279-303.

More details on the dissertation study methodology are included in Chapters Three.

A summary of how the Discursive Model of the Collaboration Process and the Conceptual Framework of Complex Innovation Implementation have guided the implementation plan to improve one QI discourse or change strategy of the maternity physician and nurse leaders, using the a Multi-Hospital Quality Improvement Collaborative methodology, is outlined in Figure 5.

Figure 5: Diffusion and Implementation of Ideas Within Multi-Hospital Quality Improvement Collaboratives:
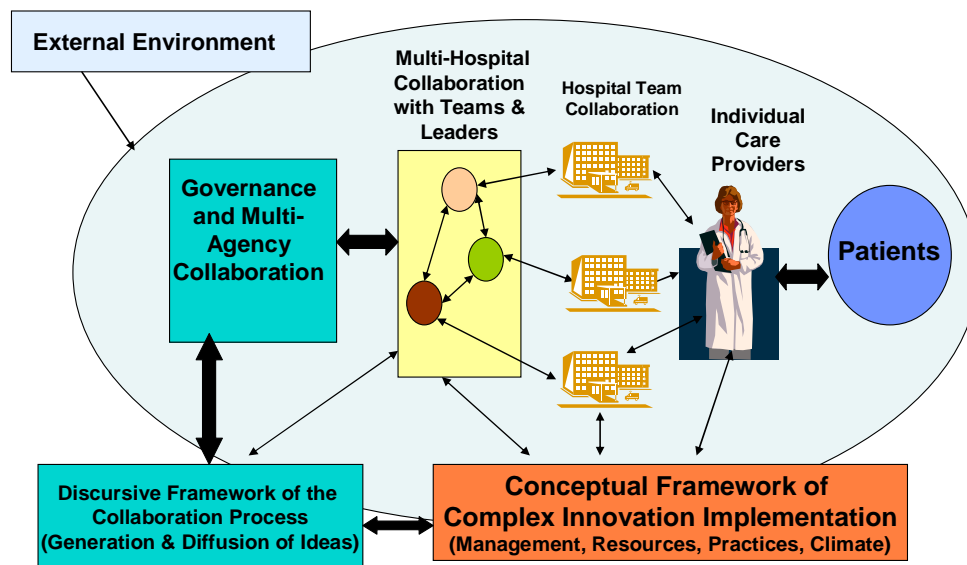
As the arrows in Figure 5 indicate, there is a great deal of interaction and exchange among all of the different groups and individuals who participate in a Multi-Hospital Quality Improvement Collaborative (MHQIC). This intermingling of information and ideas among individuals who do not otherwise routinely interact is synergistic and multi-faceted. Similar to physics and evolutionary principles, a change in any person or group in a MHQIC will create a ripple effect and an impact throughout the system. MHQICs also make it possible

for groups and individuals, who might ordinarily be quite isolated, to interact with each other in a new forum and organization. The multi-faceted dynamic outlined above is one of the reasons it is has been so difficult for QI collaborative efforts to be evaluated in a systematic manner. It also explains why leaders of successful collaboratives often give contradictory and conflicting responses as to what works and does not work. (Ovretveit et al., 2002) The collaborative creates a new organization and a new flow of feedback and information that will affect the external environment. This in turn affects the collaborative and so forth and so on. Figure 6, a Venn diagram, better illustrates the evolutionary interactions within MHQICs.

Figure 6: Interactions Within a Multi-Hospital Quality Improvement Collaborative
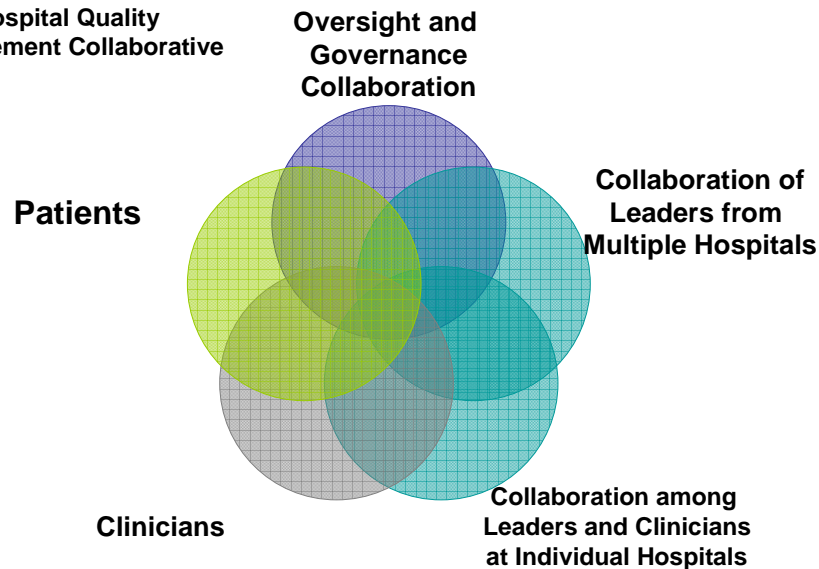
Summary

Referring back to Figure 4, the application of the two organizing conceptual models to the dissertation question is summarized as follows. First, the analysis of the literature was

organized based on the four key components that Klein and Sorra and Helfrich et al.
identified as critical for the diffusion of complex innovations within organizations; these four
key components are leaders, resources, policies and practices, and implementation climate.
Second, the Lawrence et al. organizing conceptual model, that outlines the role of discourse
within the collaborative process, guided the development of the implementation plan at the
governance level, the multi-hospital collaborative level, and at the individual hospital front-
line leader level.   Third, the modified Klein and Sorra conceptual model also guided the
dissertation study and the implementation plan at the hospital front-line leader level.

Section 2: Literature Review

Overview of the Literature Review

The Conceptual Framework of Complex Innovation Implementation found that
leaders are in a pivotal role relative to the implementation success or failure of Quality
Improvement (QI) initiatives. (Helfrich et al., 2007; K. J. Klein & Sorra, 1996) For example,
leaders affect resource generation and allocation, they orchestrate or at a minimum sign off
on implementation policies and practices, and they have a significant impact on the
implementation culture within an organization. (Helfrich et al., 2007; K. J. Klein & Sorra,
1996)

Based on the Conceptual Framework of Complex Innovation Implementation, the
literature review to outline the rationale and purpose of the proposed research was divided
into the following sections: 1) Overview of Quality Improvement (QI) in Business and
Hospitals, 2) Diffusion of QI in Health Care, 3) Health Care Leaders and QI, 4) Health Care

Leaders and QI Implementation Resources, 5) Health Care Leaders and QI Implementation

Policies and Practices, 6) Health Care Leaders and QI Climate and 7) Conclusions and

Application to the Dissertation.

Overview of Quality Improvement

Quality Improvement in Business and Hospitals

Improving business processes to increase productivity has a long tradition. For

example, Ford introduced the assembly line early in the twentieth century. However, QI, as a

multi-step approach to improving outcomes, was introduced into business organizations in

the 1970s by W. Edwards Deming, Joseph Juran, and Phil Crosby. (Cokins, 2006). Since

that time, QI has been known by many different names that have been used interchangeably,

i.e., Total Quality Management (TQM), Total Quality Improvement (TQI), and Continuous

Quality Improvement (CQI). QI is the name used throughout this dissertation to include all

of the other above-mentioned names.

Since QI was first introduced into businesses, more than just the name has changed.

Additions, variations, and complementary performance management approaches have been

introduced. The main additions to the business QI movement have been: 1) Peter Senge's

focus on organizational learning and learning organizations which he began discussing in the

late 1980s, 2) Weick's introduction of the concept of high reliability organizations (HRO),

which was introduced in the late 1980's, and 3) Michael Hammer's Business Process

Reengineering which was introduced in the early 1990's, 4) Kaplan and Norton's Strategy

Maps and Balanced Scorecard, which was introduced in the late 1990's. (Cokins, 2006;

Weick, 1987; Weick & Sutcliffe, 2001)

Diffusion of Quality Improvement in Health Care

The concepts of process, structure, and outcomes to guide health care improvement efforts were first described by Donabedian in the late 1960s. However, widespread diffusion of QI practices into hospitals did not occur until the late 1980s and early 1990s, almost a decade after most businesses began to use QI to improve performance, increase customer satisfaction, increase efficiency, empower teams, and reduce costs. (Berwick, 1989; Carman et al., 1996; Laffel & Berwick, 1992; Shortell, Bennett, & Byck, 1998)

In 1993, sixty-nine percent of 3,303 hospital leaders, who participated in a national survey, reported that they had started to implement QI. Three-fourths of the hospital leaders who responded to the survey stated that QI implementation had begun in the previous two years. (Barness, Shortell, Gillies, & al., 1993; Shortell et al., 1995) Also, in 1993, the Joint Commission (formerly the Joint Commission for the Accreditation of Healthcare Organizations) integrated QI into their accreditation standards, which led to additional integration of QI in hospitals across the United States and made QI a national standard for accreditation.

A qualitative case study by Lozeau, Langley, and Denis analyzed two hospitals in Canada in the late 1990s, chosen because of their strong reputation for implementing QI. The case study analysis showed that the highly praised QI success of these two hospitals was not based on organization-wide adoption of QI to transform the hospital operations throughout all of the units in the hospital, but that QI success was limited to one or two departments within these hospitals. The hospital unit in the study with the most QI success was housekeeping. Lozeau et al. speculate that perhaps one of the reasons housekeeping had more success implementing QI than other units is that housekeeping is most similar to

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manufacturing organizations. In addition, the housekeeping supervisor was highly motivated to gain recognition for his department. In the two hospitals analyzed, the management techniques of strategic planning and QI were adapted and "inserted" into the organizational dynamics, rather than transforming the organizational processes and dynamics. (Lozeau et al., 2002) Based on the findings of one study, it is unclear whether QI methodologies need to be adapted to better meet the needs of hospitals' clinical areas, or whether hospital leaders need to determine more effective methods for transformative adoption of QI implementation policies and practices within all of the units and departments within their organizations.

In the mid 1990s, a QI registry was formed and a questionnaire distributed among the QI leaders of Veterans Hospitals Administration (VHA) to measure the "contribution of commitment, quality councils, teams, budgets, and training to perceived improvement" within 36 hospitals of the Western Region. (Lammers et al., 1996) Lammers, et al. found that even with the strong commitment of the corporate VHA leadership team, including multiple training sessions, and the employment of quality coordinators at each hospital, there was large variation in the commitment and implementation of QI. Thirty out of 36 hospitals reported having formed QI teams, and of those thirty hospitals, some had formed more QI teams than others, and thus implemented more QI.

In 1997, a national United States QI survey of 1,751 "community" hospitals showed that the mean number of units within each hospital that had implemented QI was surprisingly low: only 3.80 units per hospital with a standard deviation of 1.72. (Weiner, Alexander, Baker et al., 2006) In the Weiner et al. study, which was designed to analyze the effect of QI implementation on specific patient safety indicators, the denominator outlining the mean number of units per hospital was not provided. Nor are there details on similarities or

differences among the units that did or did not implement QI. (Weiner, Alexander, Shortell et al., 2006)

The diffusion of QI methodologies to physician providers has not been effective. For example, in 2003, at the request of the Commonwealth Foundation, Harris Interactive performed a national survey of 1,837 physicians (involved in direct patient care and in practice at least three years post-residency) randomly selected from the American Medical Association. The survey results indicated that one-third of the physicians had not participated in QI and that one-third did not have access to QI data. (Audet, Doty, Shamasdin, & Schoenbaum, 2005) The national survey was not designed to obtain data on the impact of the QI that the physicians reported they participated in.

Waring analyzed the diffusion of QI among physician sub-specialists in one hospital in England. He found wide variation in the use and awareness of incident reporting (a method for identifying quality improvement opportunities) among physicians. Obstetricians were the group with the most awareness and the longest history of reporting incidents to hospital risk management. However, reporting of incidents is only a small component of the overall process of working to improve systems. The anesthesiologists were also very involved in QI monitoring, but had developed their own department process so they could share their information both locally and nationally. Acute medicine and rehabilitation physicians developed their own form and by-passed the hospital reporting mechanism. Surgeons were not aware of the incident report form and were actually hostile to the idea. (Waring, 2004) It is difficult to apply Waring's study, which was performed in England, to the United States, since there are wide differences in regulatory controls and in how health care is delivered. However, the study has relevance because it demonstrates that even within

one hospital in one geo-political climate, there were variations in how incident reporting occurred. In addition, the meaning of incident reporting among physicians was found to be based on their specialty. Incident reporting, or the identification of a problem and reporting that problem, is the first step toward working to improve care. (Langley et al., 1996)

Many leaders, out of concern with the slow pace of individual hospital and provider adoption of QI methodologies, have started to form Multi-Hospital Quality Improvement Collaboratives (MHQICs). (Berwick, 2003; J. D. Horbar, 1999; E. K. Main & Bingham, 2008; D. Wirtschafter & Powers, 2004) Currently, hospitals involved in MHQICs have done so voluntarily and usually pay a participation fee. Currently, there were no MHQIC's that were found to be mandatory. However, in California, two types of inducements have been developed in the last two years that have increased participation in the California Perinatal Quality Care Collaborative: 1) hospitals are required to participate in order to get enhanced reimbursement rates, and 2) neonatologists are required to demonstrate that they participate in QI activities in order to remain board certified. Not all specialists have the same requirements, e.g., there is no such requirement that obstetricians or maternal fetal medicine specialists participate in QI activities in order to remain board certified.

One drawback of the collaborative approach that requires a membership fee, is that hospitals with the greatest needs may not be able to afford to join the fee-based collaboratives. Some states have established (or are establishing) state-wide MHQICs around specific sub-specialty areas, i.e., Neonatal Intensive Care and Maternity Care, Maryland Patient Safety Center Perinatal Collaborative, The California Perinatal Quality Care Collaborative and the California Maternal Quality Care Collaborative. (J. D. Horbar,

1999; E. K. Main & Bingham, 2008; D. Wirtschafter & Powers, 2004) The fees can vary

from $5,000 per hospital for one collaborative project to $30,000 per hospital per year.

Health Care Leaders, Management Support, and Quality Improvement

Management and board support for QI has been shown to be necessary for the

implementation of QI in hospitals. (Weiner, Alexander, & Shortell, 1996; Weiner, Shortell,

& Alexander, 1997) However, in a recent study by some of the same researchers, Weiner,

Alexander, Baker, & Shortell found no association between patient safety indicators (a

measure of "possible safety problems") and the involvement of the Chief Executive Officer

(CEO) in QI. (Weiner, Alexander, Shortell et al., 2006) The researchers reason that "because

neither CEO nor board leadership is directly involved in the provision of patient care, it is

unlikely that CEO involvement in QI would directly lead to better patient safety." (Weiner,

Alexander, Shortell et al., 2006) The findings of Weiner, et al. are consistent with Lozeau

and Langley's view that QI is "concerned with micro-level operational decisions" and that

strategic planning, which might have a quality component, "deals with the macro-level

decisions." (Lozeau et al., 2002) Lozeau and Langley's opinion about the "micro-level"

affect of QI is also consistent with their qualitative analysis of QI implementation in two

hospitals. Lozeau and Langley found that local leaders of single hospital units or

departments within a hospital had more impact than senior leaders on whether QI was

implemented within the individual units of the hospitals in the study. (Lozeau et al., 2002)

Consistent with the above finding was the research by Lammers, et al. that found that

perceptions of the commitment of top management to QI was "independent" of perceptions

of the QI commitment of other employees. In addition, perceptions of QI commitment within

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the 36 hospitals in the study seemed to be clustered within different groups within the hospitals. (Lammers et al., 1996)

Based on the available studies that show that upper management support of QI change projects can have a positive as well as limited or no effect, we do not know how critical upper management support is for the success of a QI change project at the hospital unit level. For example, in well-documented, published case studies of hospital-based, unit-level QI change projects, front-line leader involvement was needed in order to achieve success; however, upper management involvement was not outlined as a critical component of success. (Lagrew & Morgan, 1996; E. K. Main et al., 2004; D. D. Wirtschafter et al., 2006) In fact, no published studies were identified which demonstrated that upper management was successful in implementing change at the unit level within hospitals without the active involvement of front-line leaders and clinicians. However, as just described, there are numerous examples of successful QI projects with no documentation of upper management involvement.

Rogers has shown that one key ingredient for the successful diffusion of innovations is the involvement of "opinion leaders" or "change champions," who are most similar to the groups they are trying to change. (Rogers, 2003) A systematic review by Doumit et al., showed that "opinion leaders appear to reduce non-compliance with desired practice." (Doumit et al., 2007) The use of opinion leaders as a strategy also appears to be "comparable" to other types of implementation tactics leaders can use, e.g., audit and feedback. However, Doumit et al., go on to say that "more broadly, studies have yet to relate specific personal and professional attributes of opinion leaders to the effectiveness of opinion leader-led interventions. The actual activities and delivery of education by opinion leaders

need to be explicated. More details on what opinion leaders do and how they do it would allow for replication across studies and contexts." (Doumit et al., 2007)

In a qualitative study analyzing the multi-layered process of change within The Leicester Royal Infirmary National Health Service (NHS) Trust, Buchanan demonstrated that one key factor in having a successful change project was the need for "change drivers" who maneuver and guide the change through the organizational maze. (Buchanan, 2003)

Based on the above findings, a multi-level leadership approach that includes the combined support of senior leadership, middle management, front-line leaders, and providers is most likely the ideal situation and has been recommended by the leaders of successful change projects. (Ovretveit et al., 2002; Wilson et al., 2003) There are also additional empirical findings that demonstrate the benefit of strong leader support for change at multiple levels within hospitals. In 1995, O'Brien, et al., analyzed the degree of implementation of QI in ten hospitals. Approximately 23 people were interviewed at each hospital. The technical, cultural, strategic, and structural dimensions of QI were analyzed at each site. The researchers found interdependence among the different components that affected the overall success of "implementing CQI" either negatively or positively. In addition, Pearson, M. L., Wu, S., Schaefer, J., Bonomi, A. E., Shortell, S. M., Mendel, P. J., Marsteller, J. A., Louis, T. A. Rosen, M., and Keeler, E. B., in a self-selected sample of 42 out of 74 eligible health care organizations participating in a Multi-Hospital Quality Improvement Collaborative, found large variability in the participating teams' abilities to improve care. In addition, the teams with "strong" leader support, active clinician champions, and day-to-day leader efforts reported the greatest improvements. (Pearson et al., 2005)

Regardless of the need for strong and committed leaders at all levels of an organization, key leaders for the diffusion of innovations have been identified as *local opinion leaders* - individuals who are most similar to the group they are attempting to influence and who are identified by the group as those persons whose opinions are most highly regarded. (Doumit, Gattellari, Grimshaw, & O'Brien, 1997; Rogers, 2003) Again, many studies were found where lack of senior leader involvement did not impede QI efforts of front-line, or local leaders. No studies were identified where senior leaders successfully implemented QI at the front-lines without front-line leader involvement.

Health Care Leaders and Quality Improvement Resources

Leaders have been shown to affect resource allocation, which in turn affects the diffusion of innovations such as QI methodologies. (Helfrich et al., 2007) However, the effect of the discretionary control front-line leaders have on currently budgeted staff resources utilized for unit level QI projects have not been systematically analyzed.

Lammers, J. C., Cretin, S., Gilman, S., Calingo, E. found that the higher the QI commitment score of a given facility, the higher the number of resources allocated for training leaders in QI methods, in a study of 36 hospitals in the Western Region of the Veterans Health Administration. (Lammers et al., 1996) However, although QI commitment was shown to increase the number of training resources allocated at the various hospitals in the study, the *amount* of training was not shown to affect overall QI improvement. The result is circular, since the scale of facility commitment and the number of QI teams did affect overall QI improvement. (Lammers et al., 1996) In other words, leader commitment to QI affects the resources they provide at the hospital level, which in turn affects the number of teams performing QI and increases the amount of training provided.

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Health Care Leaders and Quality Improvement Implementation Policies and Practices

A qualitative study conducted in Latin American hospitals by Belizan, Meier, Althabe, Codazzi, Colomar, Buekens, Belizan, Walsh, and Campbell was designed to supplement the findings of a randomized-control study by Althabe et al. to determine the facilitators and barriers to adoption of evidence-based perinatal care. (Althabe et al., 2008; Belizan et al., 2007) Hospital administrators who were obstetric and gynecology specialists, mid-level practitioners, and pregnant women patients were interviewed individually or in focus groups. The study participants were from hospitals that were not included in the guidelines trial, but were similar to the study hospitals. The barriers and facilitators identified fit within four stages or across all stages: 1) introduction of new knowledge, 2) dissemination within the organization, 3) implementation of practice changes, and 4) maintenance and sustainability of change. All of the stages were broken into three levels, the individual or group level, the hospital norms, policies, and resources level, or the environmental level. At the implementation of the practice stage (the area of focus for this dissertation), the main facilitating factor for OB/GYN practice changes "occurred through the leadership of motivated physicians and by administrative mandates, but never as patients' preferences." (Belizan et al., 2007)   Another facilitator identified involved "early adopters" whose modeling of new practices and assessment of outcomes were resources for the "later adopters" as they conducted their own assessments of the "relative costs and benefits to patients and physicians." (Belizan et al., 2007) It is unclear how relevant these findings are to obstetric practices in the United States, but based on diffusion of innovation research, the presence of both adopters and resisters in any group is an expected finding. (Rogers, 2003) In addition, the use of "early adopters" within a given group who subsequently serve as the

change champions and "model" the desired behavior change, has consistently been shown to facilitate the diffusion of an innovation within multiple types of groups. This study is another example of this process. (Rogers, 2003)

Those interviewed disagreed on the most effective ways for implementing change. For example, some felt that changes would be better accepted if they were negotiated rather than mandated; yet, others said that the "quickest way" to implement a clinical practice change was through a mandate. The barriers to implementing change that were identified were health professionals' competencies and skills, and the type of intervention being implemented, i.e., the more technological changes were perceived to be more readily adopted. Patients were not perceived by anyone to be a barrier to implementation and all agreed that the physicians did not "seek feedback from their patients about practices or outcomes." In fact, practitioner behaviors were based entirely on what the practitioners considered to be "adequate" or "correct." (Belizan et al., 2007)

Building on the knowledge gained from systematic literature reviews, Simpson and Doig sent a survey to fourteen Intensive Care Units that participated in a multi-hospital change project to identify self-reported perceptions of the "relative effectiveness of practice change interventions." (F. Simpson & Doig, 2007) The study respondents were given scenarios and asked to identify the strategy that they would use, and then ranked the effectiveness of implementation practices for change. The findings from Simpson and Doig's research were consistent with other findings; specifically, academic detailing and active reminders were considered a strong intervention, audit and feedback was identified to be moderate, and more passive and weak methods of reminding clinicians such as via posters and mouse pads. All intervention methods were considered to have some positive effect.

Unexpected findings were the high effectiveness ranking of educational outreach that included site visits and didactic lectures, and the low ranking effect of education from a peer-nominated opinion leader. (F. Simpson & Doig, 2007) The survey method to obtain these data did not allow for open-ended exploration of reasons the respondents answered the questions the way they did. This outlines one of the major difficulties with designing studies that use survey methods to seek to understand the dynamic nature of barriers and facilitators for change. Systematic reviews, although they have their limitations, are more useful for determining the most effective implementation practices than the data obtained from a single survey. Several systematic reviews were identified and are described below.

Chaillet, Dube, Dugas, Audibert, Tourigny, Fraser, Dumont performed a systematic review of the literature between 1999 to 2005 to determine "evidence-based practices for implementing guidelines in Obstetrics." (Chaillet et al., 2006) Thirty-three studies met the inclusion criteria out of 3,910 articles identified.   The inclusion criteria were studies identified to be "rigorous evaluation of clinical practice guidelines implementation practices in low, mid, and high resources areas." (Chaillet et al., 2006) The studies reviewed had various study designs, e.g., randomized controlled trials, controlled before-after studies, and interrupted time series studies. In addition, Chaillet et al. used the standard Cochrane Effective Practice and Organization Care criteria to determine quality of the study designs. Chaillet et al. undertook the systematic review based on the assumption that implementation practices in obstetrics are different from implementation practices in other specialties. Although their literature review did not adequately address whether implementation practices in obstetrics are fundamentally different from implementation practices in other specialties, the overall findings are highly relevant for outlining the state of the science on

implementation practices within obstetrics. Chaillet et al. organized the study change topics

and the study implementation practices into the following seven categories: 1) continuing

education (four studies), 2) audit and feedback (eleven studies), 3) opinion leader (two

studies), 4) qualitative improvement (four studies), 5) academic detailing (one study), 6)

reminder (two studies), and 7) multifaceted tailored intervention (nine studies).

Implementation practices found by Chaillet et al. to be most effective in obstetrics are

as follows: Educational practices were determined to be "generally effective" with

paramedical providers and opinion leaders. However, educational strategies with medical

providers were found to be "generally ineffective." Which, calls into question the routine use

of grand rounds presentations as the only step in a change initiative. Other research

substantiate the finding that educational sessions implemented independent of other practices

are ineffective for bringing about *sustained* behavior change among physicians. (O'Brien et

al., 2001)

Nine of the eleven studies utilizing audit and feedback demonstrated positive effects,

but overall audit and feedback was determined to be generally effective. In one case where

no positive effect was identified, this was attributed to weakness in the amount of feedback,

not to audit and feedback as an implementation tactic *per se*. The authors included second

opinions as a type of audit and feedback and this strategy showed mixed results. Opinion

leader implementation practices were found to have mixed results. The authors argued that

opinion leaders were more effective for changing physician behaviors than patient behaviors.

"Qualitative improvement," was determined to have mixed effects. "Academic detailing,"

and reminder practicers were identified as being "generally effective."

The identification of specific barriers to change was found to be an important factor for assessing the success of implementation practices. For example, leaders who identified barriers and developed practices to address them reported 93.8% success, compared to 47.1% success for interventions implemented more randomly. Similarly, the research showed that multifaceted, tailored interventions, implementing a combination of multiple practices, were effective and "demonstrated a high efficacy for changing behaviors." (Chaillet et al., 2006) This systematic review is well done and informative. But, it does illustrate the difficulties and limitations of trying to design an implementation plan based on the amount of details available in currently published research. General terms for implementation are used that are not universally defined. Thus, one term may signify different processes to different leaders, e.g., education is a very broad term that may include many different types of processes.

Chaillet and Dumont also performed a meta-analysis of the research published between January 1990 to June 2005, to determine the effectiveness of interventions used to reduce cesarean section rates. (Chaillet & Dumont, 2007a) Ten studies met the inclusion criteria. The interventions, audit and feedback (pooled RR = 0.87 [0.81, 0.93]), quality improvement (pooled RR = 0.74 [0.70, 0.77]), and "multi-faceted" interventions (pooled RR=0.73 [0.68, 0.79]), were found to have a significant effect on the reduction of cesarean section rates by random meta-analysis (pooled RR = 0.81 [0.75, 0.87]). (Chaillet & Dumont, 2007a) "Studies including an identification of barriers to change were more effective than other interventions for reducing the cesarean section rate (pooled RR = 0.74 [0.71, 0.78] vs 0.88 [0.82, 0.94])." (Chaillet & Dumont, 2007a) This led the authors to conclude that identifying barriers to change and tailoring intervention strategies to address the identified barriers are the most effective interventions. (Chaillet & Dumont, 2007a)

An analysis of 118 studies reviewing the effectiveness of audit and feedback on professional practice and health care outcomes was published by the Cochrane Collaboration Cochrane Reviews by Jamtvedt et al. (Jamtvedt, Young, Kristoffersen, O'Brien, & Oxman, 2006) The study inclusion criteria consisted of randomized trials of audit and feedback that "reported objectively measured professional practice in a health care setting or health care outcomes." Audit and feedback was defined as "any summary of clinical performance over a specified period of time." The analysis included an investigation of five alternative explanations for variation found in the effectiveness of the audit and feedback change strategy: 1) how audit and feedback was utilized, i.e., as a lone strategy, as part of educational meetings, or as one of many other practices, 2) the "intensity" of audit and feedback, 3) the "complexity" of the desired behavior change, 4) the "seriousness" of the "outcome", and 5) overall "quality" of the study and "compliance" at baseline.

Jamtvedt, et al. performed two types of analyses: 1) In 72 studies, there were 88 dichotomous comparisons made in which audit and feedback was compared to no intervention, and 2) An analysis of the effect of audit and feedback on continuous outcomes. For the dichotomous comparisons, where audit and feedback was compared to no intervention, there was an "adjusted risk difference of compliance with desired practice that varied from -0.16 (a 16% absolute decrease in compliance) to 0.70 (a 70% increase in compliance)." The median was 0.05 and the inter-quartile range was 0.03 - 0.11.

Communication practices, both the how and who, for the dissemination of information has long been identified in business studies and by leadership and change experts as a key strategy for effectively leading change and mobilizing others. (Gerzon, 2006; Kotter,

1996; Shashkin & Shashkin, 2003) Baldrige, a well-respected source for QI training

materials and a group that awards QI excellence for both business and health care leaders,

has identified QI discourse as a key component for the successful implementation of QI and

an important implementation practice for reaching a Baldrige score of "300." (Averson,

1998) The four Baldrige QI communication criteria are: 1) the desired change can be

expressed in a quantitative score, 2) there is a target value identified, 3) there is a target date,

and 4) there are periodic measurement cycles. (Baldrige) However, there were no studies

identified that outlined how health care leaders utilize the four Baldrige communication

criteria and, more importantly, how effective the four QI communication criteria are for

leading health care change and improving outcomes.

Traditional communication methods for the dissemination of information among

health care professionals has long included education meetings, such as grand rounds and

conferences, and printed materials. In a systematic review of the evidence, 32 studies that

were deemed of moderate or high quality met inclusion criteria and incorporated 13-411

health professionals (n=2995). (O'Brien et al., 2001) Overall, the change methods of the

research studies included in the Cochrane review were considered "poorly reported."

(O'Brien et al., 2001) The studies were difficult to compare since there was wide variation in

the "complexity in the targeted behaviors, baseline compliance, the characteristics of the

interventions, and the results."(O'Brien et al., 2001) The different practices analyzed were:

1) interactive workshops (ten), of which six of the ten had "moderately large effects" which

were all statistically significant and four had "small effects" with only one being statistically

significant, 2) the combination of workshops and didactic presentations (nineteen), of which

twelve had "moderate or moderately large effects; eleven of the twelve showed statistically

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significant improvements and "small effects" were seen in seven, and 3) for didactic presentations alone, there were "no statistically significant effects" identified except in one study where one out of four outcomes improved. (O'Brien et al., 2001)

In 2003, Grol and Grimshaw published a comprehensive of review of effective implementation practices for translating the best evidence into best practices among physicians, team practice, hospital, and the "wider environment." (Grol & Grimshaw, 2003) The general findings of Grol and Grimshaw are that most interventions that are "well-designed" had "some effect" with an average of approximately 10%. In addition, no intervention strategy was effective for all changes in all settings. The clinician-oriented change practices analyzed were: 1) Education, 2) Audit and Feedback, 3) Reminders and Computers, 4) Substitution of Tasks, 5) Multi-professional Collaboration, 6) Mass Media Campaigns, 7) Total Quality Management, and 8) Combinations of Interventions.

Grol and Grimshaw's evaluation of educational practices was divided into nine systematic reviews of the distribution of educational materials, which overall showed an 8% increase across four cluster randomized trials. In several reviews, CME activities, such as large conferences and courses, showed mixed effects, while small group education with active participation showed positive effects. There were eight reviews of education outreach determined to be effective for improving specific behavior and prevention in primary care, and an additional 18 reviews indicating that the overall effect is moderate and most likely could be improved with additional practices. Local opinion leaders were evaluated in three reviews and were shown to have mixed effect. (Grol & Grimshaw, 2003)

Audit and feedback as a change strategy was determined in 16 reviews to have mixed effects. Audit and feedback practices were found to be more effective for prevention when

performed in combination with education, outreach visits, or reminders. The effectiveness of audit and feedback could be modulated by the "type of feedback, the source, format, and frequency or intensity of presentation." (Grol & Grimshaw, 2003)

Reminders were found to have a 13% success rate, making reminders the most effective implementation strategy included in the review. There were two types of reminders reviewed; 14 reviews of general reminders and 100 reviews of computerized reminders. Reminders were found to be particularly effective for outpatient prevention practices. Computerized reminders were shown to have 75% improvement. Computer reminders were more effective for management decisions rather than for diagnosis. In a review of 68 studies, simple computer systems were more effective than more advanced, knowledge-based systems. (Grol & Grimshaw, 2003)

Six reviews analyzed substitution of tasks. Substitution of tasks refers to situations in which professional responsibilities are expanded for non-physicians such as pharmacists and nurses. This change strategy was shown to lead to better results in prescribing, but not consistently when delegated to nurses. (Grol & Grimshaw, 2003) The evaluation of multi-professional collaboration, included in five reviews, was found to be inconclusive as the studies were too different from each other to make any conclusion regarding overall effectiveness. Mass media campaigns were all shown to have a positive effect in 22 studies. Total quality management identified in one review that comprised the results of 55 studies, found that single-site projects were effective, but randomized controlled trials were not. The results of the review underscore that QI is context-specific. A combination of interventions was analyzed through the review of 235 trials, and 73% of the interventions identified were multi-faceted interventions. The change strategies that were the most effective were those

that included implementation tactics that were developed and tailored to address the identified barriers. (Grol & Grimshaw, 2003)

Cheater, et al, compared fifteen studies to determine the effectiveness of tailored intervention to overcome identified barriers. (Cheater et al., 2009)   First the "meta-regression of a subset of the included studies, using a classical approach estimated a combined odds ratio of 2.18 (95% CI: 1.09, 4.34), *p = 0.026 in favor of tailored interventions. However, when a Bayesian approach was taken, meta-regression gave a combined OR of 2.27 (95% Credible Interval: 0.92, 4.75), which was not statistically significant*." (Cheater et al., 2009)   They concluded that "interventions tailored to prospectively identify barriers may improve care and patient outcomes. However, from the studies included in this review, we were unable to determine whether the barriers were valid, which were the most important barriers, whether all barriers were identified and if they had been addressed by the intervention chosen. Based on the evidence presented in this review, the effectiveness of tailored interventions remains uncertain and more rigorous trials (including process evaluations) are needed. Further research needs to address explicitly the questions of identifying and addressing barriers." (Cheater et al., 2009)

One important limitation of the literature review on implementation policies and practices is the difficulty of comparing and contrasting the various studies. Despite the individual limitations of the systematic reviews, all but one of the systematic reviews came to a similar conclusion: the use of multiple practices tailored to address the barriers identified are consistently the most effective.   Thus, it is clear that limited guidance regarding what

the most effective implementation policies and practices leaders can use to ensure success

when working to improve care and outcomes.

Health Care Leaders and Quality Improvement Climate

Overview

The QI climate within an organization is affected by the culture that leaders help

produce, which in turn affects the employees' QI performance. (Lin et al., 2005) Climate is

defined as the prevailing factors that influence the culture or character of a group.   Culture is

defined as the set of assumptions and the practices of a group of people who have a similar

"approach, outlook, and priorities." (Weick & Sutcliffe, 2003)

Leaders can promote self-reflection, learning, and safety in organizations with a

culture for high reliability or, alternatively, leaders can encourage or tolerate self-justification

and self-deception that can produce organizational "blind spots" leading to misadventures

and poor outcomes. (Nonaka & Takeuchi, 1995; P. Senge et al., 1999; P. M. Senge, 1990;

Weick, 1987; Weick & Sutcliffe, 2003)

One well-documented case study illustrates the effect of culture on improving

processes, structures, and outcomes within a health care organization. Weick and Sutcliffe's

performed an analysis of why the Bristol Royal Infirmary's pediatric cardiac surgery

program was allowed to function for 14 years before being shut down (started in 1981 and

closed down in 1995). (Weick & Sutcliffe, 2003) The Bristol Royal Infirmary case study

illustrates that even when poor outcomes are serious and self-evident, improved outcomes

will not occur when a senior leader (Chief Operating Officer) and a front-line leader

(Pediatric Cardiac Surgeon) are convinced that they do not need to change. In this case,

children died after heart surgery at significantly higher rates than children who had the same

types of surgery at other hospitals. Improvement rates in outcomes did not keep up with other centers performing the same surgeries over the same periods of time. Weick calls what occurred in this situation, "entrapment thinking," which is a type of QI climate where leaders are caught in a cycle of self-deception and repeated behaviors that do not lead to improving structures, processes, and outcomes. The components of entrapment thinking outlined by Weick and Sutcliffe are: 1) leaders get locked into specific actions, 2) the leaders justify these actions and thus overlook cues that things are not as they are claimed to be, e.g., in the case of the Bristol Royal Infirmary it was claimed that the patients were more complicated and sicker prior to surgery than patients at other hospitals, and 3) the leaders search for confirmation to continue what they are doing rather than asking questions about how things should or could be changed. In the Bristol Royal Infirmary case study, the cultural mindset of the hospital Chief Executive Officer (CEO) and the Pediatric Cardiac Surgeon led to a culture of "blame", "justification", "paternalism", "infallibility", and "provider-orientation". Forward-looking leaders with high QI capacity are those who continuously look for ways to make improvements not only in their individual performance, but in how the organization and teams perform together. The Bristol Royal Infirmary case study points out that attitudes of leaders, the types of questions leaders ask, and the amount of self-reflection and vulnerability leaders express are key to determining the type of culture that the leaders promote. A similar type of troubling case occurred in obstetrics, wherein hundreds a women a year had their reproductive organs removed without consent and without medical justification at the Our Lady of Lourdes Hospital in Ireland. (O'Connor, 2008) The bulk of the unnecessary surgeries were performed by one physician in charge. Multiple providers, clinicians, regulators, and professional groups were complicit by failing

to adequately follow-up on complaints or to file complaints. The horrific practice of performing a symphysiotomy (the permanent widening of the pelvis) that included removal of the woman's uterus, and one or both ovaries, causing long-term pain and suffering to countless women, continued unchecked from 1984 until 1998. (O'Connor, 2008)

A "quasi-qualitative" case study conducted by Huq and Martin analyzed seven hospitals, rated on eight "workforce cultural dimensions" which had previously been identified in field research by Huq to be relevant to the implementation of QI among hospitals. (Huq & Martin, 2001) The eight workforce cultural factors identified and analyzed by Huq and Martin are similar to those discussed by Weick and Sutcliffe in the Bristol Royal Infirmary case study. The eight workforce cultural factors are: 1) Familiarity with total quality management (TQM), 2) Measures of costs of quality, 3) Worker empowerment, 4) Performance appraisal system, 5) Commitment for continual improvement, 6) Problem-solving approach, 7) Activities to remove barriers for reaching consensus, and 8) Education and training. Only one of the hospitals scored consistently high on all of the measures. Huq and Martin found that even in the highest scoring hospital there was "physician indifference" to the implementation of QI. There was no analysis of the diffusion of QI into the different units within the hospital, nor did the research focus on leaders. (Huq & Martin, 2001)

Health Care Leaders and QI Climate Boundaries

As the Bristol Royal Infirmary case study illustrates, within hospitals there is an organization-wide QI climate as well as individual unit QI climates. Despite the long-recognized fact that "hospitals are complex organizations with multiple divisions of labor and nursing units that are loosely coupled", what is not well known is how to determine the sub-unit boundaries for measuring climate. (Leatt & Schneck, 1984; Overton, Schneck, &

Hazlett, 1977) How different units within the larger hospital organization are defined may affect the results of studies that measure the effect leaders have on organization-wide and unit level climates with respect to the implementation of QI discourse and change practices. Leatt and Schneck's findings, which are consistent with Overton, were that "homogeneity" in technology use had the highest correlation to the division of labor among different nursing units within hospitals. (Leatt & Schneck, 1982; Overton et al., 1977) In addition, the findings that technology, the type of setting of the hospital, i.e., urban or rural, the level of nursing professionalism, and the amount of decision-making autonomy of the nursing staff, were found to be related to the need for coordination of efforts among the team and were identified to be the most important variables for determining unit boundaries within hospitals. (Leatt & Schneck, 1984) More recently, some researchers have acknowledged the complexity and loose coupling of the different units within hospitals by coining the term "Microsystems." (Nelson et al., 2002) Nelson, E. C., Batalden, P. B., Huber, T. P., Mohr, J. J., Godfrey, M. M., Headrick, L. A. and Wasson, J. H. hypothesize that clinical microsystems within larger health care organizations can be identified based on the following criteria: 1) a "small" group of health care people who work together within a larger organization, 2) a discrete sub-population of patients, and 3) linked aims, processes, and shared information among the patients and the health care people who work together to collectively produce an outcome. (Nelson et al., 2002) The research findings of Overton, Leatt, and Schneck and the more recent hypothesis of characteristics of clinical microsystems have implications for determining unit boundaries when measuring QI climate within hospitals.

It is well-known that the physician and nursing staff who work on maternity units are particularly isolated within hospitals for decision-making, technology, and crisis

management. This most likely makes maternity care a "microsystem" that is harder to penetrate with new ideas. For example, nursing staff from other medical surgical units, operating rooms, or adult intensive care units within hospitals rarely rotate to work in either labor and delivery or post-partum units and maternity physicians or midwives rarely admit maternity patients to non-maternity units within hospitals. The same maternity physicians, midwives, and nursing staff often interact and make decisions among only a small, highly stable group of professionals, thus reducing the amount of knowledge sharing and learning that can enter from outside sources. Hospital administrators tend to know less about what goes on in maternity units and pay even less attention to quality monitoring on maternity units. For example, there are currently no mandated, publicly reported measures of the quality of maternity care. Thus, resources are diverted away from maternity services to those areas where public reporting is mandated and maternity QI is often overlooked. This enhances the isolation of the QI efforts undertaken by maternity care clinicians within health care settings. The volume of maternity patients and the availability of providers will most likely have more effect on the work flow patterns, decision-making models, and resources within the maternity units of labor and delivery and post-partum than the overall number of hospital beds and whether the hospital is located in either an urban or rural community. (K. Simpson, 2005) For example, a maternity unit with 1,000 deliveries a year is more similar to another maternity unit with a similar volume of deliveries, regardless of whether it is a sub-unit within an urban or rural hospital setting. A maternity unit with a small volume of deliveries in a small hospital will not have the same number of specialists available during an emergency as would a larger hospital, and thus may have some disadvantages in these rare

events. However, the overall volume of deliveries will have more impact on how care is delivered and how decisions are made.

Hospital systems which have invested time and resources to improve maternity QI have documented the savings of millions of dollars in malpractice costs. For example, the Healthcare Corporation of America (HCA) reported in 2005 they had malpractice cost savings of 82 million dollars, largely attributed to the QI efforts implemented within obstetrics and the emergency department. (*Annual Report: HCA INC/TN-HCA Form 10-K, December 31, 2005*, 2006)

Health Care Leaders and QI Climate and Safety

There is currently a lot of discussion within health care on how to measure and encourage cultures of safety. A literature review conducted by Hoff, Jameson, Hannan, and Flink analyzed the "linkages between organizational factors, medical errors, and patient safety" in their systematic review. (Hoff, Jameson, Hannan, & Flink, 2004) They were only able to find 42 empirical research studies that met strict inclusion criteria out of the 2,445 that they screened. Hoff et al. concluded that "at present few generalizations can be made regarding which specific organizational factors address error and safety in the health care setting." (Hoff et al., 2004) In addition, "variables such as culture, organizational structure, and leadership were found in less than ten of the 42 articles" despite the fact that these three components were identified by the Institute of Medicine to be "key factors". (Hoff et al., 2004)

Nembhard and Edmondson analyzed the effect of physician leadership on promoting the psychological safety of "low-status" staff in 23 Neonatal Intensive Care Units which were participating in a collaborative QI project. (Nembhard & Edmondson, 2006) Physician

inclusiveness was shown to have a positive effect on the psychological safety of "low-status" staff. Staff with high levels of psychological safety were more likely to engage in QI work. (Nembhard & Edmondson, 2006) Other studies have shown that workload affects the level of staff engagement in quality improvement efforts. Overburdened staff with high levels of psychological safety feel appreciated and are also more likely to be engaged in quality improvement work when they feel included by higher-status physician leaders. (Nembhard & Edmondson, 2006; Oliva, 2001; Tucker & Edmondson, 2003),

Hackman showed that there was increased medication error reporting in hospital units where the nursing leader promoted a culture of transparency and encouraged staff to acknowledge their mistakes in order to promote learning. (Hackman, 2003) Hackman noted that these findings were counter-intuitive to the researchers because their original assumption was that a lower number of reported medication errors would mean that there was a safer patient care environment. When the researchers looked deeper and analyzed their findings at what they termed "another level," the increased reporting of medication errors was an indication of safer units because the nursing leaders had an inclusive and open style promoting learning and open discussion. In the units with fewer reports of medication errors, the nursing leaders' style encouraged the staff to keep errors quiet, effectively decreasing overall patient safety.

In a qualitative study performed in two urban birthing centers in an academic hospital, Lyndon found that the "agency for safety" of clinicians (physicians, midwives, and nurses) was strongly affected by the "context" in which the situation occurred and the relationship clinicians had with the other clinicians who were collectively caring for the patients. (Lyndon, 2008) "Agency for safety" was defined as the willingness of a physician,

midwife, or nurse to "take a stand" on what they most likely perceived as potentially leading

to conflict "on an issue of concern." (Lyndon, 2008) Nurses were being "structurally

excluded" when the flow of important clinical information among providers was controlled

in such a way that reinforced hierarchies and decreased the open exchange of various clinical

perspectives during sign-outs. (Lyndon, 2008) Structural exclusion of nurses decreased the

nurses' ability to contribute to the development of a care plan and the enhancement of patient

safety. Primary care providers who were either midwives or physicians perceived a greater

degree of teamwork than did nurses. In addition, nurses' "confidence was undermined in

novel or ambiguous clinical situations and by poor interpersonal relationships." (Lyndon,

2008) Although the findings are limited to the two labor and delivery units included in the

study, Lyndon's research underscores the complexity of determining the impact of culture

and safety on clinical outcomes. Another key finding of Lyndon's research is that under

certain circumstances, all types of clinicians censor themselves based on their "confidence,"

even when they are worried that not speaking up will cause harm to their patient. (Lyndon,

2008)

Literature Review Conclusion and Application to the Dissertation Question

Despite the fact that QI was introduced into hospitals in the 1980s and that QI has

been a Joint Commission regulatory requirement since 1993, there is still limited data

available that outlines how QI is implemented on the unit level within hospitals. The largest

and most recent survey of QI implementation was conducted in 1997. At that time only 3.8

units per hospital (standard deviation 1.72) had implemented QI. (Weiner, Alexander,

Shortell et al., 2006) A 2003 survey of 1,837 physicians showed that one-third of the

physicians had not participated in QI and one-third did not have access to QI data. (Audet et

al., 2005) These studies indicate that QI methodologies are not widely adopted on hospital units among all clinicians.

The literature review also points out that front-line physician and nurse leaders have a pivotal role in leading QI initiatives and improving the health care patients receive within hospital units. The alignment of QI goals among all levels of organizational leaders is most likely ideal, but there are no studies identified where QI success was obtained without the active involvement of front-line leaders.

Implementation climate is affected by the strategies and tactics leaders use. The systematic reviews outlined provide insight into the various implementation tactics used by leaders. For example, Chaillet et al.'s systematic review of the obstetric literature found that the more change practices, e.g. tactics implemented, the more successful the leaders were in achieving the desired change. Chaillet et al. also found that when leaders developed implementation practices that were designed to address identified barriers to change, the tailored implementation tactics were over 90% effective. Business change experts and QI experts all identify discourse as a key strategy for successfully leading change.

The literature review outlines that we have limited knowledge of how leaders' implement QI strategies and tactics. Implementation research experts agree that more qualitative research is needed in order to answer the how and why questions. (D. M. Berwick, 2008; J.M. Grimshaw et al., 2004; Rogers, 2003) In addition, professional leaders go so far as to say we do not need more research about *what to do*, but we currently are in need of research on *how to implement* the clinical practices we currently know are superior. (Thorp, 2008)

Chapter 3: Methodology

Study Overview

The specific dissertation question is: *How do front-line maternity physician and nurse leaders tailor or adjust QI implementation change practices (strategies and the tactics within the overall strategy) for their self-selected and self-defined most and least successful complex QI project?* Complexity is defined as QI projects that took more than four months to complete and met the following criteria: 1) there were at least two units involved in the QI project, and 2) there were more than one discipline involved in the change, i.e., nurses, unit clerks, aides, operating room technicians, physicians, pharmacy, child birth educators. Many studies use the term practices for tactics within the larger category of implementation practices. For example, leaders develop an overall data strategy that includes tactics, such as reminders and data feedback. The term practices is used in the dissertation more broadly to mean any processes (both strategies and tactics) leaders use during implementation.

Three methods of data collection were used: 1) semi-structured interviews with physician and nurse leaders that included both open-ended and forced choice questions; 2) on-site primary review of documents identified during the interview, such as, staff meeting minutes, QI trend charts, QI project planning records; and 3) a key-informant interview and review of the multi-hospital, system-wide QI documents.   All data collection, review, and analysis was performed by the PI.

Leaders' QI implementation practices (strategies and the tactics within each strategy) were ascertained from open-ended inquiry. Each leader was asked to describe their insights and to define why they selected these particular QI projects as examples of their most and least successful QI projects. In addition, the following QI project characteristics were assessed: 1) the QI complexity, 2) the number of Baldrige communication criteria met; and 3) the QI project progress score. (Refer to Appendix A) The four Baldrige communication criteria are: 1) the QI results are presented as a numeric score or measurement, 2) the QI gap between current state and desired state is clearly articulated, 3) The QI data are presented as a trend over time, and 4) there is a target date for reaching the QI goal.

Characteristics of the front-line leaders were also collected. A summary of the study categories are outlined in the case level display for partially ordered meta-matrix and within category sorting of self-selected and self-defined most and least successful complex QI projects is found in Appendix B. The post-pilot study semi-structured questionnaire is found in Appendix C.

Three Internal Review Boards (IRB), Sutter Health, Stanford University School of Medicine, and the University of North Carolina reviewed and approved all study protocols, recruitment transcripts, consents, and the study questionnaire. (Refer to Appendix D)

Study Methods

Overview

The study is a qualitative, non-experimental, retrospective, cross-case analysis. (Charmaz, 2006; Strauss & Corbin, 1998; Yin, 2003)   Each leader was asked to self-select and describe the most and then the least successful complex QI project that they had led during the past one to three years. The interviews were conducted within maternity units that

operate primarily via a nurse decision-making model within four separate hospitals, with more than 1,000 and less than 3,000 deliveries a year, that are part of multi-hospital system in the Northwest. The multi-hospital system is a non-government, private owned and operated. Most labor and delivery units in the United States use a nurse decision-making model and have a volume of 1,000 to 3,000 deliveries a year.

A labor and delivery decision-making model has been proposed in the literature as a way to compare and contrast study findings. (K. Simpson, 2005) The model stratifies hospitals into four categories: 1) Nurse-Managed Labor Decision Model, 2) Nurse-Midwife Communication On-Site Model, 3) Nurse-Physician Communication On-Site Model, and 4) Academic/Teaching Model. (K. Simpson, 2005)   A nurse-managed labor decision model means that there are no in-house physicians (obstetricians and family practitioners) and no in-house midwives. Not having on-site, in-house physician or midwife expertise on a labor and delivery unit means that there are relatively few in-house, immediately available clinicians with additional knowledge and skills available to supplement the nurses decision-making. In labor and delivery units that have a nurse-managed labor decision-making model, the physicians and midwives come to the hospital to perform deliveries and provide coverage for their patients only. There is no in-hospital, on-unit oversight by physicians or midwives at these hospitals. The nurse-managed labor decision model is the most common model in place in labor and delivery units in the United States.

Qualitative Methods

All interviews were conducted by the PI. The PI is a perinatal clinical nurse specialist with approximately thirty years of front-line and executive perinatal nurse leadership experience. The interviews were digitally recorded. The PI also recorded notes and

impressions during the semi-structured interviews and reviewed and expanded them on the same day the interview occurred. All of the interviews were transcribed word-for-word by a professional transcriptionist. As soon as possible after each interview, but no longer than four weeks, the PI reviewed the digital recordings and compared the professional transcripts with the audio recordings. Corrections were made to the transcripts at that time.

All transcribed interviews were coded with ATLAS.ti (Berlin, 5.2), a commercially available qualitative software. The literature review provided a starting list of select codes, i.e., the list of implementation tactics, but the pre-identified code categories did not constrain the study findings or the development of additional codes that emerged during the analyses, e.g., the three types of strategies that the tactics were determined to be a part of were not pre-determined, but instead emerged from the interview data.

Systematic, yet flexible standard methods of qualitative coding of data were used. (Charmaz, 2006; Miles & Huberman, 1994; Strauss & Corbin, 1998) For example, themes were identified and coded. The identified themes were further refined based on comparison with other data with the same codes. Making comparisons of contrasting responses was used to explore the meaning of the responses and further refine the coded themes. For example, "implementation barriers" was a pre-determined code. Yet, the various types of implementation barriers that these leaders identified during the interview were not known. Thus, the general, literature-based codes were pre-determined and formed the basis of the first wave of broad theme-based codes, e.g., leader barriers, clinician barriers. Then, the broad theme codes were compared and contrasted to further specify the possible types and meanings of these codes, e.g., the types of barriers that the leaders described. Continuing with how barriers were coded as an example of the data analysis methods used, some barriers

that were identified and coded were explicitly mentioned during the interview; other barriers were not explicit in these data, but implicit in the types of responses given. For example, computer barriers were not explicitly identified by the leaders to be a barrier, but emerged as a theme based on leaders' descriptions.

Other well established qualitative coding methods were used to systematically analyze these data. (Charmaz, 2006; Miles & Huberman, 1994; Strauss & Corbin, 1998) Each type of coding method used is defined, and an example of how the coding methodology was used to analyze the dissertation study data is provided. Open coding is defined as the identification of concepts used. Some examples of the concepts identified through open coding were "outliers", "Do the right thing", computers and QI. Axial coding is defined as relating sub-categories to broader categories. For example, as previously described, the broad category of implementation barriers had sub-categories that emerged.

Selective coding is defined as "integrating and refining the theory". (Strauss & Corbin, 1998) Theoretical sampling is defined as "data gathering derived from evolving theory" and used to compare categories. (Strauss & Corbin, 1998) Both selective coding and theoretical sampling methods were used to further refine the broader codes and develop conceptual understanding of the codes. For example, the conceptual framework on expectations of change compliance emerged from the methods of selective and theoretical sampling, and comparing and contrasting various types of data. Coding for process is defined as "sequences of evolving action/interaction, changes in which can be traced to changes in structural conditions." (Strauss & Corbin, 1998) Diagrams have been used by qualitative researchers as a method to re-construct and de-construct process, and perform systematic process analyses. (Miles & Huberman, 1994; Strauss & Corbin, 1998) The QI

project flow diagrams are examples of coding for process. Memos were written by the PI throughout the coding and data analysis process in order to remember and track impressions that could be further explored and verified, and also to document how concepts and their properties were refined. The development of tables for data display were also used to facilitate quantitative comparisons and guide additional analysis and conceptual code development. (Miles & Huberman, 1994) Confirmation, rejection, or modification of both conceptually derived and empirically emergent propositions from all of the cases were performed. (Charmaz, 2006; Miles & Huberman, 1994; Strauss & Corbin, 1998)

The study sample consisted of seven clinician leaders from four hospitals. Five leaders described two extreme QI project cases (most and least successful QI projects), each for a total of ten. The two remaining leaders contributed a total of two additional QI project cases since they worked together on the QI projects, were interviewed at the same time, and reached consensus on their responses during the interview. The twelve cases included in the study were described by the leaders as being their most and least successful QI projects (six most successful and six least successful). Each case was first analyzed separately, then the cross case analysis was performed. (Yin, 2003)

All leaders interviewed described QI projects that occurred at hospitals with a similar number of deliveries and with similar labor and delivery decision-making models within the same corporate structure over the same time period. At the individual hospital unit or microsystem level, both the most and least successful QI projects were implemented by the same leaders, at the same hospital, over the same time-period, and with the same clinicians. Comparing leaders to themselves, keeps the QI climate constant and the leader constant, which makes the variations and similarities identified to be more likely due to how leaders

employ their individual implementation practices. Specifically, performing cross case analysis of implementation practices in the same or similar implementation context is meaningful because QI implementation success has been shown to be affected by the implementation climate.   In addition, variation in implementation success has previously been assumed to be based primarily on what *tactics* the leaders used. (Chaillet et al., 2006; J. M. Grimshaw et al., 2003)

Inclusion/Exclusion Criteria

Inclusion Criteria

The inclusion criteria for the study population are: maternity physician and nurse front-line leaders who work at a single multi-hospital system (a privately owned, multi-hospital system in Northern California with approximately 35,000 births a year). The hospital inclusion criteria are those hospitals in the multi-hospital system that have a nurse-managed labor decision-making model and greater than 1,000 deliveries a year.

The physician maternity leader is defined as a physician who is responsible for the physician labor and delivery policy and procedures, e.g., a Labor and Delivery medical director who has been in this leadership role for at least the previous three years. The nurse maternity leader is defined as the labor and delivery nurse leader who is responsible to hire and fire the nurses who work in labor and delivery, is responsible for the labor and delivery nursing policies and procedures, i.e., a nurse manager, and has been in this leadership role for at least the previous three years.

The inclusion criteria for QI project complexity is defined as QI projects that took more than four months to complete and met the following criteria: 1) there were at least two

units involved in the QI project, and 2) there were more than one discipline involved in the change, i.e., nurses, unit clerks, aides, operating room technicians, physicians, pharmacy, child birth educators.

Exclusion Criteria:

Staff physicians, staff registered nurses, midwives, and residents were excluded. Maternity physician and nurse leaders who did not work at the multi-hospital health system were also excluded. QI projects that did not meet the QI project complexity definition outlined above in the inclusion criteria were excluded from the study.

Sample Size:

The sample size is twelve QI project case studies that were described by physician or nurse leaders at four different hospitals that met study inclusion criteria. Each leader interviewed was asked to select two QI projects - a most and a least successful complex QI project. All of the physician and nurse leaders in the study have been working together on a multi-hospital system QI committee and had collectively developed the First Pregnancy and Delivery (FPAD) QI project. Many of the self-selected QI projects included in the study are part of the FPAD QI projects and goals. Thus, several of the QI projects included in the study had similar goals and data collection criteria. The cases where the goals and parameters of the QI project were similar added richness to the case study analysis by making it possible to compare the same type of QI project from the perspective of more than one leader within the implementation climate of more than one labor and delivery unit in more than one hospital.   Climate is defined as the prevailing factors that influence the culture or character of a group.   In addition, the multi-hospital system QI Committee Chair,

who also is a front-line physician leader at a hospital that met the study criteria, was

interviewed in his position as a front-line leader and contributed two of the twelve case

studies analyzed.

Sampling Strategy

The sample was purposely selected from the list of the fifteen hospitals within the

multi-hospital system with primarily a nurse-managed labor decision model. The decision-

making model was determined based on the key informant, who is a maternal fetal specialist

and oversees obstetric quality for all hospitals within the multi-hospital system. Two

hospitals had both a physician and nurse leader who were interviewed. At hospitals number

three and four, either a nurse or a physician leader was interviewed.

Recruitment Strategy

The physician and nurse leaders that met the inclusion criteria were introduced to the

PI by the multi-hospital system key informant. The initial contact was made by phone and

by email. During the initial contact, the study was described to the potential study

participants and all agreed to be interviewed. Each potential study participant was emailed a

study fact sheet. The recruitment email scripts and the recruitment study fact sheet are

located in Appendix D.

Once the identified physician and nurse leaders agreed to participate in the study, a

mutually agreeable time for the on-site interview was determined. At the time of the

interview, prior to proceeding with the interview, all participants were asked to sign a

consent form. (Refer to Appendix D) All study participants were informed, prior to signing

the consent form, that their participation in the study was voluntary; that they could decline

answering any of the questions at any time during the interview; that they had the option to stop the interview at any time; and that their answers would be de-identified.

Study Components

The semi-structured interview is divided into the following sections: 1) Hospital Site, Leader Characteristics, and QI Project Topic, 2) Leader's QI Strategies and Tactics, 3) QI Project Complexity, and 4) Leader's Insights and Barriers Identified. For a detailed description of the study variables and construct definitions, please refer to Chapter Four. A copy of the Front-Line Maternity Physician and Nursing Leadership Quality Improvement Semi-Structured Interview is found in Appendix C.

Semi-Structured Interview Development and Validation

The semi-structured interview is limited to an exploration of the "implementation policies and practices" area of the Helfrich et. al. "Conceptual Framework of Complex Innovation Implementation" outlined in the literature review in Chapter 2. (Refer to Figure 4)

Figure 4: Visual Display of the Dissertation Study Variables within The Conceptual Framework of Complex Innovation Implementation

Management Support		Implementation Values fit	Champions	

Financial Resource Availability

Implementation Policies and Practices
Leaders' Behaviors:
1. Baldrige Communication Criteria
2. QI Change Strategies and Tactics

Implementation Climate

Implementation Effectiveness
Self-Defined
Most Successful and
Least Successful
QI Projects

Self-Determined
QI Project Progress Score

Self-Identified Barriers

Helfrich, Weiner, McKinney, and Minasian's modification of the Klein and Sorra Framework. "Determinants of implementation effectiveness: Adapting a framework for complex innovations," Med Care Res Rev 64(3): 279-303.

The semi-structured interview questionnaire was piloted with both a physician and a nurse leader. Based on the pilot interviews, some of the semi-structured interview questions were re-arranged and re-worded. (Miles & Huberman, 1994) These two pilot interviews are not included in the study findings. No statistical review was needed because the study is based on qualitative methods. The hospital decision-making model was validated based on the responses to the semi-structured interview questions about complexity of the QI projects and type of clinicians involved in the QI projects.

Validation of the interview data was done by the Principal Investigator (PI), who examined staff meeting minutes, memos, trend charts, bulletin boards, posters, and other documents provided by the leaders and identified during the interviews as part of the QI implementation practices. For example, if a leader stated that he or she communicated the QI goal in a staff meeting, the leader was asked if he or she keeps minutes of their meetings and, if yes, would he or she be willing to provide the PI with a copy of the minutes. If he or she

preferred not to provide a copy of the staff meeting minutes or other relevant documents, he or she was asked if the PI could review the relevant documents prior to leaving the hospital. Most of the document review occurred on-site, during or immediately after the interviews.

Generalizability of Findings

Yin has outlined that the study findings from one or more case studies can be generalized to the development of theory and hypothesis building. (Yin, 2003) For example, one case study can be the "basis for significant explanations and generalizations" for multiple disciplines and groups, e.g., Graham Allison's (1971) study of the Cuban missile crisis. (Yin, 2003) Another example Yin offers of the generalizability of case study research, is the William F. Whyte's (1943/1955) description of a Cornerville neighborhood. Yin states, "the value of Whyte's book is… its generalizability to issues of individual performance, group structure, and the social structure of neighborhoods."(Yin, 2003)

The purposive sampling method of the extreme cases of leaders skilled in QI implementation, e.g. most successful compared to least successful QI projects, increases the conceptual generalizability of the research findings. Comparisons of cases that vary in significant ways, e.g., most successful compared to least successful QI projects, has been used by other researchers to "refine constructs and establish boundary conditions" that increase the transferability of the conceptual findings of the study. (Wells, Ford, McClure, Holt, & Ward, 2007)

Chapter 4: Research Findings

Overview:

This dissertation study is a qualitative cross-case analysis designed to answer the dissertation question: ***How do front-line maternity physician and nurse leaders tailor QI implementation change practices (strategies and the tactics within the overall strategy) for their self-selected and self-defined most and least successful complex QI projects?*** (Miles & Huberman, 1994; Yin, 2003) The study data was obtained from self-described implementation practices of front-line leaders. (Helfrich et al., 2007; Yin, 2003) The purpose of the dissertation is outlined in Chapter 1, and further explored in Chapter 2 via the in-depth review of relevant literature.

QI project implementation strategies, and tactics within the strategies, and barriers were identified by the clinician leaders during in-person, semi-structured interviews. The interview data were professionally transcribed and coded using the qualitative analysis software Atlas.ti (5.2, Berlin). For more details on study methodology, refer to Chapter 3. The Case Level Display for Partially Ordered Meta-Matrix and Within Category Sorting of Self-Selected and Self-Defined Most and Least Successful Complex QI Projects is found in Appendix B. The semi-structured interview guide is located in Appendix C.

This dissertation study and literature review completes two of the four dissertation objectives:

1) Develop methods for measuring the QI implementation change practices of front-line clinician leaders.

2) Analyze how front-line physician and nurse leaders tailor the QI implementation practices they implemented based on the barriers they identified for their self-selected and self-defined most and least successful complex QI projects.

The third dissertation objective, which is to identify one QI communication or QI change practice that the maternity physician and nurse leaders in the study can improve in order to increase the effectiveness of their QI implementation practices, will be discussed in Chapter Five. The fourth dissertation objective is to develop an implementation plan (refer to Chapter Six), based on the multi-stakeholder collaborative quality improvement methodology.

Chapter Four is divided into the following sections:

      Research Findings Overview
      Research Findings
            Section One: Hospital Site and Leaders' Characteristics
            Section Two: QI Project Topic and Complexity
            Section Three: QI Project Success
            Section Four: Baldrige Communication Criteria
            Section Five: Front-Line Leaders' QI Implementation Practices
                Implementation change practices include both strategies and tactics. For example, all of the clinician leaders had communication strategies that included tactics such as sending emails, writing newsletters, or holding staff meetings.
            Section Six: QI Implementation Barriers

Research Findings Overview:

This dissertation builds upon the results of previous studies, systematic reviews, and well-documented case reports on evidence-based QI implementation practices of front-line clinician leaders. (Refer to Chapter Two) (Chaillet et al., 2006; Grol & Grimshaw, 2003; Jamtvedt et al., 2006) Rogers, Grimshaw et al., and Berwick agree that studies utilizing qualitative research methods are needed in order to answer questions regarding implementation processes. (D. Berwick, 2008; J. M. Grimshaw et al., 2003; Rogers, 2003) The Helfrich et al., Conceptual Framework of Complex Innovation Implementation, guides the research area of inquiry and delineation of study categories and variables of interest.

Variation in implementation effectiveness has primarily been assumed to be based on the *tactics* leaders used. (Chaillet et al., 2006; J. M. Grimshaw et al., 2003) *Many studies use the term practices for what could be either a strategy or a tactic. For example, leaders may develop an overall data strategy that includes tactics, such as reminders and data feedback.* If the QI project met the desired outcome, the QI tactic is determined to be effective. However, QI project case reports are more likely to be published if they were successful, meaning there is limited information on whether the same QI implementation tactics have been used with limited or no success. Retrospective reviews of published QI project implementation tactics are also limited, because QI project case studies primarily report project outcomes and provide minimal details on QI implementation processes. Thus, there is less research available on *how* leaders use (or do not use) implementation tactics for both successful and less successful QI projects. The research area of inquiry is summarized in Figure 4.

Legend:

■ Study Variables

■ Areas **Not** Included in the Study

■ Helfrich, et al.'s modifications

Figure 4: Visual Display of the Dissertation Study Variables within The Conceptual Framework of Complex Innovation Implementation

Management Support

Financial Resource Availability

Implementation Policies and Practices

Leaders' Behaviors:
1. Baldrige Communication Criteria
2. QI Change Strategies and Tactics

Implementation Values fit	Champions

Implementation Climate

Implementation Effectiveness

Self-Defined
Most Successful and
Least Successful
QI Projects

Self-Determined
QI Project Progress Score

Self-Identified Barriers

Helfrich, Weiner, McKinney, and Minasian's modification of the Klein and Sorra Framework. "Determinants of implementation effectiveness: Adapting a framework for complex innovations," Med Care Res Rev 64(3): 279-303.
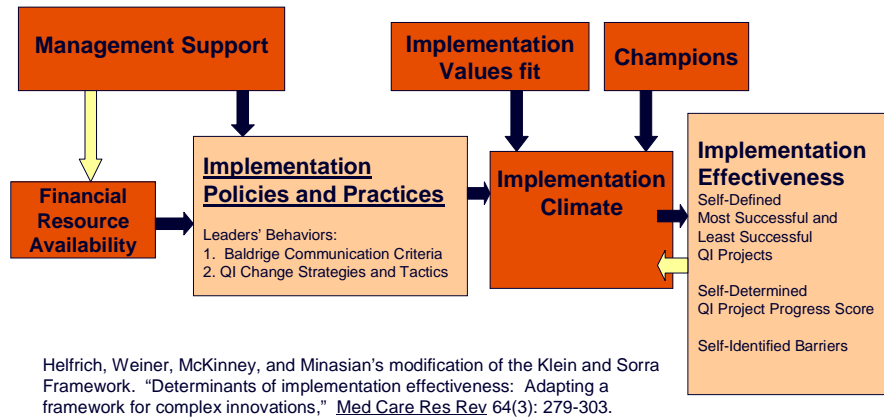
Research Findings

Section One: Hospital Site and Leaders' Characteristics

The number of hospitals, leaders interviewed, and QI projects included in the study are summarized in Table 1.

Table 1: Sample Size by Number of Leaders Interviewed, QI Projects, and Number of Hospitals and Deliveries

Leaders Inter-viewed	A	B	C	D*	E*	F	G
QI Project Topics and Goals M=Most Success-ful L=Least Success-ful	**M:** 100% of patients will wait less than 15 minutes from the time they check-in to the time they are put in an exam room **L:** Eliminate all routine episiotomies for women giving birth for the first time	**M:** Meet all First Pregnancy and Delivery (FPAD) process and outcome goals **L:** Improve rapidity of diagnosis and treatment for women in premature labor	**M:** Meet all First Pregnancy and Delivery (FPAD) process and outcome goals **L:** Decrease admission rates of first pregnancies greater than 37 weeks that have cervical dilation less than 3 centimeters on admission	**M:** 100% of RN staff will chart and communicate Fetal Heart Rate (FHR) monitoring patterns using national standards **L:** Increase breast-feeding rates for healthy newborns		**M:** Eliminate non-medically indicated inductions prior to 41 weeks for first pregnancies **L:** Deep vein thrombosis prophylaxis for 100% of scheduled, 90% of urgent, and 50% of stat cesarean sections	**M:** Less than 19% episiotomy rates for women greater than 37 weeks giving birth for the first time **L:** Less than 16% induction rates and less than 20% admission rates for first pregnancies greater than 37 weeks that have cervical dilatation less than 3 centimeters on admission
Hospital Number of Deliveries per Year	Hospital 1: 1,200-2,000		Hospital 2: 2,000-2,500			Hospital 3: <1,200-2,000	Hospital 4: >2,000-2,500

*In hospital #2, leaders D and E were interviewed simultaneously, selected and described the same cases. Responses of leaders D and E are based on the consensus they reached during the interview.

Study Participants Training, Work Experience, and Self-Assessed QI Expertise:

All of the study participants are front-line maternity physician or nurse leaders. Four of the clinician leaders also hold positions of higher responsibility within the multi-hospital system where they work. All study participants were highly experienced maternity clinicians; one study participant had twelve years of clinical experience, all others had more than twenty years of experience. Two of the three physicians were obstetricians and gynecologists; one physician was a maternal fetal medicine specialist. Three of the four nurse leaders held masters degrees and the other nurse leader held a diploma in nursing. All

study participants have more than eight years of supervisory experience. But, five out of seven study participants had held their current leadership role for three years or less.

When presented with the statement, "I am a quality improvement expert," four of the leaders ranked themselves as either agreeing or strongly agreeing, one as neither agreeing nor disagreeing, one as disagreeing, and one as strongly disagreeing with the statement. All but one study participant reported having no formal QI training. Everyone said that they had informal QI training and mentoring. All of the clinician leaders interviewed worked collaboratively on the system-wide, multi-hospital Obstetric (OB) QI Committee. As committee members, they had been attending meetings and developing joint QI projects for over eight years. During the multi-hospital, system-wide QI meetings, there were corporate QI experts and staff available to support committee efforts and to guide the development and implementation phases of the QI project. During the eight years of working together, all of the leaders mentioned sharing information and supporting QI efforts at the local level on their joint QI project. Based on their work together within the multi-hospital OB QI committee, they all participated in some manner in the publication of a peer-reviewed article. (E. K. Main et al., 2004)

Four out of six study participants gave their hospital a "B" for an overall hospital-based maternity grade when asked the question: "Please give this hospital an overall grade on MATERNAL quality improvement activities." One leader gave his or her hospital an "A" and one leader gave his or her hospital a "C" grade. When the leaders were asked, "Please give this hospital an overall grade on GENERAL quality improvement activities," two gave an "A" for the overall hospital QI grade, three a "B," and one a "B-" or "C+." The grading options were A: Excellent, B: Good, C: Acceptable, D: Fair, and E: Failing. (Table 2)

Table 2: Front-Line Leaders' Experience, QI Education, Self-Assessed Expertise, and Hospital QI Grades

Leaders Interviewed	A	B	C	D**	E**	F	G
QI Projects and Goals M=Most Successful L=Least Successful	**M:** 100% of patients will wait less than 15 minutes from the time they check-in to the time they are put in an exam room **L:** Eliminate all routine episiotomies for women giving birth for the first time	**M:** Meet all First Pregnancy and Delivery (FPAD) process and outcome goals **L:** Improve rapidity of diagnosis and treatment for women in premature labor	**M:** Meet all First Pregnancy and Delivery (FPAD) process and outcome goals **L:** Decrease admission rates of first pregnancies greater than 37 weeks that have cervical dilation less than 3 centimeters on admission	**M:** 100% of RN staff will chart and communicate Fetal Heart Rate (FHR) monitoring patterns using national standards **L:** Increase breast-feeding rates for healthy newborns		**M:** Eliminate non-medically indicated inductions prior to 41 weeks for first pregnancies **L:** Deep vein thrombosis prophylaxis for 100% of scheduled, 90% of urgent, and 50% of stat cesarean sections	**M:** Less than 19% episiotomy rates for women greater than 37 weeks giving birth for the first time **L:** Less than 16% induction rates and less than 20% admission rates for first pregnancies greater than 37 weeks that have cervical dilatation less than 3 centimeters on admission
Hospital Number of Deliveries /Year	**Hospital 1: 1,200-2,000**		**Hospital 2: 2,000-2,500**			**Hospital 3: 1,200-2000**	**Hospital 4: 2,000-2,500**
Total Years of Experience	12	>20	>20	>20	>20	>20	>20
Total Years of Supervisory Experience	8	>20	10	>20	>20	20	15
Years in Current Leadership Role	1	3	2	12	3	12	2.5
Estimated Days of Formal QI Education	14	0	10	380	72	34	16
Years Since First Formal QI Education	16	Not Applicable	4	26	32	20	10
Informal QI Education (Yes/No)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
QI Expert Self Rank (scale of 1-5 with 5 being an expert and 1 not an expert)	3	1	2	4	5	5	5
Published a QI Project*	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hospital Maternity QI Grade	B	C	B	B	B	A	B
Overall Hospital QI Grade	B	B	A	B	B	A	B- or C+

*All leaders interviewed were involved in the publication of the same QI project entitled: First Pregnancy and Delivery (FPAD). (E. K. Main et al., 2004) **Leaders D and E were interviewed simultaneously, the QI project topics and goals described are based on the consensus they reached during the interview.

Section Two: QI Project Topic and Complexity

QI project topics and complexity are outlined in two tables: Table 3a presents the most successful QI projects, and Table 3b the least successful QI projects. All QI projects included in the study met the complexity definition. A complex QI project is defined as a project that the leader has worked on for at least four months, that either included more than one unit or involved more than one clinician group, such as both nurses and physicians.

All of the QI projects included in the study were designed to bring about changes in the behaviors of many clinicians from various disciplines. The medical disciplines included in the QI projects were obstetricians, midwives, neonatologists, and family practice physicians. The number of MDs involved ranged from eleven to 45 per QI project. The number of nurses who participated in the QI projects ranged from forty to 130 per hospital. Other clinicians who participated in QI projects were respiratory therapists and childbirth educators. The non-professional staff who participated in the QI projects were office staff and ranged from approximately fifty up to 400. Refer to Tables 3a and 3b.

Table 3a: Topic, Complexity, and Number of Years for Leaders' Most Successful QI Projects

Leaders A to G and QI Project	Number of Interdisciplinary Team Members Affected by QI Project					Number of Hospital Units	Length of QI Project in Number of Years
	Obstetricians	Midwives	Family Practice Medial Doctors	RNs	Other		
A: 100% of patients will wait less than 15 minutes from the time they check-in to the time they are put in an exam room	31 Initially then spread to 250	N/A	0	N/A	Initially 50 Office Staff, spread to about 400 office staff	Started with 1 then spread to more than 5	2**
B: Meet all First Pregnancy and Delivery (FPAD) process and outcome goals	31	4 to 5	0	130	0	2 L&D, Out Patient Offices	8**
C: Meet all First Pregnancy and Delivery (FPAD) process and outcome goals	11	0	0	71	Number of Office Staff unknown	2 L&D, Out Patient Offices	8**
D&E:* 100% of RN staff will chart and communicate Fetal Heart Rate (FHR) monitoring patterns using national standards	11	0	0	71	N/A	1 L&D	3**
F: Eliminate non-medically indicated inductions prior to 41 weeks for first pregnancies *(Enhanced FPAD process goal)*	9	7	4	40	4 Childbirth Educators 70 Office Staff	2 L&D, Out Patient Offices	8**
G: Less than 19% episiotomy rates for women greater than 37 weeks giving birth for the first time	45	0	0	N/A	N/A	1 L&D	8**
Unique number of clinicians and staff participants	**~96**	**~12**	**~4**	**~241**	**~474**	12	
Total	**Approximately 827**						

The number of clinicians involved were usually estimated.

N/A = Not Applicable

*The leaders are actively working to implement and perform regular tracking of progress.

**The leaders are performing on-going monitoring and implementing minimal or no change practices.

***Leaders D and E were interviewed simultaneously and responses shown above are based on the consensus they reached during the interview.

Table 3b: Topics, Complexity, and Number of Years for Leaders' Least Successful QI Projects

Leaders A to G and QI Project	Number of Interdisciplinary Team Members Affected by the QI Project					Number of Units	Length of QI Project in Number of Years
	Obste-tricians	Midwives	Family Practice Medial Doctors	RNs	Other		
A: Eliminate all routine episiotomies for women giving birth for the first time *(Enhanced FPAD process goal)*	31	4 to 5	0	N/A	None	2 L&D, Out Patient Office	8 years**
B: Improve rapidity of diagnosis and treatment for women in premature labor	31	4 to 5	0	130	3 Neonatologists	1 L&D	5 months*
C: Decrease admission rates of first pregnancies greater than 37 weeks that have cervical dilation less than 3 centimeters on admission	14	0	0	71	Office Staff, Childbirth Educators (#'s not identified)	3 L&D, Out Patient Office, Childbirth Educators	8 years**
D&E:*** Increase breast-feeding rates for healthy newborns	11	0	0	71	N/A	2 L&D, Post-Partum	About 1 year*
F: Deep vein thrombosis prophylaxis for 100% of scheduled, 90% of urgent, and 50% of stat cesarean sections	9	7	4	40	5 Perinatal Tech-nicians	1 L&D	1 year 3 months*
G: Less than 16% induction rates and less than 20% admission rates for first pregnancies greater than 37 weeks that have cervical dilatation less than 3 centimeters on admission *(First Pregnancy and Delivery process goal)*	45	0	0	N/A	N/A	1 L&D	8 years**
Unique number of clinicians and staff participants	**~99**	**~12**	**~4**	**~241**	**~8**		
Total	Approximately 364						

The number of clinicians involved were often estimated.

N/A = Not Applicable

*The leaders are actively working to implement and perform regular tracking of progress.

**The leaders are performing on-going monitoring and implementing minimal or no change practices.

***Leaders D and E were interviewed simultaneously and responses shown above are based on the consensus they reached during the interview.

Coordination of Inter-Disciplinary Participation in Complex QI Projects

All leaders mentioned they had discussions about the QI project with leaders of other clinician groups with whom they worked closely. Nurse leaders held these discussions with doctor leaders and vice versa, in order to ensure that they would support the change, even if they were not being asked to actively work toward the change. In addition, they all held inter-professional education sessions to facilitate more "buy-in" from each other's disciplinary groups and to keep each other informed, e.g., nurse leaders initiated conversations with physician leaders and physician leaders initiated conversations with nurse leaders.

The four nurse leaders were most often responsible for organizing and following up on issues raised during the inter-professional meetings. Two of the leaders characterized the work of coordinating joint meetings with clinicians to be very important, but time consuming. They felt discouraged by a lack of non-clinician administrative support. Others mentioned that they included QI discussions in already established meetings rather than organizing separate meetings; however, such existing meetings were not usually multi-disciplinary. Only one leader described holding monthly inter-disciplinary QI meetings. But again, the work of organizing the meeting, preparing all of the documents for the meeting, keeping minutes, and following up on action items usually became the sole responsibility of the nurse clinician leader or another non-physician who attended the meeting. These findings show that clinician leaders who were highly motivated to meet with other clinician groups would do so, but there were time and resource barriers that discouraged the leaders from organizing and holding inter-disciplinary meetings.

QI Project Length of Time

The length of implementation time for the most successful complex QI projects ranged between two to eight years. The length of implementation time for the least successful QI projects was shorter on average (from five months to eight years). The QI projects that the leaders have worked on the longest, the eight year projects, have reached a phase in which the main project requirements are on-going monitoring (this included quarterly review of data) and occasional interventions, e.g., staff meeting or individual conversations, to bring the individuals within the group back on-track. All six most successful QI projects, and half of the least successful projects, fit this category. Of the remaining three least successful QI projects, two are not fully conceptualized, i.e., do not have their QI goals well-articulated. There is only one QI project (out of all twelve) that was being actively implemented at the time of the study.

QI Project Topics

Four of the most successful and three of the least successful QI projects were part of the multi-hospital First Pregnancy and Delivery (FPAD) QI initiative. (Refer to Tables 3a and 3b) The two FPAD outcome goals are to reduce nulliparous (first birth), term, singleton, vertex (head down) (NTSV) cesarean section rates and to reduce third and fourth degree perineal lacerations. Processes that were found to increase NTSV cesarean section rates were non-medically indicated induction of labor and the admission of women in early labor who presented with less than three centimeters in cervical dilation. Thus, the minimization of these two conditions became sub-goals of the FPAD QI initiative. Performing an episiotomy is a process that was found to be associated with higher rates of third and fourth degree perineal lacerations. Minimizing the frequency of this procedure also became a sub-goal of

FPAD. So, at each hospital in the sample, the leaders were working on reducing the occurrence of these three sub-processes in order to reach their outcome goals. Levels of outcomes and processes have been tracked at the four hospitals for over eight years. Each leader supplied data and quarterly benchmark reports to show the rates for the individual hospitals. From these data, system-wide reports were generated to show how each hospital compared to other hospitals within the same multi-hospital system. Hospital leaders were also provided with the rates of compliance across all five FPAD goals for each individual provider who treated patients.

The remaining two most successful and three least successful QI topics were unique and unrelated to each other. No benchmark data was shared with leaders at other sites for these five QI topics. However, the QI project to standardize fetal heart rate terminology was shared with other leaders who are members of the multi-hospital system Obstetrics QI committee. Because of this shared information, the standardized terminology is currently being adopted by leaders at other hospitals in the system.

Section Three: QI Project Progress, Success and Goals

The leaders were asked a series of questions to determine their QI Project Progress Score. Scoring the progress of a project was done to facilitate the comparison across the most and least successful QI projects. The QI Project Progress Score was developed based on the Institute for Health Care Improvement (IHI) Assessment Scale for Collaboratives. ("Assessment scale for collaboratives," 2004) This was the best tool identified for this purpose. ("Assessment scale for collaboratives," 2004) The original IHI assessment tool is outlined in Appendix A, along with the QI Project Progress Score. The changes that were made to the IHI tool in order to develop the QI Project Progress Score are detailed below.

In the QI Project Progress Score, the components of each category are broken down into quantifiable tasks. The dividing of each category score into smaller sub-categories makes it possible to assign a partial score for each process completed. For example, to reach a 1.0 progress score, there are four tasks that are scored by IHI: team formation, topic selection, target population identification, and baseline measurement. With the modification, each of these tasks receive a 0.25 score when met. Another change was made in the descriptions within the sub-categories. A status column was added that tracked both progress in this section, and whether the item was completed. Tasks that are in progress do not receive any points. A column for comments was also added. The criteria for receiving a score of five have been substantially changed, since sustainability and spread are now scored separately. ***Sustainability is defined*** *as the continuation of QI project changes such that the changes become how things are routinely done.* ***Spread is defined*** *as the implementation of the same QI project objectives at another site or unit.* Thus, the total possible score based on the IHI assessment scale is from one to five, with no ability to give partial credit for any given category. The newly developed QI progress score that was used for this dissertation starts at 0.25 and goes as high as 6.0. Refer to Appendix A where both the IHI scoring system and the new QI Progress Score are further detailed. A summary of the QI Progress Score used for this dissertation is also outlined below in Figure 7.

Figure 7: QI Project Progress Score*

Score	Process Steps	Status	Comments
1.0	**Formation**		
	0.25 - Team Formed	□ In progress □ Completed	
	0.25 – Topic Selected	□ In progress □ Completed	
	0.25 – Target Population Identified	□ In progress □ Completed	
	0.25 – Baseline Measurement Begun	□ In progress □ Completed	
1.5	**Early Planning**		
	0.25 – Team meetings held	□ In progress □ Completed	
	0.25 – Preliminary Plans Developed	□ In progress □ Completed	
2.0	**Plan Finalized**		
	0.25 – Team Actively Engaged in Research	□ In progress □ Completed	
	0.25 – QI Project Plan Finalized	□ In progress □ Completed	
2.5	**Partial Implementation of Plan No Improvements Seen Yet**	□ In progress □ Completed	
3.0	**Modest Improvements Seen, Test Cycles Completed**	□ In progress □ Completed	
3.5	**Improvement Documented**		
	0.25 – All components of the plan implemented	□ In progress □ Completed	
	0.25 – Plan revised as needed	□ In progress □ Completed	
4.0	**Significant Improvement, 75% of Change Goals Met**	□ In progress □ Completed	
4.5	**Sustainable Improvement**		
	0.25 – Sustained improvement for 75% of the goals (Specify Time)	□ In progress □ Completed	
	0.25 – Begun to Spread to a Larger Population	□ In progress □ Completed	
5.0	**Outstanding Sustainable Results**		
	0.33 – All goals reached	□ In progress □ Completed	
	0.33 – Measures at National Benchmark Levels	□ In progress □ Completed	
	0.33 – Maintenance Monitoring in Place	□ In progress □ Completed	
6.0	**Spread**		
	0.50 – Begun to Spread to Another Facility	□ In progress □ Completed	
	0.50 – Successful Spread to at least one other Microsystem or Facility	□ In progress □ Completed	

The item is not scored unless the task has been completed. In progress is checked where activity occurred, but does not bring a higher score.

*A modification of the Institute for Health Care Improvement (IHI) Assessment Scale for Collaboratives, 2004, IHI Breakthrough College Series, Boston, MA.

The QI Project Progress Score for each of the twelve case studies is shown in Table 4.

As might be expected, most successful QI projects have higher QI project progress scores

than the least successful projects.

Table 4: QI Project Progress Scores*

Leaders A to G	Most Successful QI Project Progress Score	Least Successful QI Project Progress Score
A	6	4
B	4	2.5
C	4.8	4.8
D and E**	5.5	2.5
F	5	4
G	5	3.5
Total Score	**30.3**	**21.3**
Average Score	**5.05**	**3.55**

*A modification of the Institute for Health Care Improvement (IHI) Assessment Scale for Collaboratives, 2004, IHI Breakthrough College Series, Boston, MA.
**Leaders D and E were interviewed simultaneously and responses shown above are based on the consensus they reached during the interview.

Leaders' Definition of QI Success

All seven leaders found it easy to think of successful QI projects. However, for three out of the six "most successful" projects described, leaders stated more than once that it was hard to choose which one of their successful QI projects they considered to be *most* successful and thus describe. In addition, for four out of the six "least successful" projects, leaders indicated they had difficulty choosing a least successful QI project to describe. Three out of the four leaders who had difficulty choosing a least successful QI project stated multiple times that the project was only "least successful" because it was still new. They felt that they simply needed more time to work on it in order to make it more successful. On the other hand, three of the six least successful QI projects were considered least successful due to resistance to compliance from the involved clinicians.

Section Four: Baldrige Communication Criteria

As previously outlined in the literature review, there are four Baldrige Communication

Criteria. (Averson, 1998) The four criteria are:

1. The QI results are presented as a numeric score or measurement.
2. The QI gap between current state and desired state is clearly articulated.
3. The QI data are presented as a trend over time.
4. There is a target date for reaching the QI goal.

The leaders' responses to whether they met the four Baldrige communication criteria are

presented below in Table 5.

**Table 5: Self-Reported Compliance to the Baldrige Communication Criteria for Most
and Least Successful Complex QI Projects**

Leaders A to G	QI Goal is a Numeric Measurement		Outlined Gap Between Current State and Desired State		Graphed Trend Data		Determined Target Date		Most Success-ful QI Project Totals	Least Success-ful QI Projects Total
	Most	Least	Most	Least	Most	Least	Most	Least	Most	Least
A	Yes	Yes	Yes	Yes	Yes	Yes	No**	No**	3	3
B	Yes	No	Yes	No	Yes	No	No**	No**	3	0
C	Yes	No	Yes	No	No	No	No**	No**	4	0
D and E*	Yes	Yes	Yes	Yes	Yes	Yes	No**	No**	4	4
F	Yes	Yes	Yes	Yes	Yes	Yes	No**	No**	4	4
G	Yes	Yes	Yes	Yes	Yes	Yes	No**	No**	3	3
Total Number of Baldrige Criteria Met	6	4	6	4	5	4	0	0	17	12

*Leaders D and E were interviewed simultaneously and responses shown above are based on the
consensus they reached during the interview.
**The answers to target date determined were more closely a no than a yes, but were not a simple no
response.

Baldrige Criteria: Target Date Determined

Based on the responses to the question regarding whether a "target date was

determined," it was clear that further analysis was needed to answer the following questions:

*1) Why, since the Baldrige communication criterion, "set a target date," has long been considered one of four standard criteria for leading successful QI projects, did **none** of the clinician leaders set a target date for their most and least successful QI projects? and, 2) How do front-line clinician leaders tailor their discourse during QI implementation?* The findings that relate to these questions are outlined below. Discourse is defined as all types of communication vehicles, e.g., conversations, photos, written.

Answers Were Not Simply A Yes or No Response:

How the clinician leaders answered the question regarding whether a target date was determined made it clear that the leaders saw complexity and ambiguity in the category, "target date determined," that did not exist within the other Baldrige communication criteria. Specifically, the leaders' responses were not a simple "no." The front-line leaders would often pause before answering, many got a puzzled look on their face, and after they answered; they explained or qualified their responses, similar to the following answer from one of the respondents:

> When asked, "Did you set a target completion date?," the respondent answered, *"Um...not implicit. Oh, it's that we were working toward ... it, but we did not have a target by which we had to reach this goal."*

Other types of qualifying statements were made, such as the need to do on-going monitoring, or that the QI project was still "too new" or not yet complete enough to set a target date. Sometimes the leaders would say, "Yes," that they had set a target date, pause again, and then change the answer to be, "No." Another respondent's answer illustrates the ambiguity of the answers that were given.

Respondent: *"Uh-huh* (which could mean yes, but then the leader goes on to say:)*, I don't know what it* (the target date) *was, but…you know, back at the beginning we wanted to get everybody."*

The slowness and uncertainty of many of these responses, and the qualifying statements, led to further exploration in an attempt to elucidate leader behaviors regarding setting target dates.

Leaders Describe Surprise in How Quickly or Slowly the Change Occurred:

In several of the case studies, the leaders described surprise in either how quickly or how slowly the change occurred. The leaders' inability to predict and set a target date is particularly instructive, since they are a highly experienced group, who had worked in the role of supervisor for several years and had successfully led many change initiatives. One quote illustrates the finding that even these experienced QI leaders had a hard time predicting how long the change will take.

(In this case the change had been incremental or non-existent for over a year, then suddenly, unexpectedly, there was success.)
Respondent: "So we made that one change and there was a dramatic change. And the project was done, so... it was very exciting. It was both wonderful and exciting and sort of anti-climactic, because we had been working on it for a while. And then we fixed it and it was done and we were, Okay, now what do we do?"

These findings indicate that in order to express surprise, the leader must have had some expectation of how long the change would take.

Leader Expectations of Change Compliance

Further analysis was performed which showed that all of the leaders described having expectations of change compliance that shifted during pre-implementation and implementation. The leaders noted a change in how much compliance they expected, based

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on how much compliance there was among the individuals in their group and how much

effort the leaders had invested in the change. In the next section, I discuss conversational

styles and how they correspond to leaders' expectations of change compliance.

Pre-Implementation

The major conversational style used during the pre-implementation phase consisted of

conversations of exploration and brainstorming. The exploratory conversations helped the

leader decide on the QI project topic, and how much buy-in there would likely be from the

staff. These conversations were also used to try out ideas among other peer leaders, and to

refine the project topic, as well as parameters such as definitions and data collection methods.

During pre-implementation, the leaders described reading the literature to learn more about

the potential topic and to see what they could learn from others who had implemented similar

QI projects. Preliminary data analysis was often performed during pre-implementation to

assist the leader in determining the project baseline and to further refine and set project goals.

One respondent described pre-implementation as follows:

> *Respondent: "So we sat down and tried to figure out what was going to be a good project… So we decided that a good project could be _____.... So we said, 'How do we fix that?' … so we came up with a couple of ways…"*

A summary of pre-implementation conversational style and activities is presented below in

Figure 8.

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Pre-Implementation

Exploratory Discourse

Choose QI Project Topic and Parameters

Brain Storm Read Literature

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Implementation Phases 1,2, & 3

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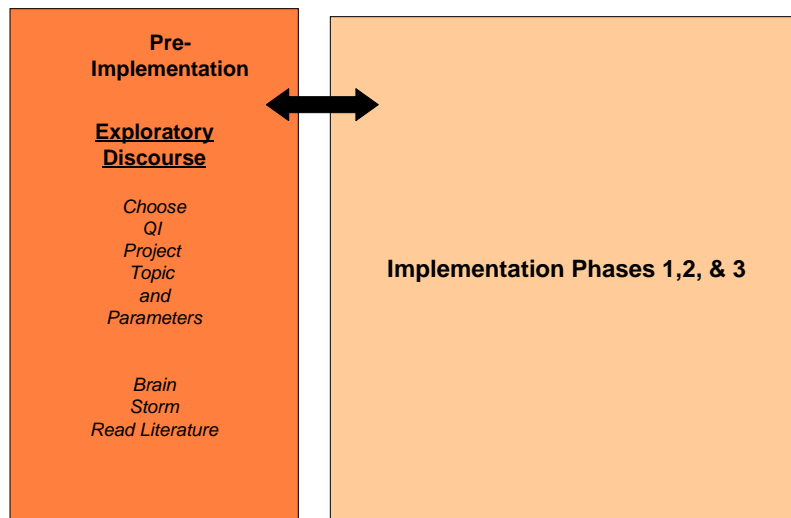
Implementation: Expectations of No, Minimal, Moderate, or Complete Change Compliance (Phases 1, 2, and 3)

Three distinct implementation phases were identified in leader expectations and conversational styles. The first two implementation phases formed part of a grace period. The grace period was where leaders had minimal to moderate expectations of change compliance and did not describe strong reactions to clinicians who did not comply. A lot of interaction and cross over occurred between implementation phases one and two. In addition, during the grace period, the leaders were open to making modifications based on the feedback the group provided them. All three phases are described below in further detail.

Expectations of No or Minimal Change Compliance: Implementation - Phase 1

During phase one, leaders had no or minimal compliance expectations. The conversations they held during this phase were to introduce and explain the QI project. The

major activities during phase one were to identify data collection methods that were

considered meaningful, timely, and accurate. Phase one was also when most of the

introductory education occurred in order to make sure that clinicians were aware of the QI

project and had enough knowledge to begin to successfully adopt the change. New policies

and procedures were also introduced to staff at this time. The ease of implementation (or

lack of ease) during phase one determined whether the leader would proceed on to phase two,

or temporarily stop the implementation in order to devise a new implementation plan. Staff

feedback and data were found to be essential in determining the leader's next steps. Refer to

Figure 9.

**Figure 9: Conceptual Framework of Leaders'
Expectations of Change Compliance**
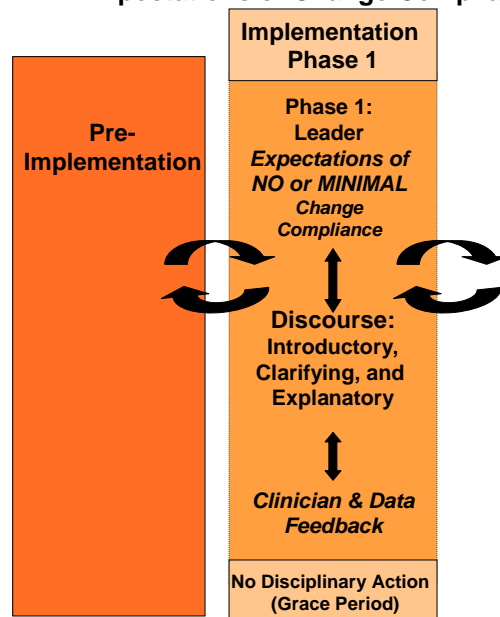
Expectations of Moderate Change Compliance: Implementation Phase 2

During phase two, the leaders had expectations of moderate compliance; the

conversations shifted to provide more detailed explanations. The leaders also held

confirmatory conversations, and at times, even negotiated. The conversations in phase two were primarily directed at the clinicians who had not been part of the early adopter group. Some of the late adopters were simply not aware of how they were performing, or needed more explanations about why the change was needed. Other late adopters were somewhat to highly resistant to the change, and pushed the leader to find out if the leader would back away from the change. Each conversation type described by the leaders in phase two is further detailed below.

Explanatory Discourse: Expectations of Moderate Change Compliance

Most of the conversations that occurred during phase two were explanatory conversations. Explanatory conversations were less intense for the leader than confirmation or negotiation conversations. The explanatory conversations were usually tailored to the needs of clinicians who were late adopters, who may not always have realized they were falling behind. However, the leader did not think these clinicians would be resistant to change, once they were shown how their performance compared to others.

> *Respondent: "I guess for me one of the surprises was the fact that people were really unaware…the data just showed that they stood out and not because they were bad docs, 'cause they weren't bad docs. It's- maybe it's kind of how they were trained and what kind of programs they were trained in and what they kind of got used to doing as practice habits…I guess, the beauty of- how you present data to them, if you do it in a constructive, positive way you can change behavior, even though they didn't know they were behaving badly…"*

Confirmatory Discourse: Expectations of Moderate Compliance

Confirmatory conversations were held to show that the leader was serious about the change, and confirmed the exact expectations to the clinicians. Once the resistant clinicians realized that a change was going forward, and that the leader's overall expectations of change compliance were shifting, some of these clinicians may have begun to work to be excluded

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from the change. Some tactics that highly resistant clinicians used were threats to leave their

job or to take their patients to other hospitals. Other methods the leaders said were used by

these resistant clinicians to avoid change were: claiming they did not want to be forced into

"cookbook medicine" or asking "Why should I change since I have always done it this way?"

The leaders had to be very firm and confirm to the resistant clinicians the reasons why the

change was the "right thing to do for patients." These confirmatory conversations were hard

for the leaders to hold and often generated strong emotions in the re-telling. All of the

leaders who described holding these hard conversations said that most often, the resisters

ultimately complied with the desired change. However, some leaders would back away from

having these types of conversations with highly resistant clinicians, and would let the

resisters continue down the path of resistance.

Negotiation Discourse: Expectations of Moderate Change Compliance

A conversation of negotiation was where the leader told the resisting clinician that the

change was requested for only a subset of their patients, or reminded that there were times

that the leader had done things for the clinician. Therefore, it was now their turn to comply

with the leader's request.   During the negotiation conversation, the leaders described

evidence supporting the change, reminded clinicians that the change was the right thing to do

for patients, and then possibly would exclude some of their patients from the change. Here is

an example of how a typical negotiation conversation went:

> *Respondent: "I got into a verbal discussion with one of them who was very
> obstinate about "cookbook medicine," and I said to her- I said, "The NIH
> study that's here. There's literature that backs this. This is the evidence that's
> there." I said, "You come to me with criticism of the nursing staff… ==Pause
> --- And,…* (then I ask) *why do you do not want to hold yourself to a standard
> that is right?…"Go with us on this primip* (first pregnancy) *thing. It's the right*

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thing for the patients. We won't challenge you on any other induction you want to do. You can bring in all the multips (women who have already given birth) *you want any time of day, your weekend. … the primip is a different animal and you need- we need to give her the best chance to deliver vaginally because - and this is the other thing we need - that if they end up having a C-section, then they've got the Vaginal Birth After Cesarean issue the next time they birth, which is another huge issue."*

The confirmation and negotiation conversations were held with the clinicians who were most resistant to the change.

Summary of Implementation Phases One and Two

Implementation phases one and two were part of a grace period. During the grace period, the leaders described targeted and sustained efforts to introduce and confirm understanding of the expected changes in behaviors. During this time, leaders provided physicians, nurses, and staff with timely, meaningful, and accurate feedback to ensure understanding and to mark progress or lack of progress toward the goal. During both phases one and two, the leaders described hours and hours of talking about the change in staff meetings, in one-on-one conversations, via sending emails, developing flyers, making structural changes, and devising other reminders to reinforce that the change was needed and reasons why. The actual strategies and tactics that the leaders used, plus the barriers they identified, are described in Sections Five and Six.

Conversations and activities in implementation phases one and two are highly interactive and, at times, leaders have to stop implementation and go back to the planning stage or the "drawing board." Below is a quote that clearly illustrates the unpredictability and messiness of the implementation of the change process through pre-implementation, and implementation phases one and two. The quote shows how the leader constantly checked and re-checked whether the implementation plan was adequate, based on the amount of staff

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compliance. In this example, the leader thought that the change he or she was attempting to implement would go faster than it did.

> *Respondent: "So we rolled this out. We did all the education posters. Changed the policy, educated the Performance Improvement committee. ... nobody fought it. You know. So what's interesting is, ..."* that after setting the goals, collecting baseline data, and starting the implementation, the leader said: *"Whoa! This education didn't work very well - actually, let's back up a little bit. We hadn't changed the policy at that point and hadn't done good education. So nobody knew what was expected. So we went back to a drawing board and changed that policy, educated everybody. The next month, we had a huge improvement...but, I didn't know why... some patients did not get the intervention. So we really weren't making much progress. And then it dropped off again. So we had to go back to the staff, give them the statistics, show them the graph, talk about what's happening."*

> *Respondent, cont'd: "Well, it turned out that they* (the staff) *were ...performing the intervention. They just weren't documenting that they were... So you'd look at the chart and you wouldn't know. So ...* **I guess the lesson here is that we didn't...take the time to identify all the process pieces that should've been in place before we started.** *So then we changed the record and put a place on there to document so they don't have to remember to handwrite somewhere in the chart. So the next month they still weren't documenting ... even though it was there now. The staff nurse ...I have doing this project, doing the data collection, she says, 'I'm not giving them credit... if they don't document it.' I said, 'Well, okay.' That's fair enough, because if JCAHO was here-they would say, 'Not documented; not done.' So even though we know ...the patient was getting the intervention because they were charting part of the intervention but not the whole piece. …We didn't give them* (the staff) *credit and the feedback that she was doing was writing what we can do better to the nurses that didn't document it so they'd get instant feedback for that patient. So that second month we had great success and then we just kept falling off, and so we're in the middle of...collecting the data right now to see if that's gonna work better."*

The quote supports the following conclusions. First, as previously pointed out, even experienced change leaders have difficulty in predicting how long a change will take. Second, experienced leaders who think they have developed a good implementation plan can be surprised by unanticipated barriers, even when they have no one who resists the change. The third and fourth findings are connected: that leaders have expectations of compliance

and these are affected by the feedback on the amount of clinician compliance that is occurring. The level of feedback is, in turn, related to what the leader implemented. If the clinicians are not making the desired change as expected, the leader works to understand why and makes adjustments in the implementation plan. In other words, the following are major sources of feedback that help to guide the leader's next set of actions: 1) the amount of change compliance, 2) what the leader had done to support the change, and 3) the amount of discordance between the leader's expectations of change compliance and the actual amount of clinician compliance. QI leaders go back and forth between making changes and making assessments regarding whether the changes they made were adequate or in need of further refinement. Figure 10 summarizes these findings regarding leaders' expectations of change compliance and the types of conversations held during pre-implementation and implementation phases one and two.

Figure 10: Conceptual Framework of Leaders'
Expectations of Change Compliance
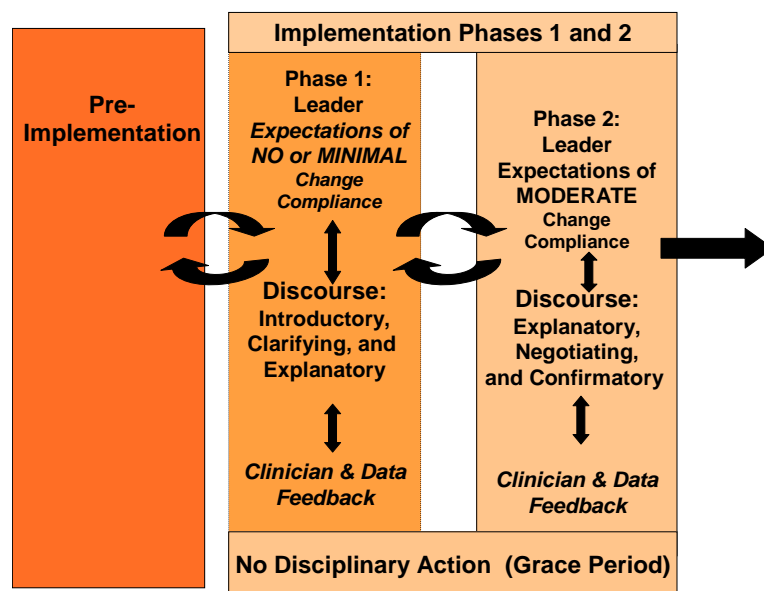
Expectations of Complete Change Compliance: Implementation Phase Three

After the grace period is over; after the leaders have introduced, explained, re-explained, confirmed, and at times negotiated the expected change, all leaders indicated that their expectations of non-compliance shifted to expectations of moderate compliance and then to total compliance. During phase three, when the leaders have developed expectations of 100% compliance, most leaders would give clinicians a warning and then hold directive or disciplinary conversations, and enforce consequences that ensured compliance. Some leaders felt stuck and frustrated in phase three, when they could not identify how to achieve one hundred percent compliance.

There were two criteria identified that impacted the timing of the leaders' shift in expectations from minimal, to moderate, to 100% expectations of change compliance. As previously mentioned, the timing was not dependent on a pre-determined target completion date, but instead was based on: *1) **The number of clinicians who had adopted the change to date, and 2) the leaders' self-assessment of how effectively they themselves had discussed, educated, and mentored clinicians through the change.***

Although in phase three, all leaders had expectations of one hundred percent compliance, not all leaders used disciplinary measures or had the authority to use disciplinary actions with non-compliant clinicians or providers. The two leaders who stated that they lacked the authority to hold disciplinary conversations expressed frustration at their inability to insist on one hundred percent compliance during phase three.

Warning and Disciplinary Conversations: Expectations of Complete Change Compliance

For most leaders interviewed, disciplinary action was an option for them to use; however, disciplinary action was not threatened until the leader had made significant efforts and had seen that most clinicians had implemented the change. In other words, disciplinary action was an action of last resort. One leader described it this way:

> *Respondent: "So we're really pushing and telling people, 'you know, you get one goof-up and then, you know [chuckles], you're going to get nailed. And it's gonna be a disciplinary process.'"*

As previously outlined, this type of warning conversation did not occur until after the leaders had moderate expectations of change compliance of the clinicians.

Directive Discourse: Expectations of Complete Change Compliance

One leader obtained 100% compliance among the clinicians involved, despite the fact that none were direct reports and that the leader had no ability to hire and fire them. This finding is in direct contrast to two other leaders who stated they had no ability to obtain 100% compliance because they could not hire or fire those who were non-compliant. The leader expressed great pleasure in obtaining 100% compliance, but not surprise; he or she expected 100% compliance and insisted that everyone get on board. In phase three, this leader (like the other leaders) indicated that the majority of the clinicians had changed their behavior, but he or she did have one person who had not made the needed changes, despite having participated in all previous conversations. The leader said that he or she had to speak to the outlier as if he were a resident. The leader's description of that conversation is a good example of a directive conversation.

Respondent described a directive conversation as being similar to how you speak to a resident and further illustrated upon request by the PI how the conversation went: *Respondent: "This is where you are going wrong. You need to correct this."*

The respondent went on to describe in greater detail what it meant to speak to someone as you would a resident, by saying: *Respondent: "It's very like (how) you talk to your kids. You just have to reprimand him a little bit and - because, you know, you're not doing a good job [chuckles]. So it's just more of a parent to child interaction as opposed to...a professional interaction, I mean, in a professional way. I don't know if you've seen any difference, but it's more of a directive as opposed to appealing to their sense of wanting to do the right thing."*

The directive conversation between the leader and the outlier was not held until the leader shifted from a phase of low expectations (of change compliance) to a phase of high expectations or expectations of one hundred percent change compliance.

One leader stood out among all of the leaders interviewed. This leader was determined to push for compliance among all clinicians (physicians, nurses, and staff) at their hospital. In addition, this leader held change conversations with pregnant women. Once this leader's expectations shifted from minimal, to moderate, to expectations of complete change compliance; everyone was informed or warned that the grace period was over. The nurses knew that if they were found to be non-compliant, they would be faced with disciplinary action (although no disciplinary action was ever needed). The physicians in this hospital also knew that if they were non-compliant after the grace period, the leader would ensure that one of two consequences occurred. First, if one of their patients received care that did not follow guidelines, the case would be reviewed and presented at a monthly interdisciplinary QI Committee meeting. The non-compliant providers would be identified publicly and invited to attend the meeting. During the meeting, they would listen and participate in the discussion of the case with their peer physicians (purposely chosen to be early adopters) and nurse colleagues. During the meeting, these non-compliant providers would be given the

opportunity to publicly justify to the approximately twenty-two committee members in attendance, why he or she did not follow the guideline(s) that were developed to improve patient outcomes. Second, the providers who chose not to attend the QI committee meeting would have a one-on-one discussion with the MD Chair of the QI committee, who would personally outline the committee findings.

Although the expectation of one hundred percent compliance may sound overly strict, this leader described high levels of interdisciplinary cooperation and teamwork. In addition, there was strong clinician satisfaction in knowing they were providing high quality care. This leader also proudly mentioned that there were high levels of patient satisfaction. The above should be understood in the context that this leader was able to get clinicians to achieve more stringent goals than any other group of providers at any of the other hospitals, who were working on similar first birth and delivery initiatives.

No Disciplinary Authority: Expectations of Complete Change Compliance

Two of the leaders who stated they lacked the authority to hold disciplinary conversations described frustration with a few recalcitrant "outlier" providers. The leaders' statements made it clear that although they did not *achieve* one hundred percent compliance, they *expected* one hundred percent compliance. The leaders were frustrated with providers who refused to change long after all other providers had made the desired behavior changes. The lack of change among the few outliers was frustrating to the leaders, because the outliers had been part of the change education, conversations, etc. Enormous energy had been expended in an attempt to get compliance.

These two leaders' statements support the conclusion that there was a phase in the QI project when leaders expected complete change compliance, and that this phase was after most everyone else had adopted the change. One of them described the situation as follows:

> *Respondent: "I think that most physicians, when confronted with a significant behavior change, will do the right thing most of the time when presented with enough data showing that the behavior change is of value, particularly when they can be shown that other people are changing, and not having bad outcomes. By the same token there are a few individuals who* ***will not change*** *(slows down for emphasis) unless you could find the appropriate - well, even if you sometimes find appropriate incentives. And so then, eventually organizations have to choose between allowing someone to continue a practice that they don't feel is...a certain quality standard or not."*

Summary of The Conceptual Framework of Leaders' Expectations of Change Compliance

These data support the conclusion that leaders' expectations and discourse shifted through three phases during the implementation period. The first two phases were part of a grace period; phase one: expectations of no or minimal change compliance where conversations were held to introduce the change project, and to describe the data that will be collected. And, phase two: expectations of moderate change compliance (phase one and two were highly interactive), wherein the discourse consisted of further explanations, confirmation, and negotiation of the change initiative in order to move the group closer toward compliance.

During the grace period, the leaders described targeted and sustained efforts to introduce and confirm understanding of the expected changes in behavior. They provided physicians, nurses, and staff with timely, meaningful, and accurate feedback to ensure understanding, and to mark progress or lack of progress toward the goal. After the grace period was over, all leaders indicated that their expectations of non-compliance or mixed-

compliance had shifted to expectations of one hundred percent compliance. During phase three, when there were leader expectations of one hundred percent compliance, most leaders gave clinicians a warning, and then had directive or disciplinary discourse and enforced consequences that ensured compliance. Some leaders felt stuck and frustrated when they could not identify how to achieve one hundred percent compliance from a few recalcitrant clinicians.

Two criteria were identified that determined the timing of the shift in leaders' expectations of change compliance, and the types of leader discourse. Neither of these two criteria included the setting of a pre-determined target completion date. The criteria that determined when the leaders' expectations shifted were: 1) the number of clinicians who had adopted the change to date, and 2) the leaders' self-assessment of whether they themselves had effectively done their due diligence of discussing, educating, and mentoring clinicians through the change.

More data are needed to further elucidate and confirm these findings regarding the implementation phases of QI change projects. In particular, additional research is needed regarding leaders' expectations of change compliance, the benefits and barriers to setting target completion dates, and the types of discourse leaders engage in during QI implementation. The findings are unlikely to be unique to maternity leaders, since the Baldrige criteria are not maternity-specific. The findings may be unique to health care and may reflect how much more complex change is within a health care compared to a business setting. For example, given the human complexity of healing, there may be many more unknowns in implementing change in health care that make it more difficult for health care leaders to *a priori* set a target completion date. Both the PI and a Stanford librarian have

since searched the literature to determine how the Baldrige communication criteria were developed. To date, no research studies on Baldrige communication criteria and setting target dates have been identified.

The Conceptual Framework of Leaders' Expectations of Change Compliance that emerged from this study is summarized below in Figure: 11.

Figure 11: Conceptual Framework of Leaders' Expectations of Change Compliance
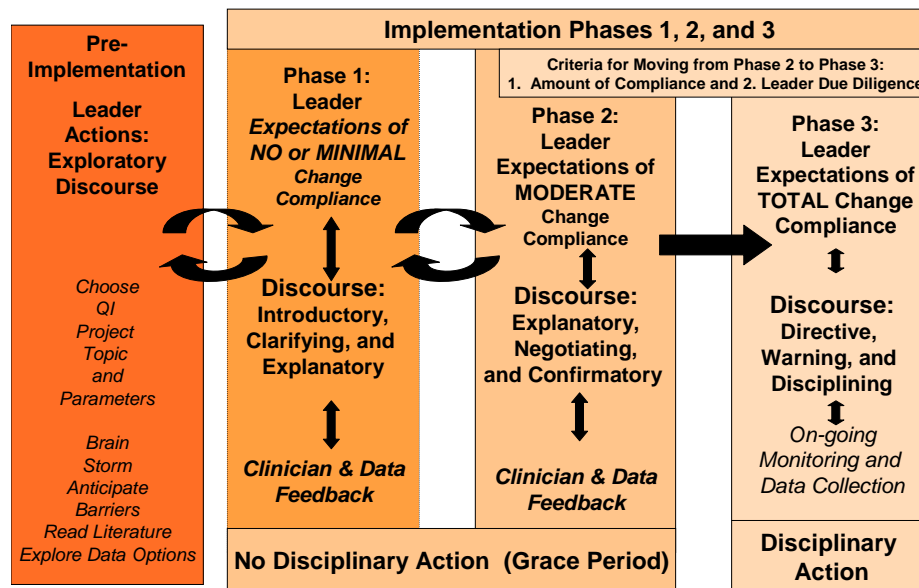
Section Five: Front-Line Clinician Leaders' QI Implementation Practices (Strategies and Tactics)

Data on how clinician leaders tailored their QI implementation practices (strategies and tactics) were obtained during the open-ended, semi-structured interviews in several different ways. First, the leaders were asked to describe their most and least successful QI projects. During these descriptions, QI practices (the strategies and tactics within the strategies) were often mentioned. Second, the leaders were asked to describe barriers and

any strategies or tactics they used to mitigate the barriers. Third, the leaders were told the name of a QI implementation tactic described in the literature, and asked if the tactic was used in the context of the QI projects being described. Fourth, they were asked to describe any insights they had developed in the course of implementing their QI change projects. In addition, document reviews were performed to further explore the types of QI practices the clinician leaders described. For example, if a leader said they used a poster or bulletin board to share information, he or she was asked to show the bulletin board or poster. If a leader said they discussed the topic in staff meetings, he or she was asked to show how the information was shared in staff meetings by producing a copy of their staff meeting minutes or a sample of the documents they would attach to their staff meeting minutes. Asking for the same type of information in different ways, as well as performing document reviews and on-site review of bulletin boards, posters, and computer displays provided verification of interview responses and data triangulation.

The repetition of requests (outlined above) for information during the interviews often elicited repetitive responses; however, without exception, front-line leaders left out some implementation details during the initial narrative telling of their QI projects. For example, during the initial narrative they usually gave an abbreviated version of their implementation tactics. Having multiple ways to prompt leader recall increased the number of implementation details obtained. In addition, the study design, in which the same leaders answered the same questions for their most and least successful QI projects, added to the ability to further explicate how front-line clinician leaders tailor their QI implementation practices.

All of the leaders interviewed made comments, usually after the interview had ended, that the interview was worthwhile and that they had learned something from being interviewed. Particularly, the leaders found the interviews helpful because the process allowed them time to reflect on how they had implemented their QI projects. They stated they had encountered new insights into their own work and new ideas regarding new implementation practices and tactics to use in the future.

The type and number of tactics used, not used, or determined by the PI not to be applicable, are summarized in Tables 6a, 6b, and 7 at the end of Section Five. Tables comparing the leaders' tactics used, and those not used, that were applicable for their most and least successful QI projects are included in Appendix E.

Next, comparisons of patterns or the lack of patterns across the individual leaders and the most and least successful QI projects were identified and analyzed. Three major types of strategy emerged during the analysis: 1) Discourse, which is a part of each strategy and tactic outlined, 2) Data and 3) Education. There are different implementation tactics within each type of strategy. For example, leaders used an education strategy that included tactics such as division meetings, classes, or conferences. The implementation strategies, and the tactics the leaders used and did not use are discussed below.

Education

Formal educational efforts occurred periodically. Informal education efforts were more continuous and also part of the leaders' discourse strategy. Usually, the nurses and physicians were provided with formal and informal education separate from each other. However, there were some efforts made for joint physician and nurse educational opportunities.

There are five types of formal education implementation tactics: 1) grand rounds or division meetings, 2) classes or conferences, 3) simulation training, 4) team training, and 5) competency validation. Each type of formal education and the leaders' descriptions of their utilization of formal education as an implementation tactic is outlined below.

Division Meetings:

Division meetings were the main method of formal physician education. Not all of the hospitals in the study held grand rounds on a regular basis, but the physicians did regularly get together for division meetings. Nurses were not routinely invited to participate in the physician division meetings.   However, nurses were invited to attend division meetings when an outside guest lecturer was making a formal presentation about the QI projects. In fact, the nurse leaders at times organized the QI project guest speakers for the physician division meetings, and at times would be co-presenters. All six of the most successful and four of the least successful QI projects used division meetings for physician and nursing project education. The two QI projects that did not use division meetings for educational purposes were not well-developed QI projects, meaning the QI projects had been shifted from implementation phase back to pre-implementation planning. These two leaders used division meeting presentations as a tactic for their more mature most successful QI projects. These data suggest that one reason these leaders did not present the QI project at a division meeting in these two cases may have been that the leaders were not ready to give a division meeting presentation; this is not to say that they considered division meeting presentations to be an ineffective implementation tactic.

Classes or Conferences

Classes or conferences are the main method of educating nurses. Classes or conferences were used for three out of the six most successful and four out of the six least successful QI projects. Leader A's most successful QI project did not require classes or conferences in order to achieve one hundred percent compliance, because the system change used a real-time computer display method that needed minimal explanation. The explanation about the computer display changes occurred during division or staff meetings, not through separate classes or conferences. Leader B's most successful and leader G's least successful QI projects were primarily designed to change physician behaviors. Thus, no classes or conferences were held that were separate from division meeting discussions and presentations. Leader C had different reasons for not using classes or conferences as an implementation tactic for the most compared to the least successful QI projects. These data suggest that the reason is that the QI project succeeded without holding classes or conferences.

Simulation Training

Simulation training is education that allows clinicians to practice skills and knowledge through the simulation of a clinical situation. Simulation training can be done with teams or individuals; in hospitals or in simulation centers. Since traditional lecture methods alone are not an effective way to change behaviors, simulation training and other methods of education are being promoted and tried. (Crofts et al., 2007; Davis et al., 1999; Maslovitz, Barkai, Lessing, Ziv, & Many, 2007) Early research on the effectiveness of the various types of simulation training for changing clinician behaviors, improving team performance, and increasing knowledge is still underway, but some early research is

promising. (Crofts et al., 2007)   Leaders D and E's most successful and leader G's least successful QI projects used simulation training to promote a change in behaviors.

The PI considered simulation training to have applicability to all twelve of the QI projects described.   The leaders interviewed did not consider using simulation training as an implementation tactic for ten of the twelve QI projects. For eight out of these ten projects, simulation training may not have been considered as an implementation tactic because it has primarily been presented in the literature as an educational method for preparing clinicians and teams for emergency situations. Simulation role playing, similar to the method described by leaders D and E, is a tactic that has not received much attention in the medical literature in general, and obstetric literature in particular. However, simulated role playing may be an effective tactic to combat the frequently described barrier that clinicians did not know how to respond to questions posed by patients or other care providers, who are requesting non evidence-based care. There are examples of how simulation role playing can facilitate a change in how individuals respond when others exert financial pressure over them. For example, Dr. Wiwat successfully curtailed the spread of the human immunodeficiency virus in Thailand through the tactic of simulation role playing. He had sex worker leaders role play with more timid sex workers on how to insist that men wear condoms during intercourse. (Patterson, Grenny, Maxfield, McMillan, & Switzler)

Team Training

Team training, broadly defined as any type of training that involves more than one discipline, was a tactic that all leaders utilized for all twelve of the QI projects. Unfortunately, the most prominent method of "team training" was simply to have nurses and physicians be "trained together" by having them attend the same lecture. Leaders D and E

and leader F went beyond the traditional lecture method of team training by having nurses and doctors co-present. Leader F was the only leader who described organizing and holding any type of regular inter-disciplinary QI meetings. Leader F's monthly inter-disciplinary meetings made it possible for all members of the team to exchange ideas with each other.

Competency Validation

Competency validation (where clinicians are required to demonstrate their knowledge of a new concept or demonstrate their ability to perform a specific skill) was a tactic used by leaders D and E and leader F and was determined applicable in eleven out of the twelve QI projects. However, as previously outlined, two least successful QI projects were not fully implemented at the time of the study. Thus, competency validation may be a tactic that the leaders will use to a greater extent in the future.

Data

Meaningful data that the leaders either collected themselves or that were provided to them was identified by all leaders as foundational to successful QI implementation. Meaningful data were defined by the leaders as being sufficiently granular, accurate, and timely.

Meaningful Data

These findings support the conclusion that data need to be meaningful in order to be useful for QI implementation. Meaningful data is defined as data that is granular enough to inform the QI project change goals, e.g., down to the individuals or groups involved, and data that are also accurate, and timely. Thus, one task of the leaders was to check and validate

data accuracy. All of the leaders stated that clinicians criticized the data and then refused to change when they did not believe data that were presented to them. Leaders described a great deal of effort being expended in monitoring data accuracy and assuring that the data were granular enough, even when there was a computerized charting system.

Other criteria for obtaining meaningful data were the timing of data collection and data display. Quarterly reports were needed for the FPAD QI projects, because it took time for there to be sufficient sample size to show whether change was occurring and to have data worth reviewing. However, other types of changes benefitted from real-time, continuous feedback.   For example, real-time, continuous data feedback was particularly useful for the QI change project on reducing the time period from patient check-in to the assignment of a room. The reasons for the delays in room assignments required the on-going coordination of multiple people, in multiple areas, at the same time. In fact, previously, when the team had periodic, but delayed feedback, there had not been any improvement despite a year's worth of effort. Once the entire team had real-time, specific, continuous feedback, the change in behaviors was dramatic.

One leader's response illustrates the points made by many leaders about the value of meaningful data:

> Respondent: *"I think the biggest barrier is trying to make sure that the data you get is* [sic] *correct. Because otherwise you have a hard time getting buy-in and people don't believe the data is* [sic] *correct or meaningful. So I think once you've got correct data that's* [sic] *meaningful, then it's getting it in a timely fashion so that you can make a change and see whether the change you've made makes a difference."*
>
> *Interviewer: "And when you say "timely," what's that?"*
>
> *Respondent: "In my opinion, that means like now [laughs]. So, same day, same moment. Real time. That's what I would consider timely. Next day is okay, but it really is hard to make a change on the day I'm doing something if I don't get the data*

back until the next day. It makes it much, much harder. You really want as granular an interaction as you can get."

Localization of Data

Localization of data is defined as collecting or re-working data so that the data are specific to the hospital, unit, or individual. All leaders described a need for localized data for all twelve of the QI projects. General data were made more meaningful by providing system-wide, hospital level, and individual clinician and staff data that were as specific as possible. These data support the conclusion that the more specific QI data were, the more meaningful for supporting the leader's change efforts. In fact, all of the leaders described spending hours gathering, analyzing, or re-working QI data to make it more granular and more meaningful for each of their projects. Some leaders were handicapped because they lacked knowledge of QI data analysis methods and data processing software. Other leaders who knew how to analyze data and knew how to use data software programs, such as Excel, were also handicapped because they did not have computer systems that were flexible enough to collect the data they needed and import it into data software that would make charts and trend graphs. Thus, the lack of flexible and integrated computer systems made it necessary for someone, usually a nurse, to regularly perform the tedious and time-intensive tasks of hand copying data from a chart and then re-entering each data element of interest into Excel spreadsheets. Data re-entry increased the possibility of additional errors being introduced at each stage in the process. In addition, in order to make the data meaningful, the leaders described the need to know enough about Excel spreadsheets to create their own charts and generate their own local reports for all QI projects that were not implemented system-wide. System-wide QI projects had some personnel who performed these types of tasks.

These data support the conclusion that each leader interviewed was motivated because these potentially major barriers to data collection and analysis did not prevent them from successfully collecting and analyzing data for their QI projects. However, given the large number of responsibilities assigned to these leaders, they may have been able to do more QI work if they had computer systems that better facilitated the collection of QI data. It is also unclear if these leaders felt that efforts to overcome major data barriers are typical or atypical. Leaders working in single hospitals, without the benefit of system leaders to help them with data analysis and to provide data trend charts, are likely faced with similar and possibly more data analysis and data display barriers than those described by the leaders interviewed.

Given the capabilities of computers, it is an unexpected finding that physicians and nurse leaders were not able to get individual provider and hospital-wide QI trend charts generated on a routine basis with minimal effort on their part. Even leaders with computerized systems struggled with getting QI data that were adequate for their initiatives. These findings prompted the PI to do a sub-analysis to systematically determine the use and non-use of computers as a QI implementation tool. The analysis on use and non-use of computers as a QI implementation tool is included at the end of the Section Six: Quality Improvement Implementation Barriers.

Private and Public Reporting, and Benchmarking of Data

Data were privately reported to the clinicians in five of the twelve QI projects. Private reporting is defined as showing data to the clinicians who work within each group. Private reporting was done in several different ways. The most basic approach was to code data and provide the individual clinicians with their own code. In this way, the clinicians

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could see how they personally performed compared with others in the same group, but without knowing specifically who the others were. Another method of private reporting is to have internal transparency of data among all of the clinicians, but not to show these identified data to the public.

Public reporting includes reporting performance on QI measures to both clinicians and patients. Public reporting could include all or partial transparency. Only one QI project out of twelve used public reporting as an implementation tactic. The leader who publicly reported did so by posting QI trend data on a bulletin board in a hospital corridor. No clinician-specific data were made available to the public. Although these data were not tucked away out of sight, they were also not readily available to women and their families unless and until they actually were present on the labor floor. The bulletin board was also located such that it would be easy for many patients to miss seeing the board.

Nine out of the twelve QI projects benefitted from benchmark data. For the other three QI projects, there were no benchmarking data available. Benchmarking of data was identified by the leaders to be beneficial to their QI efforts. Prior to participation in the committee, leaders stated that they were unaware of how the clinicians at their individual hospitals performed compared with others.

Feedback: Individual and Group

Feedback to individuals and to the group were tactics that were used by a number of leaders. Two out of the twelve QI projects did not yet provide individual clinician feedback. These two projects were in the early stages of implementation and the leaders had not yet determined what their goals for the project would be, or how they would track progress. Leaders for all twelve QI projects had provided feedback to the group on the identified

quality problem(s), and regarding how labor and delivery clinicians at each individual hospital were performing. Feedback was identified by the leaders as a critical component of QI implementation. As previously noted, the more specific the feedback, the better. General, non-specific, feedback was identified by the leaders to not be as useful. Without specific enough data clinicians would assume that they personally did not need to work on an issue. One leader expressed surprise by this, since he or she knew that physicians must be aware that they cut episiotomies. But what the physicians did not know is how they personally compared to others in their peer group and whether they were cutting more than others.

Second Opinion

In obstetrics, second opinions have been reported as a useful QI implementation tactic when, for example, the goal is to reduce cesarean sections. (Lagrew & Morgan, 1996) Requiring that the patient's physician have another physician (usually a physician in a leadership role) review the indications for the cesarean section, and agree that the cesarean section is medically indicated is seen as a way to ensure that the quality standard is met prospectively.

The PI determined that requiring a second opinion was an applicable tactic for seven out of the twelve QI projects. None of these seven QI projects used second opinions as an implementation tactic. This finding is not unexpected for the one QI project (out of the seven) where the leaders reached 100% compliance, i.e., why should they add more tactics when they had already achieved success. This finding does suggests that the leaders did not use all QI tactics that they were aware of, even when they were frustrated by a lack of change compliance.

Leader Designated Change Champion

A change champion is someone who will embrace a change and then promote this change to others. E. Rogers points out that in order for a change champion to be effective, he or she needs to be most similar to the group or individuals they are trying to change. Having a leader-designated change champion for various clinician groups was determined to be an applicable tactic for all twelve QI projects. However, only one out of the twelve QI projects used leader-designated change champions. The leader who used this implementation tactic identified both a physician and a midwife champion.

Discourse

How leaders tailor their discourse during the implementation of change was discussed in Chapter Four, Section Four: Baldrige Communication Criteria. The study findings support the conclusion that discourse, content and style, varied based on the leaders' expectations of change compliance. These findings are summarized in the Conceptual Framework of Leaders' Expectations of Change Compliance. Discourse is a central component of how leaders tailored their QI project implementation practices, including not only how the leaders communicated with others, but also how the clinicians and corporate system leaders communicated back to the front-line leader.

Discourse as an implementation strategy has been divided into five major categories, and tactics are outlined within each category. The five identified discourse categories are: 1) meetings and one-to-one discussions, 2) reminders, 3) written discourse, 4) external rewards, and 5) discipline. There are twelve tactics that fit within these five categories. The use and non-use of the twelve discourse tactics within each of the five categories are defined and findings are outlined below.

Meetings and One-to-One Discussions

System Leader to Front-Line Leader

System leader to front-line leader meetings are defined as those meetings that a multi-hospital system leader organized to discuss, guide, or support the leaders' local QI project efforts. Since all leaders in the study worked at the same multi-hospital system, it was determined to be possible for the system leader to meet with the front-line leader for all twelve of the QI projects. Ten out of the twelve projects have had system leader input, either within the multi-hospital system-wide Obstetric QI Committee or through other committees or interactions. One of the two QI projects that did not have system leader in-put was still being conceptualized locally. The remaining QI project was originally conceptualized and developed locally, unlike many of the other projects that were conceived by the system-wide leaders and then implemented locally.

Front-Line Leader to Staff

Discourse of front-line leaders to staff was identified as occurring in multiple ways and multiple times throughout the course of all twelve QI projects. All leaders indicated that their main form of group discourse was during division or staff meetings. Meeting minutes to show how these QI projects were discussed during these meetings were made available for review for all twelve QI projects. Specific types of discourse tactics used to facilitate these front-line leader-to-staff communications are listed below as individual tactics.

Clinician-to-Clinician

Formalized clinician-to-clinician project discourse occurred in four out of the twelve QI projects. Formalized clinician-to-clinician discourse is defined as QI project

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communications that were designed to be an implementation tactic. For example, Leader E

included the placement and removal of sequential compression devices as an item that all

nurses were supposed to include in their end of shift report. Leader F also ensured that both

nurses and physicians were members of the obstetrics QI committee, in order to facilitate

communication among physicians and nurses. This committee provided a place where the

leader F described reporting on the progress of the most successful QI project and developing

additional strategies for increased improvement. Leader A's project included the use of

colored dots on the computer that formally communicated to all members of the team how

successful they were in meeting their goal to have patients assigned to a room within 15

minutes of check-in. Leaders D and E's project on changing how fetal heart rate monitoring

results were communicated among members of the team included simulated clinician-to-

clinician role playing using case examples. One of the major tactics used by leader B for the

QI project to improve treatment of women in premature labor was to bring an inter-

disciplinary group together to discuss the identified problem and to collectively develop

solutions. This was a group of professionals who did not routinely meet. Leader B described

the inter-disciplinary meeting to be the primary tactic used for this project.

Academic Detailing

Academic detailing is defined as a review of relevant academic research by one

leader meeting with one clinician at a time. Academic detailing is a tactic that

pharmaceutical salespeople use regularly. Many of the seven leaders were not familiar with

the term academic detailing, and needed to have it defined for them. Once the term was

defined, the leaders knew whether they used this tactic or not. The leaders reported that for

three out of twelve QI projects, academic detailing was used. Leaders stated that for all

twelve QI projects, they made sure that all relevant literature was reviewed with the clinicians, often multiple times. However, organizing lectures or classes where literature is reviewed with groups is separate from academic detailing, and thus was presented earlier under education tactics.

Academic detailing was used by several leaders as a tactic for obtaining compliance from the outliers. The outliers, who refused to change, often still refused to change even after they had received a detailed, one-on-one review of the academic literature.   This finding is further discussed under the area of lack of persuasion of clinicians in the barriers to change section.

Reminders

Checklists

None of the twelve QI projects used checklists as an implementation tactic. This is a surprising finding, since checklists have been shown to be highly effective for changing the behaviors of clinicians in adult intensive care units. (Pronovost, 2008) In fact, the successful use of checklists by Pronovost and colleagues, and the successful spread of this tactic to other adult intensive care units received wide enough attention to be the basis of an article in the New Yorker. (Gawande, 2007) Several leaders interviewed were aware of the research showing checklists as an effective QI tactic, and went on to explain why they thought a checklist would not work for their particular QI project. For example, two separate leaders stated that a checklist for reducing episiotomies would not work, since the way checklists currently are routinely used, usually relied on someone other than the physician to observe the desired behavior and do the check off. Even if the nurses working with the physician or midwife was asked by the nurse, in front of the patient, whether specific criteria were met

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prior to cutting an episiotomy, the leaders assumed the providers would simply say yes. Therefore, the leaders determined that this additional effort by the nurse would not be likely to change provider episiotomy behaviors. The use of checklists in obstetrics will be discussed further in Chapter 5. But these data suggest that some tactics may be more useful for some types of QI project goals than for others.

Computer Reminders

Computers were used as reminders of the QI project goals in three out of the twelve QI projects. The use and non-use of computers as a QI implementation tactic has not previously been reported in the literature. With this in mind, a more in-depth analysis of the use and non-use of computers for QI implementation is included at the end of Section Six.

Paper Reminders and Other Triggers

Educational sheets, newsletters or flyers were not considered paper reminders and are listed as a separate tactic. Paper reminders are defined as signs or other types of written reminders that are located in physical proximity to the point-of-care. Paper reminders were used in one out of twelve applicable QI projects. This finding supports the conclusion that one way leaders tailor their QI behaviors is to develop implementation tactics to help clinicians remember. 'Forgetting' was one of the barriers the leaders identified and is further discussed in Section Six.

There were non-paper triggers used as reminder tactics. One example is the project where staff needed to remember to use sequential compression devices on all women giving birth by surgery. Rather than posting a piece of paper that may or may not have been read, the leader devised a much more effective type of reminder and reduced a barrier to

compliance at the same time.   The type of reminder used was physical. Specifically, when the nurse aide set up the operating room for the next case, the aide was instructed to put a sequential compression device machine with the necessary attachments on the operating room bed. This meant that if the nurse forgot to put on the machine prior to entering the operating room, the machine and all the necessary supplies were visible and literally had to be moved before putting a patient on the operating room table. This made it impossible for the clinicians to totally forget to use the new device at the time the patient entered the operating room (that is, of course, assuming the aide remembered to set up the room correctly). The leader struggled with how to help the clinicians remember to put the devices on earlier and to remember to remove them and also to chart that they were applied or removed. Changing the charting forms was another structural QI implementation tactic the leader used as a reminder tactic.

Written Discourse

Newsletters, Flyers, and Emails

Newsletters and flyers were used as an implementation tactic in seven out of the twelve projects. As previously mentioned, one project was successful without the use of numerous types of tactics. Thus, for one of the seven projects, newsletters, flyers and emails were not found to be needed and were not used. All leaders used staff meetings and staff meeting minutes to update clinicians on the details and progress of each QI project. The newsletters and flyers used were developed to supplement information provided during meetings, as reminders, or to re-focus clinician attention on the QI project.

Posters or Bulletin Boards

Posters or bulletin boards were used as implementation tactics for three out of the twelve projects. Even when posters or bulletin boards were not used, the leaders had other methods of sharing trends with the clinicians, e.g., attachments to staff meeting minutes. Leader G was very proud of the poster that he or she had made for the FPAD initiative. The poster was very succinct and clever because unlike most posters, this one was designed so it could be easily updated. There were several areas of the poster that did not change, e.g., the reasons for the project and the goals. In order to keep these data updated, Leader G had attached several plastic sleeves onto the poster to hold various types of trend charts. Each quarter, a new FPAD trend charts were inserted into each sleeve to how much progress the team had made toward each goal. The poster also made the QI project overview mobile. The leader described how he or she took the poster to many types of meetings, but in particular to the inter-disciplinary QI meetings with the clinicians at this hospital. This leader described purposely placing the poster front and center at every QI meeting so that it would serve as a physical reminder to everyone regarding what the goals were and how much progress had been made.

Leader F used both a poster and the bulletin board for the FPAD QI project, the leader's most successful project. However, Leader F did not develop a poster for the least successful project, but chose to only develop a bulletin board. The reason the same leader who was so pleased with the poster for one project, but did not find a poster necessary for the other project was not determined. However, the explanation for the variation in how the tactic was used may be the leader's target audience. For the most successful project that had a poster board, both nurses and physicians needed to be updated and most of these updates

occurred in off-unit meetings. For the least successful QI project, the nurses were the ones who needed the information. Updates on the bulletin board were visually accessible to any nurse entering the nurses' station and thus the bulletin board was a constant 24 hour reminder, versus the poster that was a periodic reminder.

Emails

Email was used as an implementation tactic for only one out of twelve QI projects. The reason provided for the limited use of emails is that direct care clinicians did not regularly check their work email, and at some hospitals they did not have a work email account. Thus, leaders rarely used email as a QI implementation tactic. Leaders D and E, who used email for their most successful project, would send a weekly email update to the clinicians. These leaders tried to make their weekly email update practical and fun. They said that the staff liked to read the weekly updates, because they were careful that the emails were not too long and not sent too often. These leaders anticipated that they would start to include more information about the least successful QI project goals and topic, once the project goals became more focused and refined. The emails included information about more than QI project updates.

External rewards

Award or Other Public Recognition for Staff

When an award or other public recognition was used to encourage clinicians to comply with a QI project, it was determined that the leaders used this as a QI implementation tactic. Two leaders for three QI projects described awards or other public recognition that met the definition of an implementation tactic. This does not mean that other leaders (and

other QI projects) did not receive recognition for their work, but for the other projects, the recognition was not described to be used as an implementation tactic.

Professional Opportunities

Leader F was the only one who linked professional opportunities with the QI projects. Leader F developed a system wherein staff were promoted based on their performance and participation in QI initiatives. None of the other leaders formally linked professional advancement to QI performance or QI participation.

Financial Rewards, Celebration, Non-Monetary Perks, and Professional Recognition

No leaders used financial rewards, celebrations, non-monetary perks, or professional recognition as QI implementation tactics for any of the QI projects described. Financial rewards were not considered by the leaders to be necessary and were also seen as complicated. Although none of the leaders gave any of the above-mentioned rewards, leaders did describe giving verbal praise, drawing smiley faces on forms, or giving verbal congratulations to the team. When asked about celebrations, some leaders mentioned that it was a good idea and that they should consider doing that more often, but others cautioned that rewards could be overused and become less meaningful. Most thought that clinicians already want to do the right thing for patients and that was enough of a reward. Leader F's response illustrates the feelings expressed in one way or another by all of the leaders regarding the complexity of offering rewards. Leader F's response (shown below) was made when discussing his or her least successful project, wherein he or she had been unable to change the behaviors of four (out of 31) recalcitrant providers, despite eight years of effort

and the fact that all the other providers had made the change and no longer routinely cut

episiotomies:

> *Respondent: " I am still trying to figure it out. There must be some incentive that I have not thought of. By the same token, you don't want to, ... create perverse incentives where ... we say, 'Well gosh, Dr. X, you know, you got 100% episiotomy rate. If you can get it down to 70% we're going to give you a bonus.' But what ... message is that to the people who have had two percent or five percent episiotomy rates and they are not getting a bonus?*

> *Respondent, cont.: "... so- you know, you* would *... create a perverse incentive system, you know, encourage people to do bad things so that they can do things kind of badly and get benefit [chuckles] versus doing them well and get no bonus.*

> *Respondent, cont.: "Right. So, you know, I'm not sure what incentives you can bring to bear that are positive that will effect the change you want to affect without creating some other odd perverse incentive system.... and yet allowing these individuals to continue to do what they do and that in and of itself perverts the incentives, because there's no downside to continue to do poor quality things, so why do I need to make the next change you're asking me to make? So you do not want to let it just sit and fester."*

Leader A's response supports the conclusion that rewards are complex and that there are

many considerations. Another leader described even using what are called "spirit awards"

sparingly. He or she wanted to encourage people to do things for the right reasons, not for

some external reward. In addition, this leader described not wanting to over use the reward,

thus rendering it meaningless.

Discipline

Verbal and Written Warnings

Verbal warnings were used as a QI implementation tactic in six out of twelve

projects. Written warnings were used for two out of twelve projects. The use of written

warnings only occurred when a leader was first given a verbal warning.

Suspension or Termination

No staff were suspended or terminated by any of the leaders for any of the QI

projects. However, some leaders indicated that staff who were non-compliant in the past had

chosen to leave their employment at this hospital rather than be suspended or terminated. As

far as the leaders were aware, no staff had left to avoid disciplinary action based on these

particular QI projects.

Holding physicians accountable was more complicated, since the leaders working

with physicians stated that none of them received annual evaluations. They stated that the

only disciplinary option was to take away privileges, which one leader referred to as the

"nuclear option." All agreed that taking away a physicians privileges is rarely done. This

means that if physicians chose not to comply with a quality initiative, some leaders felt that

there was nothing they could do to insist on physician compliance. In one respondent's

representative quote, speaking about changing physician behaviors, the leader described the

situation as follows:

> *Respondent: "Within the hospital there are a few options. You know, it's either, .. a letter saying, 'You should change,' or, you know, the nuclear option where you don't have privileges to do something anymore. In the group* (practice), *we have other financial sanctions that we can use if the group so chooses to use them."*
>
> *Respondent, cont.: "I think that most physicians, when confronted with a significant behavior change, will do the right thing most of the time when presented with enough data showing that the behavior change is of value, particularly when they can be shown that other people are changing and not having bad outcomes. By the same token, there are a few individuals who **will not change** (slows down for emphasis) unless you could find the appropriate- well, even if you sometimes find appropriate incentives. And so then eventually organizations have to choose between allowing someone to continue a practice that they don't feel is- of…a certain quality standard…".*
>
> *Respondent, cont.: "And so that happens I think in every department at every level, nurses and docs. At what point does the organization say, 'You know, thanks for being with us for 25 years, but, you know, your level of practice, your standard of*

practice in this area is not adequate. Either you change it by this date or you no longer have privileges...at this hospital,'...and I don't very often see medical staffs and/or hospitals willing to go down that road.

Interviewer: "How often in your career have you seen that happen?"

Respondent: "For quality reasons?"

Interviewer: "Yes".

Respondent: "Oh...none."

Interviewer: "None?"

Respondent: "For behavioral reasons I've seen it."

Interviewer: "...what's the difference between behavior and quality?"

Respondent: "Oh, a doctor yells at the nurses or acts in an infantile [chuckles] non-professional manner, threatening manner. For those sorts of things I've seen several, almost a couple a year where physicians are counseled, have to go through training, get monitored, and some of them, are excused from the staff. So ... that I've seen on a regular basis. But over quality? Um...Not that I have seen."

These data support the conclusion that system-wide leaders need to re-think how they approach the lack of compliance to QI project goals. Based on these data, there is a double standard. The nurses and staff personnel were held accountable and their jobs were in jeopardy if they did not comply with QI project goals. But, for two out of four hospitals, there were no consequences to the physicians and midwife who refused to comply with the QI project goals. These findings also suggest that hospital leaders who do not insist on having providers meet QI goals as a condition of employment and privileges, may erode the performance of others, not only for a given QI project, but for other QI projects that may be implemented in the future.

Implementation Practices Summary

The findings regarding implementation strategies and tactics used and not used support the conclusion that how leaders tailor their QI implementation practices is complex and contextual; no easy generalizations can be made. In addition, there was no single difference identified between the number and type of QI implementation tactics used for the most and least successful QI projects. A summary of the number and type of QI implementation tactics that were used, not used and found to be not applicable, are outlined in tables 6a, 6b, and 7.

Table 6a: Leaders' QI Implementation Practices - Education and Data Tactics

Leaders A to G	Most Successful QI Projects						Least Successful QI Projects					
	A	B	C	D&E*	F	G	A	B	C	D&E*	F	G
QI Project Topics and Goals	100% of patients will wait less than 15 minutes from the time they check-in to the time they are put in an exam room	Meet all First Pregnancy and Delivery (FPAD) process and outcome goals	Meet First Pregnancy and Delivery (FPAD) process and outcome goals (Episiotomy and Induction)	100% of RN staff will chart and comm.-unicate Fetal Heart Rate (FHR) monitoring patterns using national standard	Eliminate non-medically indicated inductions prior to 41 weeks for first pregnancies	Less than 19% episiotomy rates for women more than 37 weeks giving birth for the first time	Eliminate all routine episiotomies for women more than 37 weeks giving birth for the first time	Improve speed of diagnosis and treatment of women in premature labor	Decrease admission rates of first pregnancies more than 37 weeks that dilated less than 3 centimeter on admit	Increase breastfeeding rates for newborns	Deep vein thrombosis prophylaxis for 100% of scheduled, 90% of urgent and 50% of stat cesarean births	Less than 16% induction rates and less than 20% admission rates for first pregnancies greater than 37 weeks that have cervical dilation less than 3 centimeters
Progress Score	6	4	4.8	5.5	5	5	4	2.5	4.8	2.5	4	3.5
Education												
Division Meetings	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes
Classes or Conferences	No	No	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No
Simulation	No	No	No	Yes	No	No	No	No	No	No	Yes	No
Team	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Competency	N/A	No	No	Yes	No	No	No	No	No	No	Yes	No
Data: Audit and Feedback												
Re-work data	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Data posted for staff only	Yes		Yes	Yes	Yes	No	No	No	No	Yes	No	No	No
Data posted in a public location	No		No	No	No	Yes	No	No	No	No	No	No	No
Group data feedback	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual feedback	Yes		Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes
Second opinion	N/A		No	No	N/A	No	No	No	N/A	No	N/A	N/A	No
Change Champion	No		No	No	No	No	No	No	No	No	No	Yes	No
Applicable Education and Data Tactics Used (Total Applicable)	6 (10)	6 (12)	6 (12)	9 (11)	6 (12)	6 (12)	6 (12)	4 (11)	6 (12)	4 (11)	9 (11)	5 (12)

N/A = Not Applicable, N/A determination was made by the PI. Data Modifiers: Implementation phase and amount of leader effort.

Table 6b: Leaders' QI Implementation Practices - Discourse Tactics

Leaders A to G	Most Successful QI Projects						Least Successful QI Projects					
	A	B	C	D&E *	F	G	A	B	C	D&E *	F	G
Progress Score	**6**	**4**	**4.8**	**5.5**	**5**	**5**	**4**	**2.5**	**4.8**	**2.5**	**4**	**3.5**
Discourse: Meetings and One-to-One Discussions												
System Leader to Front Line Leader	**Yes**	**Yes**	**Yes**	No	**Yes**	**Yes**	**Yes**	No	**Yes**	**Yes**	**Yes**	**Yes**
Front Line Leader to Staff	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Clinician to Clinician	**Yes**	No	No	**Yes**	**Yes**	No	No	**Yes**	No	No	**Yes**	No
Academic Detailing	No	**Yes**	No	No	No	**Yes**	No	No	No	No	No	No
Discourse: Reminders												
Check Lists	No	No	No	No	No	No	No	No	No	No	No	No
Computer Reminders	**Yes**	No	No	**Yes**	No	No	No	**Yes**	No	No	No	No
Paper Reminders	No	No	No	No	No	No	No	No	No	No	**Yes**	No
Other Triggers	No	No	No	**Yes**	No	No	No	No	No	No	**Yes**	No
Discourse: Written												
Newsletters/Flyers	No	No	**Yes**	**Yes**	No	**Yes**	**Yes**	**Yes**	**Yes**	No	No	**Yes**
Posters/Bulletin Boards	No	**Yes**	No	No	**Yes**	No	No	No	No	No	**Yes**	No
Emails	No	No	No	**Yes**	No	No	No	No	No	No	No	No
Discourse: External Rewards												
Award or other public recognition for staff	No	No	**Yes**	No	**Yes**	No	No	No	No	No	**Yes**	No
Professional opportunities	No	No	No	No	**Yes**	No	No	No	No	No	**Yes**	No
Financial	No	No	No	No	No	No	No	No	No	No	No	No
Celebration	No	No	No	No	No	No	No	No	No	No	No	No
Non-monetary perks	No	No	No	No	No	No	No	No	No	No	No	No
Professional Recognition	No	No	No	No	No	No	No	No	No	No	No	No
Discourse: Disciplinary												
Verbal Warning	No	**Yes**	No	**Yes**	**Yes**	No	No	**Yes**	No	**Yes**	**Yes**	No
Written Warning	No	**Yes**	No	**Yes**	No	No	No	No	No	No	No	No
Suspension	No	No	No	No	No	No	No	No	No	No	No	No
Termination	No	No	No	No	No	No	No	No	No	No	No	No
Number of Applicable Discourse Tactics Used (Total Applicable Discourse Tactics)	**4 (12)**	**6 (12)**	**4 (12)**	**8 (12)**	**7 (12)**	**4 (12)**	**3 (12)**	**5 (12)**	**3 (12)**	**3 (12)**	**9 (12)**	**3 (12)**

*Leaders D and E were interviewed simultaneously and responses shown above are based on the consensus they reached during the interview. N/A = Not Applicable, N/A determination was made by the PI. Data Modifiers: Implementation phase and amount of leader effort.

Table 7: Leaders' QI Implementation Practices – Total Number of Education, Data, and Discourse Tactics Used and Not Used for Most and Least Successful QI Projects Compared to QI Project Progress Score, Implementation Phase, and Leader Compliance Expectations

	Most Successful QI Projects						Least Successful QI Projects					
Leaders A to G	A	B	C	D&E*	F	G	A	B	C	D&E*	F	G
QI Project Topics and Goals	100% of patients will wait less than 15 minutes from the time they check-in to the time they are put in an exam room	Meet all First Pregnancy and Delivery process and outcome goals	Eliminate all routine episiotomies for women greater than 37 weeks giving birth for the first time	100% of RN staff will chart and communicate Fetal Heart Rate (FHR) monitoring pattern using national standards	Eliminate non-medically indicated inductions prior to 41 weeks for first pregnancies	Less than 19% episiotomy rates for women greater than 37 weeks giving birth for the first time	Eliminate all routine episiotomies for women greater than 37 weeks giving birth for the first time	Improve speed of diagnosis and treatment of women in premature labor	Decrease admission rates of first pregnancies greater than 37 weeks that have cervical dilation less than 3 centimeters on admit	Increase breast-feeding rates for healthy newborns	Deep vein thrombosis prophylaxis for 100% of scheduled, 90% of urgent, and 50% of stat c/sections	Less than 16% induction rates and less than 20% admission rates for first pregnancies greater than 37 weeks that have a cervix less than 3 centimeters on admit
QI Project Progress Score	6	4	4.8	5.5	5	5	4	2.5	4.8	2.5	4	3.5
Implementation Phase	3	2	2	3	3	3	3	0-1	2	0-1	2	2
Leader Expectations of Change Compliance**	100%	Moderate	Moderate	100%	100%	100%	100%	Minimal	Moderate	Minimal	Moderate	Moderate
Applicable Education Tactics Used (Total Applicable Education Tactics)	2 (4)	2 (5)	2 (5)	5 (5)	3 (5)	4 (5)	3 (5)	2 (5)	2 (5)	2 (5)	5 (5)	2 (5)
Applicable Data Tactics Used (Total Applicable Data Tactics)	4 (6)	4 (7)	4 (7)	4 (6)	4 (7)	3 (7)	3 (7)	2 (6)	4 (7)	2 (6)	4 (6)	3 (7)
Applicable Discourse Tactics Used (Total Applicable Discourse Tactics)	4 (12)	6 (12)	4 (12)	8 (12)	7 (12)	3 (12)	3 (12)	5 (12)	3 (12)	3 (12)	9 (12)	3 (12)
Applicable Tactics Used (Total Applicable Education, Data, and Discourse Tactics)	10 (22)	12 (24)	10 (24)	17 (23)	13 (24)	10 (24)	9 (24)	9 (24)	9 (24)	7 (23)	18 (23)	8 (24)
Percent of Applicable Tactics Used	45%	50%	42%	73%	54%	42%	38%	38%	38%	30%	78%	33%
Average % of Applicable Tactics	51%						43%					

*Leaders D and E were interviewed simultaneously and responses shown above are based on the consensus they reached during the interview. **Leaders' compliance expectations change throughout the QI project implementation phases based on two criteria: 1) staff and data feedback and 2) amount of leader effort. Refer to Figure 11, Conceptual Framework of Leaders'

Compliance Expectations. N/A= Not Applicable. The N/A category was determined by the PI and N/A tactics are not included in the denominator. Data Modifiers: Implementation phase and amount of leader effort.

Section Six: Quality Improvement Implementation Barriers

The leaders interviewed identified many different types of barriers to effective

Quality Improvement (QI) implementation. The barriers to implementation identified during

the interviews fit into five major categories: 1) Leaders, 2) Clinicians, 3) Characteristics of

the QI project, 4) Implementation climate (both within the hospital, within the corporation,

and within the community), and 5) Implementation resources, which includes a sub-analysis

of computer use and non-use. The descriptive details of each identified category will be

outlined below. The leaders discussed some categories of barriers in more detail than they

discussed others; thus, some categories have more descriptive details than others. A list of

all of the QI implementation barriers identified is summarized in Appendix F.

Leaders' Barriers to Quality Improvement Implementation

Leaders' Lack of Knowledge

All leaders said the interview was helpful to them because they rarely reflected on

what they did and did not do and why during or after QI implementation. These study data

suggest that for most of the leaders, the choice of QI implementation tactics was based on

intuition, assumptions, and past experience, not on QI implementation research or formalized

tracking of what worked and why. Thus, these data support the conclusion that all leaders

interviewed could benefit from increased QI self-awareness. QI self-awareness is defined as:

Leaders' ability to articulate their QI implementation strategy and to choose different types

of QI implementation tactics within the overall strategy. Further, it encompasses their ability

to give a rationale for their decisions, and to describe the barriers they anticipate and

encounter.

Most leaders in the study demonstrated knowledge of the conceptualization, planning, and implementation of QI projects. QI project conceptualization is defined as the leaders' ability to select, out of a myriad of possibilities, the QI project(s) they will work on. Further, it includes the ability to decide what the behavioral objectives will be for the QI project. One leader, who compared to the other leaders had the least amount of formal and informal QI training, expressed the greatest need for additional knowledge in QI project conceptualization, planning, and implementation. Indeed, this leader's description of the QI project to the PI demonstrated lesser abilities in QI conceptualization compared to the other leaders. This leader also described him or herself to be less of a QI expert than the other leaders. However, all leaders expressed the desire to know how to increase their QI implementation effectiveness and often verbally explored what else they could try to do to be more effective.

Knowledge of computers, software programs, and basic data analysis were skills the leaders indicated they needed in order to successfully implement QI. Most expressed confidence in their abilities, as well as their knowledge of computers, software programs, and data analysis. Some said they enjoyed working with data and "loved" making spreadsheets and charts. One said he or she was not "tech-ified" and depended on others, who were not always available, to help. The availability and use of computers and software for QI implementation was separately analyzed, and the results are included at the end of section six.

Leader Attitudes

Leaders' assumptions about a QI project affected project topics, plans, goals, and implementation practices. These findings are consistent with Weick's description of the enactment-selection-retention cycle outlined in the literature review in Chapter Two. (Weick, 1979)

QI Project Topic Selection

Decisions regarding which QI projects to implement were based on both assumptions and data. Data were developed through literature reviews and primary data collection. In order for these data to guide QI project selection, the leader first had to decide whether there was a large enough problem to warrant further investigation. Many leaders would read the research literature in order to better understand the issues around the identified quality or safety problem. If after investigation, they still believed there was a problem that required their attention, they would decide what the next steps needed to be.

One example of how the leaders' assumptions or beliefs affected the selection of the QI project topic is outlined below.

Respondent: "It was in the wind and we just said that this actually makes a lot of sense."

The front-line leaders' assumptions affected the level of importance they gave to quality and safety problems identified by their system leaders. Here is an example.

*Respondent: "Well, the whole project was (*slows down for emphasis*) …one of our… quality initiatives for the hospital. We had done pretty well in most areas. So I **guess** the* (episiotomy rates)*…, at least from our facility, ….were exceptionally high."* They were *"higher than I thought they needed to be."*

The QI project topics were also chosen based on assumptions or concerns of others with whom the front-line leaders worked closely. Anecdotal data could affect these assumptions. Here is an example.

> *Respondent:* The QI project topic *"was chosen really, by* ___ (stated the person's name) *actually. It was something that … he's been, mulling over a bit because we were really seeing it was kind of all over the place. You know, in terms of the treatments of these patients slipping through the cracks, in terms of neonatology slipping through the cracks…"*

Leaders' Attitudes Affect the Selection of QI Implementation Goals

Leader attitudes based on either data or assumptions affected their QI implementation plans. Leaders' assumptions may or may not have been accurate. For example, leaders D and E's QI project (to increase breast-feeding rates for all healthy newborns) was in the early phases of implementation. The leaders' assumptions drove the process changes they planned to make, as well as how they planned to implement the changes. One of the leaders' assumptions was that (even though he or she knew that women had certain opinions about who they wanted to be with them when they gave birth), these same women would be unable or unwilling to indicate that they needed privacy when breast-feeding in front of the same family or friends that often had been present for the birth. Based on this assumption, leaders D and E believed that a major barrier impeding early breast-feeding initiation was the presence of visitors.

So, in order to be successful in meeting their QI goals, they believed they needed to implement strict visiting policies for all women during their post-partum hospitalization. In addition to mentioning this assumption, they also acknowledged that the most serious barrier to early breast-feeding initiation consisted of staff routines that imposed separation of babies from their mothers, not the presence of visitors. But neither this acknowledgement, nor the

leaders' indicated awareness of the research outlining the need for families to be a part of a supportive breast-feeding environment seemed to change these leaders' assumption that nurses should restrict the number of visitors for all women.

Leaders' Attitudes and QI Implementation Practices

Leaders' attitudes about the QI project topic affected QI implementation practices. For example, for leader C's most successful project, he or she believed that hospital episiotomy rates were too high. Based on this belief, the leader insisted on and obtained provider compliance. However, leader C believed that the barriers to success for his or her least successful project (to reduce admission rates for women giving birth for the first time at term who were dilated only to three centimeters or fewer), were too complex. In addition, Leader C did not have data to explain why many of the clinicians were not complying. This leader's assumptions affected how he or she followed-up with non-compliant physicians and nurses. Leader C further believed that the hospital was not doing poorly enough (based on the low performance of other hospitals in the system) to warrant additional effort on this particular QI project. Thus, these findings indicate that leaders' assumptions affect the degree to which leaders will work to obtain success.

Leaders' attitudes and assumptions also affect the type and timing of the QI implementation tactics they use. During implementation phases one and two, the leaders assumed that lack of clinician compliance was primarily due to *lack of clinician knowledge, as well as typical clinician practices.* Once the majority of the clinicians had adopted the change (implementation phase 3), the leaders assumed that lack of compliance was primarily due to clinician attitudes, not structural or knowledge barriers.

Neither levels of clinician knowledge nor clinician attitudes about the QI projects were ever formally assessed by the leaders either before, during, or after implementation. Yet, the leaders' expectations of compliance and their preferences for various types of change tactics underwent a shift away from educational tactics to more directive tactics, such as warnings and disciplinary action. The shift away from educational tactics was based on the number of clinicians who had adopted the change and whether the leaders believed they had provided clinicians with enough education and feedback. (Refer to Figure 11, Conceptual Framework of Leaders' Expectations of Change Compliance)

Leaders' Attitudes and Definitions of Quality Improvement Success

How leaders assessed and declared success or failure was found to be variable. Many leaders, who were working on the system-wide First Pregnancy and Delivery (FPAD) QI initiative, adopted the benchmark goals that were based on average performance among the group. Other leaders determined that the goals developed by the peer group were too lenient, and developed their own more stringent FPAD goals. For example, leader F decided that even though his or her hospital had among the lowest rates of first birth, low-risk cesarean section rates, there still was opportunity for improvement. This leader focused on the fact that one process that correlated most highly with unnecessary first-birth, low-risk cesarean sections was non-elective induction of labor. Leader F demonstrated a connection between non-elective induction and higher rates of cesarean sections at his/her hospital by tracking the rates of first-birth, low-risk cesarean sections among women who had a non-medically indicated induction. The leader then reported his or her findings, on this subset of patients, to the hospital QI committee; the results showed a rate of cesarean section greater than fifty percent for women that were induced prior to 41 weeks for non-medical causes. By

presenting these data, Leader F obtained buy-in for a stricter goal than was set by the multi-hospital system QI committee. Thus, the agreed upon goal of the QI project was that there would be no non-medically indicated inductions of labor for women giving birth for the first time who were at less than 41 weeks gestation. The stricter rule was enforced by nurses, who were instructed to simply refuse to schedule non-medically indicated inductions on women giving birth for the first time who were at less than 41 weeks.

Leader F enforced this guideline by performing chart audits on one hundred percent of first birth inductions that occurred prior to 41 weeks. He or she also wanted to ensure that the stated medical indication was "real". For example, physicians commonly indicated that an induction was scheduled due to "high blood pressure". Leader F reviewed the providers' clinical data to substantiate the diagnosis of high blood pressure, as well as to determine if the patient data matched the indication the provider charted. Any provider who had recorded an indication not substantiated by clinical patient data was required to justify their behavior to a peer QI committee. Leader F has maintained this level of effort and commitment over eight years. The leader mentioned that a new physician had recently started practicing at his or her hospital, and that the physician performed a non-medically indicated induction. Leader F's demonstrated strong emotion both verbally and physically when he or she described this recent breach of protocol. He or she was particularly upset, and described the rest of the team being upset, because they witnessed a protracted, several day-long induction that ended in what was considered an iatrogenic cesarean section. Thus, what has become a routine occurrence at most hospitals in the United States was at this hospital treated as a "sentinel event." Meaning the QI goal of no non-indicated inductions of women giving birth for the first time had become acculturated to the degree that one breach of the QI goals and standard

practice generated an intense review of the situation, called a root-cause analysis. None of the other hospitals that participated in the multi-hospital FPAD QI project were able to achieve the result of zero non-medically indicated inductions at their hospitals.

Leader F was proud of the results and pulled out records to show that his or her hospital's low-risk cesarean section rates (not age adjusted) for each of the past three years were below 15%. These rates are lower than the California, low-risk, age-adjusted cesarean section median rate of 16% and below the healthy people 2010 goal of 15%. ("Healthcare Information Division: Hospital volume and utilization indicators for California," 2007)

Leader Practices

The leader practices that were identified as barriers to QI implementation included: lack of leader clarity, leaders who back down when confronted, inadequate authority, lack of time and resources, leaders who stop working on a given QI project, and inadequate leader practices when integrating new hires.

Lack of Leader Clarity

Leader clarity affected QI project progress. For two of the projects described, the goals, desired process, and behavior changes had not been clearly defined. These projects also were those with the least amount of progress made and remained in earlier phases of implementation. (Refer to Tables 4, 5, and 7)

Leaders Who Back Down

Some leaders backed down when they encountered barriers. Other leaders did not give up trying to reach one hundred percent compliance, but, they felt frustrated and stuck when they were unable to obtain complete compliance. They express a desire to know what

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else they could try in order to *encourage or shift* recalcitrant, non-compliant outliers to become compliant. During the interview, one leader in this situation asked for advice and suggestions. Both leaders in this situation verbally explored other tactics they had considered using or tactics they described not being available to them, e.g., disciplinary action for physicians. Thus, these data support the conclusion that even after multiple years, in this case more than eight years, leaders described frustration when they did not achieve 100% compliance on QI projects they had invested a lot of time and energy in.

Inadequate Amount of Leader Authority

Leaders described having an inadequate amount of authority to hold physicians and midwives accountable, and to insist on compliance with the QI project goals. There were only a few physicians or midwives (approximately only 10 out of 96) who were unwilling to change when the majority of the group had changed. But the few recalcitrant outliers were particularly troubling to these leaders. They also potentially jeopardized the ability of the leader to successfully implement other QI projects, if the non-compliant clinicians were not required to be compliant.

Two leaders stated that physicians do not have annual evaluations of performance. One leader said that he or she had never seen a physician disciplined for quality reasons. Two leaders were able to hold providers accountable for complying with QI project goals by having strict peer-review standards, applying peer pressure, or holding directive conversations. Other leaders had tried some forms of peer pressure and directive conversations, but said they did not always work when there remained no ultimate consequence, e.g., loss of employment, for lack of compliance.

Most leaders believed that conditions of employment and privileges to practice must include the requirement that providers comply with QI project goals. The issue was not simply whether a provider, for example, refused to stop cutting an episiotomy; but whether the provider refused to follow evidence-based standards of care. A provider who refused to follow a clinical guideline that the majority of providers are compliant with was defined by the leaders as an outlier. The provider outlier's refusal to "do the right thing" was described to be an indicator of a dangerous overall attitude toward patient care and quality. One leader with non-compliant providers, expressed the strong opinion that outlier providers needed to be held strictly accountable. Specifically, he or she described the need that there be at least the possibility that physician privileges would be reduced or withdrawn for quality reasons. The other leader with non-compliant providers was not sure what the answer was, and described less concern over the fact that providers are not disciplined for refusal to comply with quality initiatives. Since the leaders themselves could not revoke privileges to practice, one leader stated that the governing boards of hospitals and hospital administrators needed to insist on compliance with the goals of formal quality initiatives. How leaders respond to clinicians who refuse to comply with QI initiatives was determined to be a critical determinant of the overall QI project patterns and thus warrants further exploration.

Lack of Adequate Resources

Lack of adequate resources represents a barrier to implementation. However, the amount of available resources was similar for both most and least successful QI projects. Thus, it is unclear to what extent resources constrained success. One way in which a lack of resources may have constrained success could be the process by which leaders decided which of the QI projects to spend their time on. All but one of the least successful projects had less leader

attention, if leader attention is measured by the number of years the project has been worked on. Leader A's most successful project is the one exception to this statement.

The barrier of competing projects and priorities also affected the number of QI projects the leaders were willing to initiate at one time. Leaders described that there was a saturation level or a limit to how much change a group of clinicians could absorb at one time. These findings suggest that leaders believed there was a saturation level. These data do not outline parameters for how to measure how much change groups are able to absorb.

Leaders Stop Working on a QI Project

Leaders may get stuck or side-tracked and simply stop working or actively trying to meet the QI project goals. Adequate leader effort appears to be important to project success and progress, given differences highlighted by the respondents between their most and least successful QI projects. For two of the projects that were least successful, the leaders stated that they planned to "re-energize" and "re-group" to continue the projects. Several leader responses highlight the importance of leader persistence and energy in staying focused on project goals. Staying focused and energized was highlighted by leaders for both most and least successful QI projects.

Least Successful QI Projects
> Respondent1: "It's been a while since we've put that out there all the time at the staff meetings. We've tried little efforts at it, but it hasn't worked so well. We're going to reformulate and we're going to kind of strategize in the next few months... We decided...to get the staff refocused again."

> Respondent 2: "We hope that... we can bring it back and push the issue."

Most Successful QI Project:
> Respondent: "Some people have broken down over time. You know, if you persist - I think persistence is a key virtue here - you break some people down."

One way that leaders were able to remain "focused", "energized" and "persistent" was to participate in the system-wide QI collaborative effort. One respondent described how the multi-hospital QI group energized its members to keep working toward the QI project goals.

> Respondent: "*The whole collaborative* (multi-hospital system collaborative leadership meetings) *…, educators and labor and delivery managers and all that. It was very exciting to be a part of that (*the multi-hospital system collaborative leadership meetings)*. When you're in the situation with them,* you are... *energized. They're just like, 'Yeah, we can make this work.' And I think that's part of a thing that …makes it work."*

Even after a leader had success with a QI project and met the project goals, there still was a need to perform on-going monitoring to ensure that the improvements were maintained. This means that leader focus and efforts must be maintained for long periods of time; most of the QI projects had been continuing for over eight years. Even after the passage of between approximately one to eight years, one respondent's comments represent the view of all of the leaders regarding the importance of on-going vigilance.

> Respondent: "*Perhaps now … we need to refocus on that parameter …and re-energize ourselves… to thinking about … that subset and not … take our eye off the ball so to speak."*

Inadequate Leader Practices to Deal with New Hires and Staff Returning From Vacation or a Leave of Absence

All leaders mentioned staff turnover and long leaves of absences as barriers to QI implementation. The barrier was described to be present even if the leader had several structural changes in place. For example, in Hospital 3, Leader F indicated that a new physician had been able to book an elective induction prior to 41 weeks on a woman giving birth for the first time. Leader F said that this particular incident made them realize they

needed to do a better job informing new physician hires about the local QI initiatives and standards, and remind staff to continue to block inductions that did not meet the standard. Another challenge identified was how to ensure that all staff returning from leaves of absence or vacation were fully aware of the QI project goals, prior to taking care of patients. More discussion on these two barriers is covered in the section on clinician knowledge barriers.

Clinician Barriers

Clinician barriers to QI implementation include lack of knowledge, attitudes, and current non-compliant practices. These findings are consistent with Cabana, Rand, Powe, Wu, Wilson, Abboud, and Rubin's systematic review of the research published between 1966-1998. (Cabana et al., 1999)

Lack of Clinician QI Project Knowledge

The first major barrier to QI implementation that the leaders worked to overcome was a clinician's lack of knowledge about their own practices and lack of awareness regarding why a change was needed. Meaningful data and on-going feedback were important for increasing clinician knowledge. As previously mentioned, meaningful data is defined as Data that is granular enough to inform the QI project change goals, e.g., individual or group, and data that is also accurate, and timely. Increasing clinician knowledge was the priority leader's described during implementation phases one and two in the Conceptual Framework of Leaders' Expectations of Change Compliance. (Refer to Figure 11)

Most leaders found staff leaves, such as maternity and sick leaves, and long vacations to be an added challenge, and at times a barrier, to ensuring clinician knowledge about the QI

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project. In addition, new hires required focused attention to ensure that they are aware of

project goals and local guidelines.

> *Respondent: "Part of the thing is it's been a year since we did this, and a lot of new*
> *personnel have come onboard. So probably we need to go back and repeat the steps that*
> we *went through* (when) *this was on the front burner as an initiative in order to educate*
> *some of the new kids coming out. I call them kids 'cause they are.* [both respondent and
> interviewer laugh].… *I have kids their age."*

The need to use tactics to ensure staff knowledge about the QI project goals was

consistent across both most and least successful QI projects.

New and Less Experienced Staff as Barriers and Facilitators to Change

Several leaders highlighted differences between new and more seasoned staff as both

barriers and facilitators to QI success for their most and least successful QI projects.

New and Younger Staff as Barriers to Change

Amount of turnover represents a potential barrier new staff pose to the

implementation of QI project goals. For example:

> *Respondent: "Part of the thing is it's been a year since we did this, and a lot of new*
> *personnel has come onboard."*

Another potential barrier posed by new staff pose is the amount of skill they possess.

> *Respondent: …*the new nurses *"had to use their own skills in terms of supporting a*
> *woman through labor and helping them and empowering them, but, they didn't have*
> *that skill…'Cause they're relying upon the epidural or, you know, all the technology*
> *that we have that in many ways is great, but it isn't in other ways. Because they can*
> *sit at the desk and look at the monitor and, you know, chart there rather than seeing*
> *with their own eyes and touching with their own fingertips and feeling… I remember*
> *an old labor and delivery nurse tell me one time, she said, 'You know, … if you're a*
> *real competent labor and delivery nurse you should know…by walking - watching a*
> *patient walk in how far dilated she is'."*

<u>Less Experienced "Younger" Staff as Facilitators for Change</u>

Younger staff's ability to adapt to technology in the clinical setting was seen as a facilitator for the QI projects where computers and other technology were important to the success of the QI project.

<u>Experienced "Older" Nurses as Barriers to Change</u>

For some QI projects more seasoned or "older nurses" were found to be a barrier.

Respondent: "Some of the older nurses are barriers. It was really difficult for them to change."

<u>Experienced Nurses as Facilitators for Change</u>

For Leader G's most successful project and Leader C's least successful project, experienced nurses facilitated the success of the projects and did not represent a barrier to change. For Leader G's QI project, most of the need for experienced strong nurses occurred during the day shift when inductions were usually scheduled; the experienced nurses were more comfortable refusing physician requests to schedule non-medically indicated inductions.

Respondent: "But most of the inductions are scheduled during the day shift and the day shift people have been here since we opened and they're strong patient advocates…" " they know it's best for the patient" to stop non-medically indicated inductions.

For leader C's least successful project, the lack of experienced nurses on the night shift was seen as a barrier to the success of the project: to minimize the admission rates of women giving first-time birth at term who were three or fewer centimeters dilated.

Respondent: "Well, I think it depends on the nurse who's involved, … and her experience or lack thereof. … we have had … a lot of new and younger labor and delivery nurses and invariably they start on the night shift because, you know, it's a little hierarchical. … the longer you've been here, you get to… have the day shift

rotation… it's easy during the day because doctors see (the patients) *in their office first and can kind of filter a lot of that stuff. So the patients come in at night and 2 in the morning and* (the nurse) *calls the doc…it's easier to just say admit them, than to try to work through a dialog and scripting for the nurses to use. And some experienced nurses are very good … they've done it for years and they can, …talk to the patients in a very maternal way and comforting way and convince them that they need to go and wait a little bit longer. The inexperienced nurses can't do that as well and they're going to call the doc and the doc is going to sit there half awake at 3 in the morning and it's easier to say, 'Well, just put them in, and then I don't have to worry about it until they get there in the morning.' And I guess probably relative nursing inexperience on that night shift.. is probably one of the bigger things besides the… doctors' reluctance to tell somebody he knows well and has a good relationship* (with)*, who's in tears and doesn't want to go home to go home…you don't want to look like the bad guy and make them go home."*

Clinician Attitudes

Clinician attitudes identified as barriers to QI implementation included that clinicians were not persuaded to change and wanted "autonomy." These findings are consistent with research that identified clinician attitudes as a barrier to adopting clinical guidelines. (Cabana et al., 1999) In addition, similar to the findings on leaders' assumptions, clinician assumptions affected clinician attitudes. The clinician assumptions that affected their attitudes may or may not have been evidence-based.

Clinicians Were Not Persuaded to Change

The lack of clinician persuasion as a barrier to change is consistent with E. Rogers' research indicating that once people have knowledge about an innovation, the next step is for them to become persuaded to adopt the change. (Rogers, 2003) Most leaders who had clinicians who were not persuaded by research findings stated that clinicians would find multiple reasons or conditions within the research sample, or in the findings to justify their lack of persuasion.

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One reason leaders indicated that clinicians were not persuaded by research evidence was their fear of bad outcomes based on past experience. For a few clinicians, their own clinical experiences trumped research evidence.

> *Respondent:* "*And most of the time they* [the non-persuaded] *will say, 'You know, I've had* a *third or fourth degree laceration X years ago and I don't ever want to have one again'."*
> *Interviewer: "They've actually said that to you?"*
> *Respondent: "Oh yes. 'I had one twenty years ago, I don't ever want to have another one. I'd rather cut the mediolateral episiotomy and sew them every single delivery than* (have) *a fourth degree laceration every 20 years or however many often.'"*

The rationalization for not following guidelines in this situation was based on the flawed logic that a few negative outcomes justified the routine use of a procedure with known serious sequelae. In this case, the procedure was an extreme measure rarely used by others, but used here in order to avoid the occurrence of lacerations that rarely occurred. Thus, past traumatic experiences or fear of a bad outcome was the justification leaders described many clinicians, at all of the hospitals, used to ignore research evidence. For the QI change projects focused on reducing the rate of episiotomy, fear was a very strong barrier to change, since clinicians had been taught that without an episiotomy women would tear. Thus, they had for many years been faithfully cutting and repairing episiotomies, and knew no other way. The new teaching was directly contrary to what they had been taught and had practiced for years. It required that they admit that the way they had been practicing was causing more harm than good. The idea that the way they had always done things was incorrect was a hard fact for clinicians to admit. To be presented with evidence that forces clinicians to re-evaluate what they have always done is a type of cognitive dissonance that is difficult to experience. Clinicians see themselves as doing things to help, not harm others. The finding that clinicians will justify their past behaviors when faced with research that is contrary to

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their current practices is consistent with cognitive dissonance research. (Tarvis & Aronson, 2007)

Another leader described how powerful fear can be as a barrier to change. This leader dealt with clinician fears by showing that if they made the change, their fears would not materialize very frequently and in this situation, less frequently than it previously had.

> *Respondent: " You know, the biggest barrier, … is people were afraid that if they did not do an episiotomy, they'd have a worse tear to repair."*
>
> *Interviewer: "How did you deal with that barrier?"*
>
> *Respondent: "Testimonials and data. You know, we volunteered and made a place on the form to track hand grenade repairs. We defined these type of repairs as greater than three packs of sutures used…We made it into something they could count, because everybody remembers the terrible case that you know you're there for longer than a c-section, …to do the repair. But they actually occur quite infrequently. So, to be able to demonstrate how infrequently it occurred, we devised … a way of tracking them. Of course, it was almost never checked".*
>
> *Respondent, cont.: "…Fear is … one of the stronger drivers. Fear of something going wrong is a stronger incentive than accolades for doing something right."*

The testimonials referred to by this leader represented an approach other leaders used, as well. The testimonials used were from the clinicians they worked with who had made changes in their practice, resulting in better outcomes. Receiving testimonials from their peers was more convincing to some clinicians than research evidence.

> *Respondent: "…people are much more comfortable doing something that they - or if there are other people in the area that have done it before - are doing…well."*

Clinicians Want Autonomy

Another related attitudinal barrier to change that was identified in the study is the strong cultural value of professional "autonomy." This finding is consistent with Leape and Berwick's assessment of a reason little progress has been made in improving patient safety

since the release of the Institute of Medicine report "To Err is Human." (Leape & Berwick, 2005)

> *Respondent 1: "…well, there are some of them that are willing to listen to that. But there are some that are just obstinate. They feel like it is cookbook medicine and 'I've done it this way all my life. I've done it this way so far. Why should I* (change)?' "
>
> *Respondent 2: "Well, the barriers initially were that, 'You can't tell me how to practice.'"*

In this situation, the cultural value of "autonomy" is directly opposite to the cultural value of "first do no harm." However, there is no conflict between the two values when clinicians choose not to believe research evidence that does not oppose how they are used to doing their work. Thus, the clinician barrier of "autonomy" and relevance of the research evidence to their particular situation are closely related.

Clinician Practices

The clinician practice barriers identified were: 1) clinician inertia and 2) changes were perceived to add more work or slow down current workflow.

Clinician Inertia

Inertia represents a barrier to change. For example, if clinicians had specific tasks they were used to doing in a certain order, it was easier to keep doing things the way they had always done them. Thus, even if clinicians were persuaded to make a change, they would often forget to do things the new way.

> *Respondent: "Yeah. I shake them… [laughs]. … these people get in - I don't want to say bad habits, but they just … lose their focus and drift into - oh, I guess bad habits…".*

Changes Add More Work or Slow Down Current Work Flow

Another barrier is the perception that that some of the changes may add more work, thus taking more of the clinicians' time. Some changes did not add extra work, but required re-learning routine tasks; such re-learning required additional effort and time.

Respondent: *"And it takes time to do that and you have to remember to do that."*
An added challenge for Labor and Delivery units is that the flow of patient needs can not be scheduled, e.g., when they will be in labor and need attention, was generally not controllable. Thus, the implementation of a change often was complicated by the inability to control the amount of patients who were in need of attention.

Characteristics of the QI project

The QI project topic affected clinician buy-in for all of the projects analyzed, which in turn affected how readily the changes were adopted.

Effect of QI Project on Clinician Time and Income

One respondent response is a representative example of this type of barrier. This leader said that some QI projects hit "closer to home" because they affected the physician's income and time.

> Respondent: *There was …a lot more direct physician pushback on this rather than the episiotomy - people who grumbled about episiotomy said… 'I have to change the way that I was trained.' But that was the worst they could come up with … But there was a lot more physician pushback on this one… But the pushing back is clearly different. At a different level. So this is hitting closer to home in a couple different levels…"*

> Interviewer: *"Describe that further."*

> Respondent: *"Well, home is where economics is. Home is where…equally important to economics… is try to organize your life and days so you have some time off. And physicians are trying to control that more and more."*

The effect of a QI project on clinician time and income also was shown to be a positive driver of clinician buy-in. For example, reducing the time interval from patient admission to when they were assigned a room had complete clinician and staff buy-in because, as the leader described, keeping to a schedule meant: 1) everyone could go home on time, 2) more patients were satisfied, and 3) revenue increased due to increasing patient loyalty and referral rates.

Clinician Perception of the Desirability of the Change to Patients

Changes that were perceived by the clinicians to be less desirable to patients engendered decreased clinician buy-in. For example, the reduction of episiotomy rates was a change that the leaders perceived to be desirable to patients. However, the reduction of induction rates was perceived to be less desirable to patients. Physicians' behaviors, in particular, were described by all of the leaders to be most affected by physician perceptions of the desirability of the change to their patients. However, perceptions of desirability were primarily based on anecdotal evidence, not on a systematic analysis. Also, leaders indicated that providers who did not want to comply with their patients desires, e.g., the provider wanted to cut an episiotomy but the patient did not want one, would justify their lack of compliance by telling the patient that the episiotomy was warranted in their individual case. The patient had no way of knowing whether the individual provider was giving an honest assessment, nor would she be privy to the provider's rate of episiotomies, in order to determine the veracity of this statement. In addition, there was evidence cited by most leaders that when clinicians explained to patients why they would not meet a patient request due to a QI initiative that was initiated to avert harm to the mother or baby, (e.g., a non-indicated induction), the patients who were thus informed did not change physicians or hospitals.

Implementation Climate

Implementation climate within the hospital, within the system-wide corporate leader level, and within the local and national community were identified as having an effect on QI implementation.

> *Respondent: "… the external value is an external validation that this is important.,… It's not just me here, but many people who see this as a worthy goal and a worthy project. It can be very isolating as a single person in a single hospital trying to lead the other physicians along. Which is the value of … national statewide quality measures and quality projects… to give reinforcements to the individuals who* (are) *trying to lead the project."*

Hospital

Having too many or too few patients was identified as a barrier to QI implementation for three out of twelve of the QI projects. Having too many patients was identified as a barrier when the volume of patients affected how much time and attention the clinicians could devote to implementing the desired changes.

Corporation

One question raised in the literature review was the necessity of senior leader support for front-line QI projects. The literature is not straightforward, but based on the research, it is a reasonable conclusion that the more leaders who support a QI project at various levels within the organization, the more likely it is that the QI project will be successful. Related to the literature review findings, for ten out of the twelve QI projects (five out of the six most successful and five out of the six least successful), the front-line leaders identified the active support of the multi-hospital corporate leaders as being beneficial. These data indicate that the involvement of multi-hospital system corporate leaders had a positive effect on QI topic selection, QI topic data collection, and whether there was a QI project at all. However,

several of the front-line leaders stated that having corporate support also had a downside. If clinicians saw the QI project as coming primarily or directly from corporate leaders, then front-line clinicians (physicians and nurses) would be less receptive and actually less likely to adopt the changes. Front-line clinicians were described to be less receptive to QI projects that were imposed upon them from the corporate leaders.

> *Respondent: "But it's different if one of your own says, "You know, we need to do this. We need ... to figure out this and why it is important ... typically it's better buy-in ... And as much as you don't want to have an us and them, as soon as it becomes them [chuckles], the administrators are coming to help make our lives better [laughs]. It doesn't usually go over as well."*

But, despite these type of comments, leaders also described benefits from having corporate leader or senior leader support. For example, the ability to get benchmark data and to learn from each other through the sharing of successes and failures.

Community or Patients

Patients were seen to either facilitate or act as a barrier to change. For most of the QI projects, patient opinions were not relevant to the project goals, e.g., how nurses charted and communicated fetal heart rate monitoring data or the use of sequential compression devices. However, for the project to reduce episiotomy rates, patients' desires not to have an episiotomy were mentioned as facilitating the change. For the projects in which women may want care provided to them that was contrary to goals of the project, patient preferences were described to be a barrier, e.g., some women were reported to want to be admitted to the hospital prior to three centimeters' dilation and others reported to want non-medically indicated inductions. The leaders described that patient requests that were contrary to the QI project goals were ameliorated by developing patient education materials and ensuring that

the materials were handed out in private physician offices, discussed in childbirth education classes, etc. Some of the leaders recommended that physicians use these materials, but not all physicians were willing to do so. The leaders' described that some physicians were less willing to explain to their patients that they would not comply with their requests, and the reasons why. The clinicians who did educate patients about the risk of induction or risks of being admitted prior to 3 centimeters did not, according to the leaders, have less satisfied patients satisfaction, nor did the patients choose to deliver at another facility or with another care provider. In fact, these leaders reported that the care providers who complied with the QI project goals had very high patient satisfaction scores and robust practices. Thus, the described barrier of patient preference may be a barrier of clinician assumptions and attitudes about how they should reconcile patient requests with best practice guidelines and not truly a patient barrier.

Implementation resources

Lack of implementation resources was one of the most prominent barriers identified by the leaders. The types of implementation resources that were identified as barriers included lack of data, lack of leader time, lack of enough support personnel, and financial constraints that put pressure on the leaders to make sure care providers did not take their patients elsewhere. All of the leaders worked around their resource barriers; they did not indicate that either the lack or presence of resources became a cause of or a hindrance to QI project progress.

Data Barriers

Lack of timely and accurate data and feedback was a barrier that leaders expended a great deal of energy and time to overcome. All leaders described data as either facilitating or impeding clinician compliance with QI project goals. All six of the most successful QI projects had developed clear data collection and data display methods. Two out of the six least successful QI projects, the two projects with the lowest QI progress scores, had not yet enumerated their data needs, did not have their goals articulated in a numeric goal, and had not developed trend charts to show the gap between current state and desired state. (Refer to Table 4 and Table 5)

Lack of Leader Time and Adequate Support Personnel

The type and amount of staff support available to leaders for implementing QI projects varied from hospital to hospital. It is not clear from these data how much staff are needed for QI implementation. But two leaders did state that lack of time and lack of personnel made it more difficult for them to complete all of the quality initiatives imposed by corporate leaders, as well as to implement QI projects that they felt were priorities for their hospitals. The leader with the least amount of leadership experience, who had been in his or her position the least amount of time, and had received the least amount of QI training, appeared to have less implementation support available compared to the other leaders. He or she stated that there had been staff turn over and that there were vacant leadership positions on the unit.

Computer resources also varied from hospital to hospital. The computer resources and the leaders' use and non-use of computers for QI was thoroughly analyzed and these data

are described in a separate section entitled "Use and Non-Use of Computers as A QI Implementation Tool."

Financial Constraints

Most leaders interviewed identified financial constraints or pressures from the hospital as being a potential barrier. Leaders stated that physicians would use the threat of taking their patients elsewhere, a financial threat to both front-line and corporate leaders, if the leader forced the physicians to comply with the QI project goals. One leader refused to back down, in his or her own words "called their bluff", and the threatening physicians did not take their patients elsewhere. However, this was a difficult stand for the leader to take. The leader felt pressured by this threat because his or her bosses required that he or she facilitate a high patient volume. When asked what his or her QI implementation insights were, this leader said that that physicians may make threats that they do not always follow-through with. The leader also said that leaders need to do the right thing for patients and refuse to be bullied by physicians and staff.

Other financial barriers existed when physicians believed that complying with the QI project goals would displease their patients; if for example, physicians believed that their patients would simply go to other physicians who would give the patient what the patient was asking for. The leaders who identified patient requests as a barrier to implementing QI project goals, said were some physicians who were willing to explain the reasons for not acceding to a non-evidence-based request, e.g., an induction, who had not seen their patients change physicians, and some physicians who refused to have these discussions with their patients. The leaders did not know of any patients who switched physicians because the physicians refused to comply with harmful patient requests. In addition, leaders who

provided education to patients during hospital tours and childbirth education classes about, for example, the risks of non-medically indicated inductions, said that they did not know of any patients who chose to deliver at a different hospital because of these QI project guidelines. In addition, three leaders said that when they personally explained the rationale for these protocols to patients, all of the patients they spoke to were easily persuaded that the protocols increased safety for both mothers and newborns. In fact, they were proud to say that they had very high patient satisfaction scores. These data suggest that perceptions of patient preferences as a barrier can be mitigated with education.

Summary

These data support the conclusion that barriers are particularly affected by the individual assumptions and the group context. This conclusion is further supported by the cross-case analysis since barriers based on assumptions and fears were shown to be inconsistent. Specifically, what were assumed to be insurmountable barriers at one hospital or by one leader or one physician were shown to be a barrier that was successfully overcome by another leader at another hospital. The type and number of barriers described by the leaders interviewed for each hospital site are summarized below in Tables 8a and 8b.

Table 8a: Barriers to the Implementation of Quality Improvement Projects

B=Barriers, *A barrier that was sustained and impeded QI project progress.

	Most Successful Complex QI Projects						Least Successful Complex QI Projects					
Clinician Leader	A	B	C	D&E	F	G	A	B	C	D&E	F	G
QI Progress Score	6	4	4.8	5.5	5	5	4	2.5	4.8	2.5	4	3.5
Leader Barriers												
Leader Knowledge												
Lack of knowledge of QI Conceptualization, planning, & Implementation								B				
QI Self-Awareness	B	B	B	B	B	B	B	B	B	B	B	B
Knowledge of Computer software and data analysis tools								B				
Leader Attitudes												
Non-data driven assumption(s) affect topic selection, topic goals, and implementation tactics									B	B		
Definition of Success			B			B		B	B			
Leaders' Practices												
Lack of leader clarity of QI project goals								**B***		**B***		
Backing down		B				B	B		B			B
Inadequate amount of authority to enforce compliance						B	B					B
Lack of adequate resources of both time and staff		B						B				
Stop trying						B			B			B
Inadequate practices to deal with new hires and staff returning from vacation or leave of absence				B	B					B		
Clinician Barriers												
Clinician Knowledge												
Lack of clinician knowledge about their own practices (no feedback)	B	B	B	B	B	B	B	B	B	B	B	B
Clinician lack of knowledge about the QI project		B	B	B	B	B	B	B	B	B	B	B
New staff and less experienced staff		B	B	B	B			B	B	B	B	B
Clinician Attitudes												
Clinicians not persuaded to change		**B***		B	B	B	**B***		B	B		**B***
Clinicians want autonomy		**B***			B	B	**B***		B	B		**B***
Clinician Practices												
Inertia - Forget	B	B	B	B	B	B	B			B	B	
Changes add more work or slow down work flow		B	B	B		B	B		B	B	B	B
Total	3	10	7	8	8	11	9	9	11	11	6	10

Table 8b: Barriers to the Implementation of Quality Improvement Projects, cont.

	Most Successful Complex QI Projects						Least Successful Complex QI Projects					
Clinician Leader	A	B	C	D&E	F	G	A	B	C	D&E	F	G
QI Progress Score	6	4	4.8	5.5	5	5	4	2.5	4.8	2.5	4	3.5
Characteristics of the QI Project												
Clinician income					B				B			B
Clinician time		B	B	B	B	B	B		B	B	B	B
Clinician perceptions of desirability of the change to patients					B				B			B
Implementation Climate												
Hospital		B			B			B				
Multi-Hospital System												
Community or patients					B							
Total Characteristics and Climate Barriers	**0**	**2**	**1**	**1**	**5**	**1**	**1**	**1**	**3**	**1**	**1**	**3**
Total Leader and Clinician Barriers	**3**	**10**	**7**	**8**	**8**	**11**	**9**	**9**	**11**	**11**	**6**	**10**
Total Barriers Present out of Possible 24	**3**	**12**	**8**	**9**	**13**	**12**	**10**	**10**	**14**	**12**	**7**	**13**
	57/144						**67/144**					
Total Number of Applicable Tactics Used	10 (22) 45%	12 (24) 50%	10 (24) 42%	17 (23) 73%	13 (24) 54%	10 (24) 42%	9 (24) 38%	9 (24) 38%	9 (24) 38%	7 (23) 30%	18 (23) 78%	8 (23) 33%

B= Barrier, *A barrier that was sustained and prevented QI project progress

Use and Non-Use of Computers as A QI Implementation Tool

During the interviews, computers were identified to facilitate the QI change in two out of the twelve case studies (Leader A's Most Successful and Leaders D and E's Most Successful QI Projects). However, several of the leaders stated that they lacked a computer. Since computers were found to be a facilitator by some leaders, the lack of a computer was identified to be a possible barrier to QI implementation. These data were complex enough to warrant a separate sub-analysis to answer the question: ***How do front-line maternity physician and nurse leaders use or not use computers as a direct QI implementation tool for their most and least successful complex QI projects?***

Findings Overview

In eight out of the twelve QI projects, computers were used as a direct QI tool within the broader practices of education, data collection, and discourse. Use of computers as a direct QI tool is defined as computers fulfilling a specific function that facilitates the front-line leaders' QI change strategy. The four direct QI computer roles identified by the leaders are outlined below. Indirect use of computers for QI was used by all leaders interviewed, and is defined as the use of computers to generate reports and trend charts. In two out of the twelve QI projects, computers were identified to be the primary QI implementation strategy used. These study findings suggest that leaders tailor their QI practices and tactics based on tools they have available to them.

Computers were used (or not used) by the leaders in four direct roles: 1) Source of feedback for leaders and clinicians, 2) Audit tool for leaders, 3) Reminders to the clinicians, and 4) Structural change in the data entry charting options available to the clinicians, e.g., nurses notes and physician standard order sets. All four direct QI computer roles are

discussed below with respect to the amount of computer usage for each particular role. The

amount of use within each of the four roles is defined as either All, Most, Some, None or

Computer Not Available for this particular role. The use of computers within the leaders'

most successful and least successful QI projects was similar. The findings regarding the use

and non-use of computers by the role they performed for each QI project are shown in

Table 9.

Table 9: Direct QI Computer Use and Non-Use Outlined by Computer Role for Most Successful and Least Successful Complex QI Projects
(All, Most, Some, None, or Computer Not Available – N/A)

	Most Successful Complex QI Projects						Least Successful Complex QI Projects					
Clinician Leader	**A**	**B**	**C**	**D&E**	**F**	**G**	**A**	**B**	**C**	**D&E**	**F**	**G**
QI Progress Score	6	4	4.8	5.5	5	5	4	2.5	4.8	2.5	4	3.5
Computer Role												
Source of Feedback for Leader and Clinicians	All	None	None	None	Not Avail	None	None	None	None	None	Not Avail	None
Audit Tool for Leader	All	Most	None	None	Not Avail	Most	Most	None	Some	None	Not Avail	Most
Reminders to the Clinicians	None	None	None	None	Not Avail	None	None	None	None	None	None	None
Structural Change, e.g., Change in data entry options	All	None	None	All	Not Avail	None	None	Some	None	None	Some	None

Computers as Source of Feedback to Leaders and Clinicians

Computers as a source of feedback is defined as making computer displays available

that summarize and display information to the leaders and clinicians. Computer displays

show clinicians how close they are to meeting their goal. The feedback is developed by the

type of data entered into the computer. The feedback to the leaders and clinicians can be

real-time or post-event, continuous or periodic. Computer data entry can occur in many ways and combine data from multiple sources.

Computers as a source of feedback to leaders and clinicians occurred in only one case, Leader A's Most Successful QI Project. In this case, feedback was available **"all"** of the time; it was real-time, meaningful, and accurate. The feedback was available to all clinicians and staff simultaneously, but in physically separate sections of the office. In this "most successful" QI project, the use of the computer to provide continuous feedback was a strategy that was implemented a full year after many other tactics had been tried, all with minimal to no effect. When the plan was developed to use the computer for continuous display of feedback, the leader did not anticipate that the computer data display would be the solution to the quality problem they had been laboring over for an entire year. However, much to their pleasure and surprise, one week after implementation of continuous data display, there was 100% compliance among the entire team within this unit. Leader A stated that the change has now been sustained for several years, with no additional effort on the part of the clinician leader or others within or outside the unit. In addition, the computer feedback system has been implemented effectively in several other units among over 250 clinicians and 300 staff, all with similar, dramatic, and rapid results.

For this QI project the use of computer technology to provide continuous, simultaneous, real-time, accurate, and meaningful feedback to numerous clinicians, was effective for rapidly changing integrated behaviors. This may be particularly true in this situation, in which clinicians and staff all agreed that the QI change was desirable and were working together within one unit. Once there was continuous computer feedback display the grouped changed almost immediately.

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Computers as Audit Tool for Leaders

Computers used as an audit tool is defined as the use of automated computer software to collect and generate QI audits and reports based on either pre-determined or customized variables. When health records are entered and stored on computers that do not have data collection and reporting options, the chart audit and data collection processes are the same for computerized charts as it is for paper charts; the audit data must be collected by hand. Thus, automated systems represented a time savings for the leaders who had computer systems with audit capabilities. In addition, computer audit systems reduced the possibility of data errors made during transcription.

About half the cases used computers for some QI data collection, but no pattern was observed between the most successful and least successful projects, that would indicate that computer-generated audits are more effective than paper-generated audits for providing clinicians periodic data feedback. This finding contrasts with the previous finding that continuous and real-time data display, available to everyone on the team, allowed for real-time adjustments in clinician behaviors, that led to sustained improvements.

Leaders with automated audit systems stated that the system saved them time. Leaders without automated audit systems stated they were looking forward to when their computer system would be installed. However, leaders also mentioned that computer entries by clinicians were subject to mistakes, just as paper charts were. Leaders had to spend time verifying computer data entry, notifying clinicians when there were mistakes, and following up with the clinicians in order to correct data entry mistakes.

Computers as Reminders to Clinicians

The use of computers for sending direct reminders to clinicians is defined as the use of the computer for sending the team or individual clinician an automated reminder message to either chart or to accomplish some other task. The reminder is sent based on the type of data the clinicians enter to trigger the reminder message. For example, a computer algorithm can be written that links data in such a way that potential errors can be avoided. The reminder algorithms can be based on any number of variables. Some common types are: 1) Dates, e.g., the orders have become out-of-date and need to be re-written, 2) Drugs, e.g., two incompatible drugs are outdated, or, 3) More complex relational reminders, e.g., if ____ is ordered or charted then ____ is needed. None of the leaders chose to describe QI projects that included examples of computer algorithm-generated reminders.

Computers as Structural Change in Data Entry Options

Structural changes in these data entry options are changes in the default entries for both charting options and standard order sets. For the two QI projects where structural computer changes were identified as *"all"* and two QI projects where structure changes were identified as "some", the clinicians always had the option to refuse to make the change in charting and to bypass the new defaults. The leaders stated that it was unusual for the clinicians (both physicians and nurses) to bypass the defaults; it was possible to do so, but cumbersome and time consuming.

Thus, changing computerized order entry sets was reported to be effective for getting rapid compliance from providers. All of the changes in standard order sets were made by nurse leaders. In other words, changing physician order sets is a tactic nurse leaders used to make changes in physician behaviors that, in turn, drove changes in nurse behaviors.

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For leaders D and E's most successful QI project, changing the nurse charting options was the primary tactic used. The structural changes in the computer were made after the nurses and physicians were provided with education. The structural change in computer charting options affected approximately 100 nurses who worked on this unit. The change in charting language was described by the leaders as a way to get rapid change compliance through computerized reminders and facilitation. Structural changes in paper charting options were also described to be a change tactic that was used to remind clinicians to put on and remove TED stockings or sequential compression devises. These data support the conclusion that changing computer charting options and paper forms are both effective tactics that leaders can use to facilitate behavioral changes in how a large number of nurses chart.

Barriers Conclusions

All leaders had multiple barriers to overcome for each QI project they implemented. There were no patterns identified between most and least successful QI projects with respect to barriers. In addition, no patterns were identified related to the number of implementation tactics leaders used or the number of barriers they identified.

Chapter 5: Discussion

Overview

It is reasonable to assume that the study of the implementation of QI projects in health care can benefit from diffusion of innovation research. After half a century of primarily quantitative research methods having been applied to the study of diffusion of innovation, the field now has recognized the need for more "process" research. (Rogers, 2003) As previously noted, QI implementation tactics are defined as the actual means or processes the leader uses to execute a strategy. Thus, the study findings of QI implementation tactics that are used within overall implementation strategies is primarily a study of process. Health care QI leaders and researchers, Grimshaw, Grol, Greenhalgh, and Berwick, also agree. (D. Berwick, 2008; T. Greenhalgh, 2006; J. M. Grimshaw et al., 2006) In fact, Berwick goes so far as to say qualitative research methods are not only a valid method of QI research, but are "superior" methods. (D. Berwick, 2008)

Currently, most QI studies concentrate on outcomes and do not contain details on QI implementation strategy and tactics (or processes). The focus on outcomes has led to a bias in the literature to report and publish papers with good outcomes. A focus on outcomes also means that publications lack implementation process details. This lack of implementation process details makes it difficult for other leaders to replicate research findings or to make strategic implementation decisions. The lack of implementation details also means there is

limited or no information on the identified barriers. Minimal implementation process details make it more difficult to identify the most effective implementation QI practices and to perform and interpret systematic reviews. (Chaillet et al., 2006) For example, were the tactics that are compared to each other defined and implemented the same way? In addition, without descriptive processes data, details of timing are lost. Thus, there is limited information about when a leader used a particular implementation tactic or why one tactic was used when others were not. With a literature bias toward publication of good outcomes, if the process was flawed (meaning the strategy and tactics were insufficient), then the fact that the hoped-for outcome was not achieved may mean the implementation was flawed. If one only looks at outcomes, then one will not know how to change or tailor what was done in order to get a more desirable outcome.

In reality, both outcomes and process matter and are intrinsically linked. An internationally recognized QI leader and researcher, Jeffrey Gould, MD, MPH, PI of the California Perinatal Quality Care Collaborative (CPQCC) recently summed it up as follows: "Outcome is process, if you have the right process attached to the right outcome." (Gould, 2009) He then went on to further describe what he meant. If you want to eat a boiled egg, you need to follow a process of putting an egg in water that boils for nine minutes. By following this process you can reliably produce a predictable outcome – a boiled egg. If, however, you want to make ice cream, you need to use different ingredients and follow different processes. So the processes are what drive the outcomes. Currently, we are asking leaders to independently develop recipes for ice cream, by only giving them a list of ingredients. It makes a lot of sense to provide those who develop a good "recipe" with effective methods for communicating and sharing them with others. Local adjustments will

need to be made to the recipe, but at least there is something to start from. In fairness to Dr.

Gould's comment, he was referring primarily to processes of care leading to different patient

care outcomes. However, the same logic applies to how leaders implement QI. If leaders

attend to the processes by which they implement QI, and seek to improve the effectiveness of

their implementation processes, the outcomes of the QI project will be altered.

The conclusions and discussion for this dissertation study are based on the qualitative

descriptive findings described in Chapter Four. The twelve extreme case QI projects

analyzed impacted the practices of over 800 individual clinicians, who collectively cared for

approximately 7,600 women, who gave birth each year between the years 2001-2008.

The study conclusions and discussion, outlined in Chapter Five, are organized as

follows:

Section One: QI Implementation Process Patterns
Section Two: QI Implementation Tactics
Section Three: Barriers to QI Implementation
Potential Study Limitations
Study Strengths
Summary

Section One - QI Implementation Process Patterns

The study findings support conclusion number one, that there is no single

combination of tactics or barriers that distinguish the most from the least successful QI

projects; however, QI implementation process patterns were identified and can be

described. (Refer to Appendix G) For example, all of the leaders shifted their own

expectations of change compliance and conversation style based on expectations of change

compliance. Two criteria were identified that determined when there was a shift in the

leaders' expectations of change compliance, and the types of conversations the leaders would

hold. Neither of these two criteria included the setting of a pre-determined target completion

date. The criteria that determined when the leaders' expectations shifted were: 1) The

number of clinicians who had adopted the change to date, and 2) the leaders' self-assessment

regarding whether they themselves had effectively done the due diligence of discussing,

educating, and mentoring clinicians through the change.

Another example of implementation process patterns that were identified is

represented by three types of implementation patterns that are demonstrated in the

implementation project diagrams. (Refer to Appendix G and the following discussion entitled

QI Project Implementation Project Diagrams) *The presence of QI implementation patterns*

supports conclusion number two: that more implementation process research is needed to

determine if there are other patterns not identified in this study and to confirm these

results.

QI Project Implementation Project Diagrams

Conclusion number three is that the identified QI project patterns indicate that

there are five critical determinants of the QI project diagram patterns: 1) Amount of leader

persuasion (none of the QI projects would have existed or made any progress without a

persuaded leader), 2) Whether a leader had fully conceptualized a QI project, 3) Amount of

clinician persuasion, 4) Presence or absence of meaningful data, and 5) How leaders

responded to resisters. The critical determinants of the project patterns are listed in the order

in which they affected the QI project diagram patterns. *Conclusion number four: Leaders'*

knowledge about QI implementation patterns, and critical determinants of the patterns,

may facilitate timely and accurate diagnosis of an implementation problem, that may

ultimately increase the leaders' ability to determine effective ways to counteract potentially

predictable QI implementation barriers. These QI implementation patterns are most

similar for QI projects with the same QI topics and goals. In addition, the identification

of implementation patterns suggests that it may be possible to develop models that reliably

replicate and predict the effectiveness of implementation strategies. Having more reliable

predictions regarding QI implementation tactics that are most effective for a given QI topic

and its associated barriers, will likely decrease the amount of time wasted in trial and error.

Pattern Number One – The Adopters and Resisters Pattern (100% Compliance or Partial

Compliance)

Six out of the twelve QI projects emerged to follow what has been named the

Adopters and Resisters Pattern. This pattern was the most common pattern identified.

Leader A's least successful, and Leaders B, C, D and E, F, and G's most successful QI

projects are examples of the Adopter and Resister pattern. These findings are consistent with

other research that identifies that the rapidity of the diffusion of an innovation occurs based

on the "meaning" of the innovation to the group within which the diffusion is occurring.

(Rogers, 2003)

The QI project either reached one hundred percent compliance, meaning all of the

resisters became adopters, or a few recalcitrant providers (only about 10 out of 100

providers) refused to change. For the most successful QI projects, all of the nurses were held

accountable and either complied or resigned. To facilitate the ability to compare and contrast

the Adopter and Resister patterns identified, leader C's most successful (no recalcitrant) and

leader G's most successful (a few recalcitrant) QI project diagrams are illustrated below as

examples of this pattern.

Pattern Number 1a – Adopters and Resisters (No Resisters), Figure 18: Leader C's Most Successful QI Project Diagram

Leader C – Most Successful Group Affected (1):
Providers (OB Doctors and Midwives)

Pre-Implementation ← Research, Benchmark Data, System Leaders

Eliminate all routine episiotomies for women greater than 37 weeks giving birth for the first time

Group only partially persuaded in the need for change at time of implementation

Benchmark & Individual Data Shared

Resisters → Adopters

Tailored Directive Conversations

Clinicians Adopt Change → On-Going Monitoring

Follow-up Discussions

100% Compliance Maintained

~8 years
Minimal to no change practices currently being implemented.

Number of Tactics: 10

Number of Barriers: 8

Impact:
Providers: 11
Nurses: 71
Total: 82
Patients: 2,000-2,500 deliveries per year
Progress Score: 4.8

Pattern Number 1b - Adopters and Resisters Pattern (Some Recalcitrant) Figure 24: Leader G's Most Successful QI Project Diagram

Leader G – Most Successful Group (1):
OB Doctors and Midwives

Pre-Implementation ← Research, Benchmark Data, System Leaders

Eliminate all routine episiotomies for women greater than 37 weeks giving birth for the first time

Group only partially persuaded in the need for change at time of implementation

Benchmark & Individual Data Shared

Resisters → Adopters

A Few Non-Compliant (refuse to change)

On-Going Monitoring

Change Maintained

~ 8years
Minimal to no change practices currently being implemented.

Number of Tactics: 10

Number of Barriers: 12

Impact:
Providers: 45
Total: 45
Patients: 2,000-2,500 deliveries per year
Progress Score: 5

Pattern Number Two – Data Loop

The Data Loop pattern occurs when there is a problem obtaining meaningful data. Meaningful data is defined as the tracking of individual, timely, accurate information. The name describes the pattern. The pattern is based on the fact, that the progress toward change is stuck in a loop or a circular pattern. The progress toward change acts like a broken record, going around and around, but not moving forward. QI projects that fit the Data Loop pattern did not have much progress unless the data loop was broken. Identifying ways to obtain meaningful data were more difficult when there were more than one group whose behavior needed to be monitored. There were three QI projects that fit the Data Loop pattern: Leader A's most successful and leaders C and L's least successful.

Leader A's most successful QI project is an example of the Data Loop pattern when the data loop is resolved, and all of the clinicians are persuaded that the change is desirable. Leader C's least successful QI project is an example of the Data Loop pattern that has not been resolved. In this situation, there are both adopters and resisters among the clinicians.

As previously discussed, for leader A's most successful QI project, the entire clinician group was persuaded to change (meaning that only adopters and no resisters remained). But despite the group's universal desire to change, even after an entire year of trial and error, there had not been much improvement. Once it was discovered how to capture and display real-time, meaningful data to all of the groups, the change was dramatic. They achieved one hundred percent compliance within one week. They then shared with other clinicians in different offices how to obtain meaningful data, and these groups adopted the change and experienced dramatic results, as well. This case example supports the

conclusion that topic specific QI implementation solutions can be shared with others and decrease implementation time.

Leader C and G's least successful QI projects are examples of data loops that were not resolved. However, there is a major difference between Leader C and G's groups and Leader A's. Leader C and G's groups were not all persuaded that the change was desirable. In addition, the leaders' assumptions about patients' desires also represented a possible barrier. So, although leader C and G's QI project diagrams currently fit the Data Loop pattern, if and when leaders C and G resolve the data loop issues, the remainder of the project diagram will most likely end up being a combination pattern. This means that these data suggest there is the possibility of a combined implementation pattern: the Data Loop pattern at the beginning and the Adopter and Resister pattern at the end.

All of the QI project diagrams are included in Appendix G. To facilitate the ability to rapidly compare and contrast, Leader A's most successful and Leader C's Least Successful QI Project Diagrams are shown below.

Pattern Number 2a – Data Loop (All Persuaded), Figure 14: Leader A's Most Successful QI Project Diagram

Leader A – Most Successful Groups Affected (3):
Doctors
Front Office Staff
Back Office Staff

Pre-Implementation

Patient Satisfaction Data System Leaders

100% of patients will wait less than 15 minutes from the time they check-in to the time they are put in an exam room

100% of Providers and Staff Persuaded at time of Implementation
Increased Income
Reduced work time

Data Barriers

Minimal or No Improvement

Make Changes

1 Year of Trial and Error

~2 years
Minimal to no change practices currently being implemented.

Number of Tactics: 10

Number of Barriers: 3

Impact:
Providers: ~250
Staff: ~450
Total: 700
Patients: Not Determined
Progress Score: 6

Real Time Computer Display Implemented

100% Compliance in *1 Week*

Change Spread to ~250 Providers and ~400 staff

Pattern Number 2b: Data Loop (Adopters and Resisters) - Figure 19: Leader C's Least Successful QI Project Diagram

Leader C – Least Successful Groups Affected (3):
Providers (OB Doctors and Midwives)
Nurses
Patients

Pre-Implementation

Research, Benchmark Data, System Leaders

Decrease admission rates of first pregnancies greater than 37 weeks that have cervical dilation less than 3 centimeters on admission

Groups only partially persuaded in the need for change at time of implementation

Benchmark Data Shared
Individual MD Data Shared
(Unable to provide individual RN Data)

~8 years
Minimal to no change practices currently being implemented.

Number of Tactics: 9

Number of Barriers: 14

Data Barriers:
Patient
Provider
Nurse
Timing
Volume

Impact:
Providers: 14
Nurses: 71
Others: Not Identified
Total: 85
Patients: 2,000-2,500 deliveries per year
Progress Score: 4.8

Minimal Improvement Made

Make Changes

Pattern Number Three – All Persuaded with No Data Barriers

The third type of pattern occurred when all clinicians involved were persuaded that the change was needed, and that there were no data barriers. Two out of the twelve QI projects fit this pattern; leader B and F's least successful QI projects. (Refer to Appendix G) Given the fact that these two QI projects had fewer data and persuasion barriers, it is noteworthy that these two QI projects were identified by the leaders to be their least successful QI projects. These findings suggest that leaders' definition of success may not be based on how easy or hard it is to implement the change, but instead on how much compliance there is with the change.

For leader B's least successful QI change project, he or she had not fully conceptualized the QI project, e.g., had not determined all of the behavioral changes and outcome goals needed to meet the stated larger objective. Thus, the QI project diagram only takes into account the first early change, but not the entire change the leader was describing. Leader F has different reasons for selecting this QI project as the least successful. He or she stated that this was only the least successful QI project because he or she had just started to implement it. After more effort, Leader F expressed confidence that this QI project would be as successful as his or her most successful one. Thus, the fact that the All Persuaded with No Data Barriers pattern was identified among two least successful QI projects, is probably not an indication that QI projects that fit this pattern will remain defined by the leaders as their less successful QI projects. This suggests that QI projects are not static, but ongoing and inter-related to the context. Leader F's least successful QI project diagram is illustrated below.

Pattern Number Three – All Persuaded without Data Barriers, Figure 23: Leader F's Least Successful QI Project Diagram

23: Leader F's Least Successful QI Project Diagram

Leader F – Least Successful
Groups Affected (3):
Nurses
OB Doctors
Nurses Aides

Pre-Implementation ◄── **National Standards System Leaders**

Deep vein thrombosis prophylaxis for 100% of scheduled, 90% of urgent, and 50% of stat cesarean sections

All Persuaded

~1.3 years
Minimal to no change practices currently being implemented.

Number of Tactics: 7

Number of Barriers: 7

Education (simulation training)
Group and Individual Data Feedback
New Charting Forms and Other Reminders
New Equipment

Impact:
Providers: 21
Nurses: 40
Other: 5
Total: 66
Patients: 1,200-2,000 deliveries per year
Progress Score: 4

Meeting 80% of Goals

On-Going Monitoring; Group and Individual Feedback

QI Project Not Fully Conceptualized

The implementation plan for leaders B, and D and E's least successful QI projects were too early in the conceptualization and implementation process to determine a pattern. This does not mean that these leaders had not been working on their QI project. But, at the time of the interview, they had not determined what their QI project behavioral goals would be, or how they would implement and measure the goals. They said they needed to "re-focus" on this particular QI project and re-implement.   Their QI project progress scores were only 2.5 out of 6. These data suggest that in order to determine a QI implementation pattern, the project has to be further along in the implementation process.

Section Two - QI Implementation Tactics Discussion

The following conclusions emerged from an analysis of the QI implementation tactics used for both most and least successful QI projects. The numbering of the study conclusions is continued from Section One – QI Implementation Process Patterns.

Conclusion Number five:

These data support the conclusion that none of the leaders, even when combining both most and least successful QI projects, used all of the implementation tactics they were queried about.

When the leaders were asked whether they had used specific implementation tactics, most of the time they were able to quickly answer either yes or no. However, occasionally, some leaders paused and/or got a puzzled look on their faces. They seemed to consider their answer before responding. When the leaders paused and/or looked puzzled, they most often gave a "no" answer. Sometimes after the leader paused and/or looked puzzled, he or she would inquire what the term meant. For example, academic detailing was not a term most leaders were familiar with, and thus, they needed to have the term explained to them. But after the term was defined, the leaders were able to answer whether they had done academic detailing, or not. Some leaders who paused and who may or may not have had a puzzled expression, verbally explored reasons they did not use a particular tactic. The rationales given during this verbal exploration appeared to be formulated on the spot, as if it was the first time they had considered whether to use this particular tactic for the QI project they selected. The tactic that the leaders most often verbally explained or gave a rationale for not using was checklists.

Conclusion Number Six:

These data suggest that all leaders had some familiarity with all of the QI tactics they were queried about, but could likely benefit from education to expand how they conceptualized and implemented the options within each type of tactic. In addition, leaders' assumptions about a QI project topic and implementation tactics may have affected the types of tactics they used. This conclusion is related to conclusions number three and four.

Following are three examples of tactics leaders were familiar with, but apparently were limited in the knowledge of how the tactics could be conceptualized and operationalized: checklists, team training, and simulation training.

Example Number One - Checklists

None of the leaders for the twelve QI projects used checklists as an implementation tactic. This is an unexpected finding, since checklists have been reported in the QI literature as an effective QI implementation tactic. (Clark, Belfort, Byrum, Meyers, & Perlin, 2008) The lack of use for checklists did not appear to be due to a lack of familiarity with the tactic, since none of the leaders asked for clarification prior to responding. In addition, one leader said he or she planned to use a checklist as an implementation tactic for another QI project that was being planned. A few leaders did pause and consider before responding to the question about checklists. After pausing, the leaders then verbally explored why using a checklist would not be an effective tactic for their particular QI project. The conclusions reached were based on the assumption that the effort to implement would not be time well-spent, because the tactic was unlikely to yield the desired effect. However, it was unclear whether they had previously considered and rejected using a checklist as a tactic for the QI project they described. Thus, as previously stated, this example suggests that leaders'

assumptions about a QI topic affect their selection of tactics. In addition, it suggests that the way in which a leader conceptualizes a given tactic may affect the leader's assumptions about whether the tactic will be effective or not.

Example Number Two - Team Training

All of the leaders said they used team training as a tactic. However, all of the leaders described team training as the attendance of nurses and doctors at the same classroom style lecture. This suggests that the conceptualization and operationalization of team training is limited. In addition, although all leaders said they organized QI project team trainings, e.g., joint lectures, these "team trainings" were not routine. In addition, all of the leaders indicated that the routine meetings they held were most often not inter-disciplinary meetings. Only one hospital leader described holding monthly meetings where nurses and doctors and would routinely meet together. But, whenever a new physician came to work at this particular hospital, the new physician would express surprise about the involvement of nurses in these meetings. It took the physician new to this group a little time to get used to the idea, but then the leader said they saw the benefit of it.

Improving team work has been identified as a safety and quality concern by the Agency for Health Care Research and Quality (AHRQ) and the Joint Commission. (E. K. Main & Bingham, 2008) In fact, the Joint Commission recently issued a sentinel alert outlining the importance of improving communication among health care team members. ("Behaviors that undermine a culture of safety. Sentinel Event Alert 40.," 2008) Airlines have experienced a reduction in accidents after they implemented team training. (Gladwell, 2008) Airline team training included the practice of reducing power differentials by having everyone call each other by their first names, and encouraging all members of the team to

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speak up in a clear manner when safety was at risk. (Gladwell, 2008) The need for more robust conceptualization and operationalization of team training is further supported by the finding that many physicians who resisted a change, bullied and threatened the leaders who were attempting to enforce the behavior change.

Example Number Three – Simulation Training

Simulation training was an implementation tactic that was used in two out of the twelve QI projects. The PI determined that simulation training would be applicable to all twelve QI projects. One leader, who did not have one hundred percent compliance with the change, stated that simulation was not applicable to this particular type of change project. However, one barrier identified for many of the QI projects was that clinicians were uncomfortable saying "no" to their patients, e.g., "No, I will not do an induction." Thus, simulation role playing may help physicians practice how to respond to difficult situations and appears to be an applicable tactic for this particular QI project and leader-identified barrier. These findings suggest that most of the leaders may have had a limited conceptualization of simulation training as an implementation tactic.

Conclusion Number Seven:

The dissertation study findings support the conclusion that all of the leaders defined QI success as reaching one hundred percent change compliance with their QI project goals. In addition, these data also support the related conclusion that when some leaders are unable to achieve one hundred percent compliance, they are frustrated and may continue, even for many years, to put efforts behind trying to figure out how to achieve one hundred percent compliance with their QI project goals.

There are five out of twelve examples of leaders getting stuck, not reaching all of their goals, and expressing some level of frustration (some more than others); leaders B and G's most successful and leaders A, C, and G's least successful projects. Two of the twelve QI projects were not far enough along in their progress to know whether the leaders would get stuck or not. (Refer to Appendix G) The conceptual model entitled, "The Conceptual Framework of Leaders' Expectations of Change Compliance," emerged from these study data and also supports these conclusions. (Refer to Chapter Four)

Conclusion Number Eight:

The study findings support the conclusion that counting the number of QI implementation tactics leaders used is not an accurate measure of QI implementation progress or success. For example, leaders indicated that they used a similar number of QI implementation tactics for several least successful QI projects with low progress scores as for their most successful QI projects. The most successful QI projects had higher QI progress scores. In addition, some leaders used more implementation tactics for their least successful QI projects than they used for their most successful QI projects. For example, leader F used eighteen implementation tactics for his or her least successful QI project, and thirteen implementation tactics for the most successful QI project.

Conclusion Number Nine:

The study findings support the conclusion that effective implementation tactics for one QI project, with one topic, in one setting, are not consistently effective for another QI project with a different QI topic in a different or similar setting. For example, the same leaders, in the same hospital, with the same clinicians, within the same community experienced both

successes and failures when they used the same type of QI implementation tactics. ***However, the study findings do support the conclusion that similar QI topics, e.g., reduction of episiotomy rates, had similar barriers and had similar amounts of QI progress when similar tactics were used.*** For example, Leaders A and G, at two separate hospitals, used similar QI implementation tactics for eliminating non-routine episiotomies and had similar amounts of non-compliant providers when these initial tactics were used. Leader C for the same QI topic used the same QI implementation tactics that leaders A and G used, however, in addition, he or she used the tactic of directive conversations or warning conversations that carried the implicit threat of disciplinary action. Neither leader A or G used a disciplinary conversation for this particular QI topic and neither reach 100% compliance. Leader C attributed the directive conversation, e.g., disciplinary type conversation, as necessary for having no resisters and achieving 100% compliance. Leader A stated that he or she believed that if he or she had been at liberty to hold a disciplinary conversation or if the organization would support his or her efforts to insist on compliance that he or she would be able to achieve 100% compliance.

Conclusion number nine is related to conclusion numbers one through four that state that QI implementation process patterns were identified. As previously outlined, the critical determinants of the QI implementation patterns are: 1) Amount of leader persuasion (none of the QI projects would have existed or made any progress without a persuaded leader), 2) Whether a leader had fully conceptualized the QI project, 3) Amount of clinician persuasion or resistance to the QI project goals, and 4) Presence or absence of meaningful data, and 5) How leaders responded to resisters. ***These data also support a sub-component of conclusion number nine and the fourth critical determinant of the QI process pattern,***

which is that the only QI projects that reached 100% compliance were those that had no resisters or if there were resisters, the resisters faced significant consequences for being non-compliant. For example, significant consequences that were described were, disciplinary action that could result in a loss of employment or being brought before a peer review committee where the clinicians lack of compliance with QI project goals was openly reviewed and scrutinized.

Section Three - Barriers to QI Implementation

As previously discussed in conclusions number one through four, there were five barriers that consistently were shown to have significantly altered the QI Project Diagrams, and thus were named "critical determinants" for QI progress. Additional conclusions about the barriers identified during the study are shown below, and continue with the numbering from Sections One and Two.

Conclusion Number Ten:

These data support the conclusion that some of the identified barriers do not always function as a barrier. For example, at times the leaders described experienced nurses as barriers and less experienced nurses as facilitators; at other times this was reversed.

Conclusion Number Eleven:

These data suggest that patient, community, and hospital barriers occurred less frequently and had minimal impact on the progress of the QI projects, unless the clinicians were persuaded that these external forces imposed impermeable barriers. This suggests that assumptions and leader and clinician self-efficacy may affect perceptions of barriers that ultimately affect their behaviors.

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External forces are defined as individuals or conditions that occur outside the function of the clinicians and leaders, i.e., hospital and patient factors. For example, for the QI project with the objective of reducing inductions, leaders described physicians who decided to stop performing non-indicated inductions, regardless of whether their patients requested them. These physicians chose to educate their patients about the risks of non-indicated inductions and, according to the leader, had no problems convincing their patients. However, there were other physicians who insisted that they needed to do non-indicated inductions in order to meet the requests of their patients.

Another type of external barrier identified during the study is a lack of resources. Highly motivated leaders, such as those interviewed, did not let the specific external resource barriers identified in this study prevent them from achieving QI progress and reaching their goals. For example, none of the leaders cited resource barriers as having impeded their success, even for their least successful QI projects. However, this does not mean that external barriers may not act as critical barriers to other leaders in other settings, or for these leaders for other types of QI projects. Nor does it mean that resource barriers did not slow QI implementation progress.

After the interview ended, one leader wanted to talk further about his or her concerns regarding lack of resources and quality standards. He or she mentioned that, currently, there are no system alerts when quality is sufficiently lacking such that patients are endangered. He or she went on to explain that it takes a lot to get someone in a senior leadership position to notice and respond, even when the system is failing and patients are endangered. Here are excerpts from the leader's comments made in this vein:

> Respondent: *"…the thing that surprised me at some level is that it really took an individual or two who really thought it was important to continue to just push it and*

push it and push it to get it done... you'd think that there would be certain set criteria at which there would be a trigger. When we get to X, we are going to do Y. And I don't think we have that pheromone. There is no... quality standard.   Now, it's mostly somebody that looks at it and says, 'Gosh, you know, it's looking kind of bad [chuckles], I think we need to do something about it.'

Because there is no agreed upon standard..."you then have to get enough other people convinced that you have got to do something about it... It's another thing to...mandate that when you hit certain targets or when you're below certain targets, you have to do certain things. You have to have certain meetings. Certain people have to be called in. You have to provide the next set of data over what period of time."

Interviewer: "Like stop the line?"

Respondent: "Exactly." Where you say, "This is not acceptable, we can't go on. We have dashboards. We have lots of numbers we look at all the time. It's kind of mind-numbing 'cause you look at so many." But," there's no mandated" quality triggers.

Interviewer: No mandated?

Respondent: "So we can say,...' our morbidity or our mortality for X disease is terrible.' We are then asked: 'What are we doing about it?' We respond: ' We're doing blah, blah, blah.' 'Okay, next,' [chuckles]... and then the next meeting you go 'Our morbidity and mortality for the same disease is terrible. Well, it's been terrible for three years. What's going on?' As opposed to saying... 'when you hit a certain target, whatever that target is, there are certain things you have to do. There are certain people that have to be called in. There's a certain team that needs to be created.' It raises the level of awareness...You don't make it for everything...You have to make it for certain really important things. When you hit those levels...we have to take responsibility." The quality response team "has to be very impartial. They have to make sure that the nurses are doing it and the docs are doing it and the administrators are doing it and they're meeting at the appropriate times, that the data is being collected in that formal constructive way, in a timely way...I think if you don't have that level of commitment at the governance level, operationally you could do a lot of things to sweep [chuckles] and hide."

The idea that there should be quality and safety standards that "trigger" an automatic response and infusion of resources is an idea that was not found elsewhere in the literature. In addition, this description of how easy it is to get the board to ignore lack of quality indicates that there need to be tighter guidelines regarding what constitutes a dangerous situation. This leader's comments are reminiscent of Weick's case study of the Bristol Royal

Infirmary regarding what he described as "entrapment thinking". (Weick & Sutcliffe, 2003) In Weick's case study, the physician convinced the hospital administrator that the reason they had poorer outcomes was due to variations in the patient population. At the very least, there should be benchmark data available to help leaders know when the care being provided is sub-optimal and potentially life threatening. In addition, the leader's description of needing to work hard to convince others that there was a problem also sounds like the stories from the airline industry, when a mechanic would be concerned but could not get anyone to listen. Having pre-determined criteria governing what would constitute a patient-safety emergency, that further triggers extra resources to the unit, is an idea worthy of further consideration.

Conclusion Number Twelve:

These data suggest that there was no distinguishable relationship between the number of tactics used and the number of barriers identified. Thus, it is likely that simply counting the number of barriers does not predict the number of implementation tactics needed.

Conclusion Number Thirteen:

> ***These data support the conclusion that clinicians did not routinely know how their performance(s) compared with other clinicians or with national standards. Showing clinicians how their performance compared to other clinicians and to national guidelines changed the behaviors of many clinicians, and was for most clinicians the only implementation tactic that was needed.***

This finding is also related to conclusions three and four and the identified QI project diagram pattern named Data Loop and that there are adopters and resisters.

Conclusion Number Fourteen:

***These data suggest that once most clinicians were convinced that change was needed, they
would monitor their own behaviors and maintain the desired behavior changes.***

One representative statement that illustrates this conclusion is:

Respondent (Describing how clinician's view of importance affects clinician
behaviors)*: Clinicians need to reach the point where they say to themselves: "This is
so important that I'm not going to revert back to my task orientation."*

Other examples that substantiate this conclusion are the six QI project diagrams that illustrate

the adopter and resister patterns. This pattern illustrates that there were some clinicians who

never need to be persuaded and readily adopted the change. Also, most leaders reported they

did not revert back to old habits. (Refer to Chapter Five, Section One and Appendix G)

Potential Study Limitations:

As with all research, both quantitative and qualitative, there are limitations to the

application of the findings. Thus the limitations of the study design used must be considered

relative to the study question the study was designed to answer. For the dissertation study

question, the study methods and sample size were adequate. However, similar to the

cautions made about how the results of a randomized controlled study are applied in the

clinical setting, these findings would also benefit from additional research to compare the

responses of other leaders in other non-maternity health care settings. However, none of the

strategies and tactics explored and discussed by the maternity leaders were maternity

specific. Limiting the sample to a maternity unit was based on the literature findings that QI

implementation is affected by QI implementation climate and culture. Thus, keeping as

many external climate variables constant was a method of controlling for potentially

confounding variables in order to have thick and relevant comparisons of the major variables of interest, e.g., the types of QI implementation strategies and the tactics used within those strategies and the QI implementation barriers.

Research questions to answer how "typical" these responses are among health care leaders require that other types of studies be designed. Thus, the dissertation findings are limited to the development of concepts, descriptions, and generating empirically driven hypotheses that will be useful for guiding further inquiry on QI implementation practices of front-line leaders. There is a recognized need that as with all studies, these results will benefit from replication of the study methods or complimentary study questions that further elucidate and confirm these findings.

There was a potential for lack of recall or recall bias since the leaders were describing implementation processes that went back as far as eight years earlier. This potential limitation may be more theoretical than actual, since all of the leaders were able to provide documents that substantiated the staff meetings they held, and their data trends. The leaders also gave very detailed answers about the tactics they used. They were not asked to provide details regarding exact timing of events, but did relate their implementation efforts based on the general sequence of events. The most likely recall bias may be that they did not remember all of the QI implementation tactics that they used.

There were several steps taken to reduce the potential for recall bias. During the on-site primary document review, the leaders were prompted to remember the tactics they used. In addition, they were asked: 1) what they did, 2) they were asked about barriers and insights, and 3) they were specifically asked whether they used a particular tactic based on the tactic check-list developed for the study. (Refer to Appendix C) Sometimes, when going through

the checklist of possible tactics, the leaders remembered the use of a tactic that they had not previously mentioned. However, most often, going through the checklist did not prompt them to remember any additional tactic(s), but it did often prompt them to expand the descriptions of tactics they had already mentioned. Given the multiple ways in which data were collected and how the leaders were prompted, it is unlikely that the leaders failed to identify all of the implementation tactics and barriers for each of the QI projects described.

Another potential limitation is that study participants are biased participants and thus may be consciously or unconsciously inclined to misrepresent what actually occurred. This is a potential limitation for all human subject research. For this study, there is evidence to support the conclusion that study participants did not knowingly bias the responses they gave. For example, the selected primary document review was performed to validate the statements of the study participants. No discrepancies between the leaders' responses and the documents were found. For example, when a leader stated that they held meetings as a strategy for mobilizing support for the change, a request was made for the leader to provide a copy of the relevant staff meeting minutes. The minutes were readily provided and always confirmed their statements. All of the leaders were willing to provide the documents requested; no leaders refused. In fact, many of them were excited to show the documents and often did not need to be asked. The leaders interviewed were also very open about the results of their QI projects, were not vague, and readily discussed successes, challenges, and failures. Based on the fact that all study participants were shown to be credible, there is no reason to believe that they knowingly gave misleading information.

Study Strengths:

The case study design was chosen because it is known that QI implementation within health care is a complex, multi-layered, multi-faceted, and context-specific human endeavor. Due to the complexity of QI implementation, it is impossible to control for all of the potential confounding variables that may alter the effectiveness of the implementation of QI projects within health care. For example, individual leaders change, staff change, upper management changes, budgets change, patient population characteristics may vary, there are changes in the geopolitical climate, etc. In addition, the state of the science on QI implementation is such that descriptive research is needed to guide the development of future studies. Many experts agree that the current foundational QI implementation research questions that help explore the cultural aspects of QI implementation and the processes of implementation are best answered using qualitative research methods, not randomized controlled trials. (J. M. Grimshaw et al., 2003; Rogers, 2003)

The purposive sampling plan to control for as many confounding variables as possible is a study strength. The context variables that were controlled for are: 1) the population type that the leaders oversaw, namely, a labor and delivery unit, 2) the decision-making model of the labor and delivery unit, 3) the hospitals were all under the same strategic umbrella for the multi-hospital system decision making, 4) the units all had similar numbers of deliveries per year, and 5) for some of the cases, even the QI topic and goals were the same or similar. Controlling for many external context variables helped to assure that the observed practice variations were due to differences in the leaders' implementation practices, the clinicians practicing at each hospital, and (at times) the QI topics themselves.

The choice to select the hospitals sampled from a multi-hospital system that has a reputation as a quality leader increased the likelihood that the leaders interviewed would be knowledgeable about QI. This too was a study strength, since the study design required that the leaders had implemented complex QI projects. The need for a selective sampling methodology in order to study the variables of interest was underscored by the minimal amount of data gleaned from the two least successful QI projects that had QI progress scores less than three. The dissertation study findings support the conclusion that leaders less familiar with the conceptualization of QI projects would be less likely to have complex QI projects to describe, and would also have more difficulty describing the tactics and barriers they used. A study designed to ascertain the skill level of the typical front-line QI leader,would need to use a different sampling plan to answer this type of question. However, this sampling plan was rigorous and appropriate to answer the study question of how front-line leaders tailor their implementation practices for complex QI projects.

The semi-structured interview format was a study strength. The leaders were able to guide the interview and talk freely within a broad framework of inquiry. Having some structure to the interview also enhanced the ability to perform cross case comparisons of each leader's own two extreme QI projects versus the QI projects of the other leaders. The inclusion of quantifiable measurements also enhanced cross case comparisons and are potentially useful for future QI implementation research.

Despite multiple methods of selecting the desired sample, the potential still remains that the results obtained from a small, select sample of cases may be "influenced in both anticipated and unanticipated ways" and also raises questions of the transferability of study results to other leaders in other settings. (Wells et al., 2007) Case study researchers have

found that one valuable strategy for "refining constructs and establishing boundary conditions" is to use "extreme cases" that conceptually vary in significant ways. (Strauss & Corbin, 1998; Wells et al., 2007; Yin, 2003) Thus, the study design in which each leader was asked to self-select their own extreme cases (most and least successful QI projects), made it possible to compare each leader's cases to each other, as well as to the other leaders' cases. The use of extreme cases increases the transferability of the conceptual findings of the study.

As previously noted, qualitative, cross-case research methods are a well-respected, and preferred research method to answer "how" and "why" research questions. In particular, case study research has been identified to be ideal for studying complex, contextual situations where laboratory experimentation and controlled settings are not possible. Case study research methods are best suited for questions such as determining, retrospectively, how leaders tailor their implementation practices. Yin has posited that the results obtained from the analysis of one case study based on a case study protocol is similar to performing one experiment. (Yin, 2003) However, an experiment may be designed to be generalized to populations, the results of one case study can be generalized to theory and concepts, but not to populations. (Yin, 2003) For example, these study findings were not an attempt to obtain data on large numbers of leaders who were implementing QI projects in order to determine the typical QI implementation practices of most leaders. These study conclusions, however, were seeking to identify the concepts and processes of QI implementation practices.

Case study research methods require that the data collection and analysis be based on a research protocol. A case study research protocol varies from quantitative methods in that there can be ongoing modification and refinement of the case study research protocol, based on the findings from the earlier cases analyzed. Thus, data collection decisions were

empirically driven. However, the study protocol, as with any scientific research, was meticulously documented in such manner that another researcher would be able to replicate the protocol. Therefore, future research would be able to test the validity and reliability of the results obtained, assuming the researcher used the same study protocol and analyzed the same cases. Case study research methods are different from, and should not be confused with, case study presentations and medical case reports, both of which are common methods of education within health care medical and nursing training programs.

The research findings that describe the use and non-use of QI implementation tactics are most likely transferable to settings other than maternity care, since the tactics and strategies described are based not only on these study findings, but on tactics used both within and without health care settings. In addition, none of these tactics are maternity-care specific. For example, the Baldrige communication criteria, disciplinary measures, and rewards are widely used in both business and health care settings. These data support the conclusion that the most effective tactics to use to drive a specific QI project topic forward, and to address the potential barriers, depends on the context, the leaders, the clinicians, the population, the problem, and the desired outcomes and will likely be unique to the QI project topic. For example, a leader who is working to reduce third and fourth degree lacerations during birth will most likely exhibit similarities with others working on the same QI project topic, when it comes to how he or she tailors QI implementation practices. Thus, although the list of strategies and tactics the leader picks from are not automatically limited to any particular type of setting or QI project, it is the timing and combination of tactics used within the QI project that become context-specific. This is not to say that patterns that help identify the most effective practices cannot be identified. In fact, there are several examples of this

within the findings of this study. Nor does it imply that there may not be some tactics that should be used by all leaders, for all QI projects, regardless of context and QI topic. However, transferability of these results has the limitations that were outlined previously.

There is currently a lack of empirical evidence regarding how to define and describe QI project success in health care. Additional knowledge and insights were derived in this study by having the leaders self-define and self-describe QI success, rather than by imposing success criteria.

Finally, the leaders interviewed and the QI projects analyzed impacted the births of approximately 7,600 women per year, and approximately 800 different clinicians. Thus, the sample size of seven leaders in four hospitals, who implemented twelve QI projects, had a greater impact on patient outcomes than might be assumed, and underscores the importance studying front-line leaders QI implementation processes.

Summary

The dissertation literature review and study findings support the conclusion that all of the leaders interviewed could benefit and be more effective through increasing the amount of QI introspection and enhanced conceptualization of QI implementation strategies and tactics. For example, all of the leaders stated that the interviews helped them gain insights into their own QI implementation practices and to identify new tactics they could try. A related finding is that the all of the leaders stated that they had not previously taken the time to systematically reflect on and to outline how they implemented QI, and the types of tactics they used or did not use; no one had ever asked them to provide, nor did any of them spontaneously record, this level of detail. This is so despite the fact that all: 1) were experienced QI leaders, 2) all but one leader had received formal QI training, 3) had jointly

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published regarding their combined QI efforts, and 4) were actively working on successfully implementing multiple complex QI projects. In other words, since these relatively well-prepared leaders are routinely asked to reflect on their own QI implementation practices and do not maintain a clear record of the tactics they used and why, chances are that other leaders with less QI expertise are even less aware.

The need for enhanced QI self-awareness is further underscored by the fact that regardless of which change expert you read, the recommended implementation practices currently promoted are general and non-specific. For example, the recommendations are often reduced to non-specific tips, such as: "Keep trying," or, "Since that did not work, try something else," "This worked for so and so, maybe it will work for you," or, "Tailor your implementation tactics to address your barriers." While some change experts, e.g., Kotter, give a list of a number of key steps to follow, other change experts like Klein, et al. and Greenhalgh, et al., extrapolate from the published research broad theoretical frameworks in an attempt to help leaders navigate the entire change process. (T. Greenhalgh et al., 2004; K. J. Klein & Sorra, 1996; Kotter, 1996) However, what is missing are more specific QI implementation guidelines that will improve the effectiveness of health care QI implementation practices of front-line leaders. Currently there is a paucity of details on what leaders do during implementation. Most of the research available is limited to one specific tactic, e.g., the use of a check-list, or frequent rounding, or includes a vague list of tactics used with minimal details provided, or is based on recommendations developed for business settings that are extrapolated to health care with minimal and at times no research to substantiate the transferability of these approaches. (Pronovost, 2008)

The dissertation study findings that QI implementation patterns exist in a health care setting indicate that it may be possible to develop topic-specific implementation guidelines. In addition, identifying and then sharing what worked is worth the effort. For example, the study finding that Leader A struggled for one year to try meet a QI goal, found the solution, and spread the solution to hundreds of other clinicians demonstrates how tracking and sharing QI process details reduces wasted time and effort. Thus, when there is a specific change that needs to be made in many hospitals across the country, then implementation will be more effective if leaders can learn from each others successes and failures for each QI topic. Once the implementation patterns are identified for each QI topic, then implementation process guidelines can be developed that will likely facilitate a more rapid and effective implementation plan that can be further refined and replicated. For example, currently there are seventeen perinatal National Quality Forum (NQF) endorsed quality measures. For each quality measure there most likely are similar implementation patterns based on what are identified as typical barriers. Leaders striving to implement the first delivery, low-risk cesarean section measure for example, would benefit from learning from other leaders who have labored for over eight years to implement QI projects to achieve these same goals. Thus, developing methods of how to track not only outcomes but processes will likely reduce implementation time and increase effectiveness of efforts. The recent publication of Standards for QUality Improvement Reporting Excellence (SQUIRE) initiative is a current national effort that is moving in this direction. (Ogrinc et al., 2008)

Based on the dissertation study findings, it is reasonable to conclude that independently teaching leaders about the various QI tactics they can choose from or the common or even critical barriers to implementation, will be beneficial. However, only

teaching about the various QI implementation tactic options and barriers does not go far enough. These dissertation study findings support the conclusion that helping leaders improve how they conceptualize QI projects and supporting leaders to become more mindful and reflective of how and why they make implementation decisions, will likely have the greatest impact on increasing leader QI implementation effectiveness. For example, improving leaders' QI self-awareness will generate more detailed tracking of QI implementation choices, which will then enhance leaders ability to gain insights into their own implementation decisions. Having more QI self-awareness makes it easier for leaders to have QI implementation insights and then articulate their QI implementation insights. The ability to have and articulate QI implementation insights enhances leaders ability to share insights with other leaders and thus exponentially increase understanding. Leaders' are also most likely more effective if their implementation efforts become more systematic, more transparent, and less intuitive. Thus, increasing QI self-awareness begins to shift leaders' QI implementation practices from the reactive, intuitive approach (the approach used by all leaders in the dissertation study) to a more pro-active, planned approach. With the above in mind, improving how leaders conceptualize and operationalize their QI implementation strategy by increasing leaders' QI self-awareness will be a valuable way to improve the individual and collective QI implementation effectiveness of leaders.

Chapter 6: Implementation Plan to Increase the Effectiveness of Front-Line Leaders' Quality Improvement Practices

Objective

The implementation plan objective is to ***increase the effectiveness of the QI implementation practices of front-line leaders by increasing the leaders' self-awareness and expand how they conceptualize and operationalize their QI implementation strategy.*** Leaders' QI self-awareness is defined as leaders' ability to articulate their QI implementation strategy and to choose different types of QI implementation tactics within the overall strategy. Further, it encompasses their ability to give a rationale for their decisions, and to describe the barriers they anticipate and encounter. Increasing leaders' QI implementation self-awareness is an effort to improve the amount of insight leaders have about their own QI implementation practices, e.g., what they do, when they do it, and why they do what they do. Reflective practice is a major component of double-loop learning, highly-reliable organizations, learning organizations, and consistent with the general principles of QI. (Argyris, 1991; Nonaka & Takeuchi, 1995; P. Senge et al., 1999; Weick, 1987) Reflecting on their own implementation practices increases leaders' ability to see both positive and negative implementation patterns.

The two measureable behavioral outcome objectives of the implementation plan are that: 1) each leader keeps a QI implementation log for one QI project (the same QI topic for all leaders), and 2) each leader develops basic QI Project Implementation Project Diagrams.

(Refer to Appendix F and G) Leaders initiate the QI project implementation log during the pre-implementation phase and continue it until the leader reaches his or her QI objectives.

The Implementation Plan

The plan to increase leader QI self-awareness by having them keep a QI implementation log and develop a QI implementation project diagram for one QI project is based on the conceptual framework outlined in Chapter Two, entitled The Discursive Model of the Collaboration Process. (Refer to Figures 2 and 5) In addition, the timing and types of group activities that are recommended below are based on the Institute for Health Care Improvement (IHI) multi-hospital Breakthrough Series learning collaboratives model. (*The Breakthrough Series: IHI's Collaborative Model for Achieving Breakthrough Improvment*, 2003) (Refer to Figure 12) The activities included in the IHI model are three in-person group learning sessions and monthly group update phone calls.

Figure 12: Institute for Health Care Improvement (IHI) QI Project Collaborative Overview

Call for Participation
Date

Participant Enrollment
Date

Select Topic
Date

Participant Pre-Work

Expert Meeting
Date

Develop Framework & Changes

Legend:
P=Plan
D=Do
S=Study
A=Act
LS=Learning Sessions

A P
AP1
S D

A P
AP2
S D

A P
AP3
S D

LS 1
Date

LS 2
Date

LS 3
Date

Project Deliverable

Sustain & Spread

■ **Charter (aim, goals)**
■ **Change package**
■ **Measurement strategy**

Supports
■ Conference calls
■ Listserv
■ Monthly Team Reports
■ Web sessions
■ Learning Sessions

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The implementation plan contains three steps: 1) introduction and adjustment of the plan, 2) implementation and on-going adjustments, and 3) evaluation and future recommendations. Each step is discussed separately.

Introduction and Adjustment of the Plan

The leaders who participated in the study and other front-line maternity and physician leaders who work within the same multi-hospital system will be invited to join a multi-hospital collaborative effort entitled: *Increasing Front-Line Leaders' Quality Improvement Self-Awareness.* The inclusion of non-study leaders in the process will make it possible to maintain the confidentiality of the study participants. All of the leaders who were not part of the study will be asked to complete a brief self-assessment prior to attending Learning Session One. (Refer to Appendix C, Semi-Structured Interview section entitled - Study Participants: Hospital Site, Decision-Making Model, and Leaders' Characteristics)

Learning Session One

All participants in this collaborative will be invited to an initial two-day conference entitled: Learning Session One. Prior to attending the meeting, each leader participant will be asked to perform a gap analysis. The gap analysis compares current state to desired state for the QI project outcome goals.

Learning Session One will primarily introduces key concepts to meeting participants. The main objectives for this session are:

Day One:

1. Discuss how to conceptualize a QI Project and modify the group QI Project topic and outcome goals as needed. Having everyone working on the same QI project goals

will increase the group's ability to focus on patterns among the QI projects. The QI

project objectives will be selected based on a one-year time-line.

2. Review the relevant QI implementation literature.

3. Discuss study results and implications for practice.

   a. Discuss the Conceptual Framework of Leaders' Expectations of Change

      Compliance findings

   b. Discuss implementation strategies and the use of various tactics within the

      overall strategy

   c. Discuss findings regarding barriers to implementation

Day Two:

4. Define QI Implementation Self-Awareness

5. Describe the QI Implementation log.

6. Draw QI implementation project diagrams.

The leaders attending the learning session will be asked for input and suggestions to improve

the QI Implementation Log sheets. They will be asked to come prepared with their own

examples of QI implementation successes and failures to share with the group. Upon

completion of learning session one, the leaders will participate in the monthly phone calls.

Prior to each call the leaders will fax their completed implementation logs to the facilitator.

Implementation and On-Going Adjustments

Monthly Meetings

The monthly meetings are scheduled for the same day and week each month. The

meetings take place via telephone conference calls with on-line presentation capabilities;

thus, everyone is able to see the same slides at once and to interact via voice and an on-line

chat feature. As previously outlined, all leader participants will fax their QI implementation log sheet(s) to the facilitator prior to each monthly meeting. The log sheets are shared with the rest of the group only with the participants' permission, but transparency is encouraged throughout the rest of the process in order to maximize learning from each other. During the monthly meetings, additional ideas for modifications to improve the QI Implementation Log are requested. Email and phone exchanges are encouraged between the monthly meeting times. In-person visits are also encouraged.

The participant leaders are encouraged during the monthly meetings to illustrate their QI Implementation Project Diagrams as posters. The posters will be presented to the group during learning session two.

Learning Session Two

Learning session two is a day-long, in-person conference. The objectives for Learning Session Two are:

1. Discuss each leader's Hospital QI Project Interim Project Diagram. The discussion is led by the group of leaders from each hospital.

2. Identify QI implementation patterns:

    a. Tactics that worked or did not work.

    b. Timing of tactics.

    c. The barriers encountered – which barriers are more difficult to overcome and what strategies were used to address these barriers.

After Learning Session Two, all of the leaders will continue to participate in monthly phone meetings. The phone meetings provide the leaders with support to complete their QI project year-one objectives. In addition, the monthly phone calls guide the leaders through the

development of QI Project Implementation Project Diagram posters. Each month, the leaders QI implementation progress will be tracked based on the QI implementation logs that they fax to the facilitator.

Evaluation and Future Recommendations

The final evaluation will is performed in-person during Learning Session Three. The evaluation is based on three parameters, 1) peer and facilitator feedback on the year-long collaborative process, 2) the QI implementation log sheets, and 3) the QI Project Implementation Project Diagrams. Future recommendations will be determined based on the evaluation.

Implementation Plan Summary

The dissertation study findings support the conclusion that leaders benefit from enhanced QI self-awareness. QI self-awareness is increased through a combination of education and practical application, e.g., keeping an implementation log and developing QI implementation project diagrams. On-going assessment of leader self-awareness during the collaborative process will be based on their demonstrated ability to perform a gap analysis, articulate QI project goals, what they record on their QI implementation log sheets, and their QI project diagram posters.

Chapter 7: Recommendations for Research and Health Policy

Overview

There are several research and policy recommendations that were identified based on the dissertation literature review and study findings. First, the recommendations for future research will be described and discussed. Second, the recommendations for health policy will be described and discussed.

Recommendations for Future Research

There are several general research recommendations that emerged from these study findings. Each will be described and discussed separately.

Inductive Research Studies – Exploration of Concepts

Many concepts about QI implementation were identified that would benefit from further inductive research. Inductive research expands our understanding of a concept by allowing the responses to drive the inquiry, rather than deductive research methods that work to limit the variables that are analyzed. One example of a concept that would benefit from an inductive research approach is the concept of the meaning of QI for health care leaders. In the business literature, most often the stated benefit, or meaning of QI work, is to increase productivity, or to increase customer satisfaction in order to increase revenues. In health care, the meaning of QI work may likely be much more similar to the reasons people give up

their time and energy to serve others. The meaning of health care QI may thus be more closely related to a desire to do good, or as the leaders so often stated in the study, to "do the right thing for patients."

How QI is conceptualized and talked about by leaders and staff on a unit or within a hospital may bring (as one of the study participants stated), "…a tremendous sense of satisfaction and empowerment to make a difference." For others, QI may be seen as a bother and a regulatory requirement they must meet that gets in the way of the clinical tasks of the day. The meaning leaders bring to their QI work will most likely drive how their QI work is performed. (Buchanan, 2003) Thus, some potential research questions could be: Why do leaders make the efforts they do to improve care, even when they are often confronted with major barriers? Or on the other hand, why do leaders give up and stop trying? Given the fact that these data support the conclusion that leaders' assumptions and QI conceptualization are critical determinants of QI success, studies designed to explore the meaning of health care QI work are needed. Subsequently, correlating the meaning leaders bring to their QI work with how they operationalize QI will further elucidate critical determinants of QI success. Specifically, longitudinal, ethnographic studies of QI within a unit or microsystem and within multiple units in a hospital would expand our understanding of how QI is lived and experienced by leaders at the front-lines, and within the larger cultural context of the hospital. The recommendation to perform ethnographic research on how leaders' assumptions and understanding of QI affect their QI efforts is consistent with Weick's case study on hospitals as cultures of "entrapment thinking." (Weick & Sutcliffe, 2003) In the Bristol Royal Infirmary case study, two leaders, in particular, (the head administrator and the surgeon), caused unnecessary death and injury to patients by failing to see that what they

were doing was substandard care. (Weick & Sutcliffe, 2003) Their lack of "seeing" led to a

lack of action.

The meaning of *quality* itself is another related concept that these study findings

indicated could benefit from inductive research methods. For example, these data showed

that some leaders set higher standards for their groups than other leaders in the sample. For

example, leader F set the goal to have no elective inductions prior to 41 weeks on all women

giving birth for the first time. Other leaders set the goal to be less process-oriented and more

outcome-oriented. Thus, their QI goal was easier to achieve because it combined the high

and low performers together to arrive at an overall cesarean section rate. Some of the

questions these findings raise are: 1) Why is there this difference between the QI goals one

leader sets for his or her group compared to others, even among highly motivated leaders?,

and 2) How can other leaders be motivated to strive for higher standards and not be content

with even one patient receiving sub-standard care? Leader F described the process of setting

the higher standard for his or her group as follows:

> Respondent: *"When we started out …our primip* (woman giving birth for the first
> time) *C-section rate was less than 15 percent. …which is the national goal. So it
> wasn't like, 'We've got to make some change here, guys, because we're not meeting
> the goal.' We were already meeting the targets. But we still knew it was the right
> thing to do…So that really made it challenging…. it took about two years for us to get
> that last physician to adopt the protocol."*

This quote indicates that the reason this leader set the stricter goal is based on an internal

motivation and understanding of quality that was applied to every patient and every

physician. As previously discussed, the internal motivation of leaders was shown to be a

powerful force for pressing forward and ensuring success, regardless of the barriers

encountered. In addition, how leaders defined quality was shown to affect the goals they set

and the efforts they made. Thus, studies that further explore the meaning of quality will further elucidate these findings.

Another related research topic is to identify the most meaningful measures of quality. For example, are health care leaders choosing to work on the most important QI projects, or the easiest to implement? In addition, were there unintended consequences (negative and positive) that occurred due to the QI project implementation? For example, if a QI project topic is undertaken to reduce episiotomies, obviously a clinician could argue that performing a cesarean section will eliminate the need for an episiotomy. This, of course, would lead to a reduction in overall quality of care and would be an unintended consequence of an otherwise well-intentioned QI project.

Exploration of QI Project Timing

Research that is designed analyze how a specific QI project is implemented over time would be useful for other leaders who are working on implementing a similar type of QI project. The timing of the implementation of various tactics will likely expand leaders' understanding of how to optimally select tactics and in what order.

Increasing the QI Capacity of Front-Line Leaders

Front-line leaders skilled in QI are a necessary ingredient for improving health care and patient outcomes. However, currently, there is a limited amount of research on the QI capacity of front-line leaders. Thus, more research devoted to measuring and increasing front-line leaders' QI capacity is needed. The study findings support this conclusion, since the work of only seven leaders impacted the work of approximately 800 clinicians who cared for approximately 7,600 women giving birth each year.

Health Information Technology and Quality Improvement

Most leaders did not have the full benefit of computers and health information technology to support their QI efforts. These study findings highlight the need for more research on how computers can support the QI efforts of health care leaders. Health information technology systems must be designed to facilitate the QI efforts of front-line leaders.

Setting Target Dates

The research finding that none of the leaders set actual target dates for QI project completion requires further research. Are target dates indeed useful for enhancing the implementation timetable or are they not needed? Is it even possible for leaders to determine a realistic target date, in particular if they are implementing a QI project for the first time, have no implementation guidelines, and have no input from another leader who has successfully implemented the same QI project previously? Based on a review of the literature, there were no studies identified to substantiate the need for setting target dates for health care QI projects. However, it is commonly understood that goals need time boundaries, e.g., SMART objects. Thus, more research is needed to explore the tension between what is currently understood to help drive projects forward and these findings that showed even experienced QI leaders had difficulty setting target dates. In addition, further research will help illuminate how and why target dates were determined in a more fluid manner based on feedback from the group, and a leaders' own sense of whether they had done due diligence.

Discourse and Change

Discourse analysis, in particular discourse analysis related to change, could further elucidate the study findings that leaders tailor their conversation style based on their expectations of change compliance. Discourse is defined as all types of communication vehicles, e.g., conversations, photos, meeting minutes, other written documents. Does the fact that all of the leaders in this sample described the same pattern of conversational styles as the QI projects progressed mean that this pattern is the most effective one, or is it simply a common approach? Ford and Ford, discourse researchers, have outlined recommended change conversations. (Ford & Ford, 1995) Most of the recommendations made by Ford and Ford appeared to be intuitively followed by the leaders. The statement that the leaders' conversation style choices appeared to be intuitive, rather than research-based, is a conclusion based on how the leaders described their conversations, not via direct observations. There was one recommendation that some leaders did not describe; specifically, some of these leaders did not describe formally holding conversations of congratulations. In addition, research in which observations are made to identify the background conversations of resistance and how leaders handle these situations would also be useful. (Ford, Ford, & McNamara, 2002)

What happens when a leader uses directive or warning conversations immediately after introducing a change project? Does the group rebel and further resist the change to a greater extent than they otherwise would? These and other research questions are raised by the findings that all of the leaders shifted their conversational style based on the give-and-take verbal exchange of the group and on their data feedback. Would making these

conversation options more conscious to the leaders alter the type of overall implementation strategy they develop and employ?

Many change experts have identified communication as a central component of leading change. (Gerzon, 2006; Kanter, 2004; Kotter, 1996; Patterson et al.; Rogers, 2003; Shashkin & Shashkin, 2003) Ford and Ford go one step further and state that change is not a phenomenon that occurs within conversation, but conversations are what drive the change. (Ford & Ford, 1995) The dissertation study findings are consistent with these other studies, since discourse tactics were the type of tactics most often used by the leaders. With the above in mind, more research about QI and discourse is needed.

Creative "Newer" Implementation Tactics

More creative and "newer" types of implementation tactics were not mentioned by any of the leaders during the descriptions of their QI projects, e.g, the use of videotapes, de-briefing, and dramatization. These tactics are currently most often a part of simulation training, but there are some researchers who use them as implementation tactics apart from simulation. For example, at the 2008 Lamaze International conference, Kajsa Brimdyr, PhD, presented work that she had done in collaboration with others to use interaction analysis and video ethnography as an implementation tactic in Egypt. (Brimdyr, Widstrom, Svenson, Cadwell, & Turner-Maffei, 2008) Brimdyr showed several videos during her workshop: 1) a video of current birth practices in Egypt at the hospitals implementing the change, 2) a video showing how a baby is kept skin-to-skin immediately after birth, 3) a video of how the team debriefed and made implementation plans after the video, and 4) an example of the teams implementing the changes after an actual delivery. The videos were compelling. Rather than presenting change as a complex top-down approach with an expert telling the group

what to do, the multi-disciplinary group of clinicians came up with their own solutions and plan for changing their current practices in favor of those shown as ideal in the videos. Seeing a video of the desired behaviors and then debriefing about the video gave the teams the opportunity to take ownership regarding changes they needed to make. In addition, most were likely cued by the video to consider changes that they may not have otherwise thought of. The video may also help with persuading others that a change is possible, since they can see others modeling the desired behaviors. The teams who were working to implement the changes were, according to Brimdyr, financially motivated to make the change. (Brimdyr et al., 2008) But the tactic of using video ethnography and interaction analysis as implementation tactics is not often used in non-emergency simulation health care change projects.

A slight variant on the use of video as a change tactic has been used by Vento et al., who videotaped actual resuscitations of newborns. (Vento et al., 2008) They videotaped the resuscitations through the use of video cameras being installed on all of the warmers in the delivery rooms. The teams were able to capture and record their neonatal resuscitation efforts during an actual emergency. Vento et al. used videotaped segments in much the same way as professional sports teams do, in order to scrutinize every aspect of how they did their work, and they developed a list of areas that need improvement, and practiced to become better at how they performed resuscitations. (Vento et al., 2008)

Dramatic performances have also been used in many social change projects, but are not commonly used in health care. A recent publication outlined the use of dramatic performances for knowledge transfer. (Kontos & Poland, 2008)

Creative types of data collection and data display are also being explored and used in various settings. For example, leader A described seeing another group of leaders who use a "slot machine" for more real time tracking of patient satisfaction data. The patients were given a chip that they deposited in the slot to indicate their level of satisfaction when they left the unit. Thus, everyone on the team knew how well they were satisfying their patients on that particular day, allowing them the opportunity to make immediate adjustments to their performance should that be needed.

These are just a few of the examples of the various types of implementation tactics leaders can create to facilitate the effectiveness of QI implementation. These examples illustrate the point that QI implementation tactics are not static, but are dynamic. Sharing newer and more creative methods of implementing change can inspire other ideas for more rapidly translating research findings into action.

Multi-Hospital Quality Improvement Collaboratives - Research Cohort Opportunities

Many multi-hospital quality improvement collaboratives are being formed across the country, e.g., the Maryland Patient Safety Collaboratives, the Institute for Health Care Improvement Collaboratives, and the California Perinatal and Maternal Quality Care Collaboratives (CPQCC and CMQCC). (E. K. Main & Bingham, 2008; D. Wirtschafter & Powers, 2004) These collaboratives develop topic-specific quality improvement multi-hospital collaboratives that most likely represent an ideal study cohort to further explore how to measure and increase QI implementation effectiveness. The Institute for Health Care Improvement (IHI) has developed the Breakthrough Series collaborative model (which forms the basis of the QI implementation plan described in Chapter Six) for translating research into action among multiple hospitals. (IHI, 2003) Another large-scale model for translating

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evidence into practice has been recently described in the literature. (Pronovost, Berenholtz, & Needham, 2008) Some of the collaboratives are long-term, but form short-term, topic specific multi-hospital, action collaborative projects under the umbrella of ongoing collaborative QI work, e.g., CPQCC and CMQCC. Other collaboratives bring hospitals together for a specific QI project, e.g., IHI.

Recommendations for Health Policy

More Robust Methods for Front-Line Leaders and Clinicians to Alert Others that There is a Safety and Quality Concern Requiring A Coordinated Response

As leader A so aptly pointed out, there are no set guidelines regarding what constitutes a basic understanding of quality. Thus, as leader A described, when clinicians are worried about a situation, they expend energy describing the situation to others and trying to convince them that there is a breach in quality and that lives are in danger. This means that unless there is a leader keeping track of the situation, willing to sound the alarm, and to do what it takes to attract attention to the issue, nothing will get done. However, not all hospitals and units have access to a leader with these characteristics. So our current lack of benchmark data about what is going on in hospitals reduces the ability for others to assure that quality is maintained.

The healthy people 2010 goals serve as population benchmarks for tracking overall population health, but to date no such comprehensive health care benchmarks exist. The work of the National Quality Forum (NQF) is moving our country closer to this goal, but still much more work is needed. One example of the need for national benchmarks for quality care practices is the current 55 percent rise in cesarean section. The rise in cesarean sections has resulted in harm to both mothers and newborns. Currently, because cesarean sections are

not considered a measure of the quality of care women receive in labor, it is possible for the blame to be shifted from clinicians to women. This is counterproductive and reduces the clinicians' ability to recognize they have a problem, and to start to work on the solving it. Society thus becomes implicit in promoting "entrapment thinking" and blaming the victims, rather than recognizing that these outcomes are likely driven by multiple factors that need to be better understood and acted upon. (Weick & Sutcliffe, 2003)

Training New Clinicians and Current Clinicians How to Conceptualize, Implement, and Reach QI Project Goals

Recommendation: All new clinicians and current leaders need to receive training in how to conceptualize, implement, and reach QI project goals.

All new clinicians must get basic QI education. The need for physician and nurse QI education is based on two facts, 1) leaders are promoted from clinical positions, and 2) QI efforts are most successful if all staff are involved in QI. Specifically, every clinician who graduates should know how to define a sentinel event, perform a root cause analysis, and understand the stages of diffusion of innovation. Forming a strong QI foundation to build from will help anchor the clinicians' on-going learning about implementation of QI and their efforts to develop and support QI initiatives. Teaching all clinicians that QI is everyone's work and should be a major part of their identity will help change the culture to be more self-reflective.

Currently, there are many leaders who are in leadership positions who have not received QI training. There is a need to develop QI training programs specifically geared toward clinician leaders who work in all levels within health care. Having skilled QI leaders will reduce harm, and improve the quality of care patients receive.

Research Funding

Recommendation: Fund qualitative research studies to build empirical evidence regarding how to more effectively implement QI.

Currently the field of translational research is emerging and thus, agencies such as the National Institutes for Health (NIH) need to promote qualitative, implementation process research and a QI topic specific implementation registry. In addition to promoting these types of research projects, there is a need to support the diffusion of the research findings. Clinicians need to receive training on how to interpret and apply qualitative research findings into their own practices.

Diffusion of QI Implementation Information

Policy Recommendation: Develop more effective methods of sharing diffusion of implementation successes and failure through the a QI topic specific implementation registry.

The Joint Commission, The National Quality Forum, the Agency for Health Care Quality and Research, the National Institutes of Health, and the Centers for Disease Control are uniquely positioned to develop more effective methods of collecting QI topic-specific implementation process details.

New clinical implementation guidelines that are published should also include tailored, topic specific, implementation guidelines. For example, when a research finding identifies the need for changing clinical practice, e.g., no elective deliveries prior to 39 weeks, or the use of thromboembolism prophylaxis for surgical patients, countless leaders in every hospital in the United States must individually work to make the changes at the front-lines. However, it is a waste of resources for every leader to individually and independently struggle with how to implement the guidelines. These data support the conclusion that QI

topic specific implementation guidelines can be developed and that leaders could benefit

from each others experiences. Sharing implementation details will likely reduce the amount

of trial and error; the early adopters could pave the way for others to follow.

The recommendation to start an implementation registry is ground-breaking in

much the same way that the Cochrane reviews were. Previous to the Cochrane review

process every clinician had to do their independent review of the literature. This was a waste

of precious resources. A QI topic specific registry filled with implementation details that are

summarized following specific guidelines will build on the Cochrane legacy. The Standards

for QUality Improvement Reporting Excellence (Squire) is a beginning step. However, this

recommendation is much broader and more targeted to develop a registry of implementation

plans that are detailed enough that other leaders could replicate or strategically alter.

Tracking implementation details with a QI Implementation log is a first step toward setting

up a QI implementation registry. Multi-hospital and multi-stakeholder collaboratives who

develop large-scale change projects could be developers of a QI implementation, topic

specific registry.

States should be encouraged to form multi-hospital, multi-stake holder quality

improvement collaboratives in order to break down silos and work among multiple

stakeholders to improve quality of care, and set quality guidelines. Working on QI at

multiple levels within a system is an important part of solving the quality chasm. Taking a

systems approach is needed, since many of the incentives are misaligned, and leaders with

expertise in payer reform, regulation, public health, hospital administration, etc. who work

together will be able to identify more robust and effective solutions for closing the quality

chasm at all levels. (E. K. Main & Bingham, 2008)

Health Information Technology

Policy Recommendation: Develop minimal Health Information Technology (HIT) QI requirements that not only promote the ability to collect data, but facilitate data query, data analysis, and data display.

The need for integrated Health Information Technology (HIT) systems to reduce the cost of lost data is well recognized as a health policy priority. (ref) However, most of the discussion on the need for HIT has focused on the importance of collecting data and improving the accuracy of medical records, rather than on the need for integrating computer data collection or electronic medical records with QI data needs. The dissertation study findings on the use and non-use of computers for QI implementation highlights the importance of HIT systems that make it easy for leaders to analyze data, develop QI trend charts, and display these charts. Currently, most of the leaders had to re-enter data from their charts into other software programs in order to perform their QI work.

The importance of HIT for improving data collection is critical for improving quality of care. However, simply collecting a lot of data will not be very useful. The most effective way to determine the HIT needs are to identify the biggest problems and determine what data are needed to solve them. Meaning, if we only work on collecting data, we will likely make limited progress toward solving the most pressing quality issues we are confronted with. We will expend a great deal of money and effort and remain with less to show for our efforts. Data alone will not reduce the quality chasm. Thus, how one decides what data needs to be collected should be based on the problem one is trying to solve, leading to what data are needed to track progress toward solving the particular problem.

Rather than having data collection be the primary focus of hospital, state and national QI efforts, leaders need to focus on what they need to "know" in order to guide what they

need to "do" to improve outcomes. Making it the first priority to describe the problem the data are expected to help solve, and secondly, to make the decisions as to what data are needed allows for more effective data collection. Data becomes the means to the ends, not the end in and of itself. Thus, moving the focus from data as a primary outcome goal, and shifting the focus instead on what data are needed to solve problems in order to improve quality of care, is a more direct and effective method for setting priorities and developing interventions.

Conclusion

More descriptive implementation process research is needed. The specific process and non-process research recommendations are to conduct further research on QI concepts, QI project timing, health information technology and QI, the setting of QI target dates, QI discourse and change, creative types of QI implementation, and the role of multi-hospital and multi-stakeholder QI collaboratives.

There are five recommendations for health policy. First, there is a need for more robust and streamlined methods for front-line leaders and clinicians to alert others when there is a quality and safety concern requiring a coordinated enhanced response from multiple stakeholders, e.g., a rapid response QI team. Second, include QI training for new clinicians and current clinicians so they will know how to conceptualize, implement and reach QI goals. Third, increase QI implementation research funding. Fourth, develop more effective methods for tracking and sharing implementation information with other leaders and clinicians such as a topic specific QI implementation registry. Fifth, develop health information technology solutions that include QI as a component.

Appendix A: Quality Improvement Progress Scoring Scales

Figure 7: QI Project Progress Score*

Score	Process Steps	Status	Comments
1.0	**Formation**		
	0.25 - Team Formed	□ In progress □ Completed	
	0.25 – Topic Selected	□ In progress □ Completed	
	0.25 – Target Population Identified	□ In progress □ Completed	
	0.25 – Baseline Measurement Begun	□ In progress □ Completed	
1.5	**Early Planning**		
	0.25 – Team meetings held	□ In progress □ Completed	
	0.25 – Preliminary Plans Developed	□ In progress □ Completed	
2.0	**Plan Finalized**		
	0.25 – Team Actively Engaged in information gathering	□ In progress □ Completed	
	0.25 – QI Project Plan Finalized	□ In progress □ Completed	
2.5	**Partial Implementation of Plan No Improvements Seen Yet**	□ In progress □ Completed	
3.0	**Modest Improvements Seen, Test Cycles Completed**	□ In progress □ Completed	
3.5	**Improvement Documented**		
	0.25 – All components of the plan implemented	□ In progress □ Completed	
	0.25 – Plan revised as needed	□ In progress □ Completed	
4.0	**Significant Improvement, 75% of Change Goals Met**	□ In progress □ Completed	
4.5	**Sustainable Improvement**		
	0.25 – Sustained improvement for 75% of the goals (Specify Time)	□ In progress □ Completed	
	0.25 – Begun to Spread to a Larger Population	□ In progress □ Completed	
5.0	**Outstanding Sustainable Results**		
	0.33 – All goals reached	□ In progress □ Completed	
	0.33 – Measures at National Benchmark Levels	□ In progress □ Completed	
	0.33 – Maintenance Monitoring in Place	□ In progress □ Completed	
6.0	**Spread**		
	0.50 – Begun to Spread to Another Facility	□ In progress □ Completed	
	0.50 – Successful Spread to at least one other Microsystem or Facility	□ In progress □ Completed	

The item is not scored unless the task has been completed. In progress is checked where activity occurred, but does not bring a higher score.

*A modification of the Institute for Health Care Improvement (IHI) Assessment Scale for Collaboratives, 2004, IHI Breakthrough College Series, Boston, MA.

Figure 12: Institute for Health Care Improvement Assessment Scale for Collaboratives

Score	Assessment/Description	Definition
1.0	Forming Team	Team has been formed; target population identified; aim determined and baseline measurement begun.
1.5	Planning for the project has begun	Planning for the project has begun Team is meeting, discussion is occurring. Plans for the project have been made.
2.0	Activity, but no improvement	Team actively engaged in development, research, discussion but no changes have been tested.
2.5	Changes tested, but no improvement	Components of the model being tested but no improvement in measures. Data on key measures were reported.
3.0	Modest improvement	Initial test cycles are completed and implementation begun for several components. Evidence of moderate improvement in process measures.
3.5	Improvement	Some improvement in outcome measures, process measures continuing to improve, PDSA test cycles on all components of the Change Package, changes implemented for many components of the Change Package.
4.0	Significant Improvement	Most components of the Change Package are implemented for the population of focus. Evidence of sustained improvement in outcome measures, halfway toward accomplishing all of the goals. Plans for spread the improvement are in place.
4.5	Sustainable Improvement	Sustained improvement in most outcomes measures, 75% of goals achieved, spread to a larger population has begun.
5.0	Outstanding Sustainable results	All components of the Change Package implemented, all goals of the aim have been accomplished, outcome measures at national benchmark levels, and spread to another facility is underway.

Assessment scale for collaboratives, in *Breakthrough Series College*. 2004, Institute for Health Care Improvement: Boston, MA. ("Assessment scale for collaboratives," 2004)

**Appendix B: Case Level Display for Partially Ordered Meta-Matrix and Within
Category Sorting of Self-Selected and Self-Defined Most and Least Successful
Complex QI Projects**

Appendix B: Case Level Display for Partially Ordered Meta-Matrix and Within Category Sorting of Self-Selected and Self-Defined Most and Least Successful Complex QI Projects

Each maternity care physician and nurse front-line leader included in the sample will be asked to self-select and self-describe what they determine to be their most and least successful complex QI Project that they led or participated in within the last 1-3 years.

Section 1:   Hospital Site, Leaders' Characteristics, and QI Project Topic

Hospital Sites	Leaders' Descriptions:	QI Project Topic Selection:
There are three types of maternity decision-making models within three types of hospitals (see below). All of the leaders in the study will be selected from a multi-hospital system with a nurse-managed labor decision-making model.	What is the amount of formal QI education of the front-line leader? What is the self-perceived QI expertise of the front-line leaders interviewed?	1. What are the QI project topics? 2. Why did they select the QI project topics?
1. Nurse-Managed Decision Model	• Degrees and certifications	• What was the QI Project Topic for the most-successful and least-successful QI projects?
Medical Front-line Leader	• Leader title	
Nursing Front-line Leader	• Number of years with current title	• Why did the QI topic get chosen?
2. Nurse-Physician/Midwife Decision Model	• Years worked in current specialty	
Medical Front-line Leader	• Published articles about QI	
Nursing Front-line Leader	• Areas of administrative responsibility	
3. Academic/ Teaching Decision Model	• Amount of formal QI training	
	• Overall perceived QI expertise	
Medical Front-line Leader		
Nursing Front-line Leader		
Hospital Types: 1. Independent Private/Government 2. Same system, multi-hospitals private, i.e., Kaiser Permanente, Multi-Hospital System 3. Same system, multi-hospitals government, i.e., Veterans Health Administration **Hospital Size:** • Total Number of in-patient beds • Number of annual deliveries		

Section 2: Leaders' QI Change Strategies and Section 3: QI Project Complexity

Discourse: 1. How was the collected QI data communicated to the staff? 2. How many of the four Baldrige communication criteria did the leader meet?	General Implementation Practices: 1. What are the change strategies that the leader used for the most-successful and least-successful QI projects?	QI Project Complexity: 1. How complex was the QI project?
• Were the QI results shared with the staff? • If QI results are shared with the staff, how much of the following was shared? • *A score* • *Trends over time* • *A comparison between goal and current state* • *A target date* • What other ways did the leader use to communicate the results, i.e., results posted (describe format), discussed in staff meetings, grand rounds, individual feedback, education sessions.	• What specific types of implementation practices did the leader use or not use? i.e., team training, educational sessions (specify) • Why did the leader use these specific change practices?	• How many different hospital units were involved in the QI projects? • How many different disciplines participated in the QI projects? • Approximately how many staff did the QI projects affect? • How long did the QI project take?

Section 4: Leaders' Insights and Barriers

Leaders' Insights into the degree of "success" of the QI Projects:	Concerns and Barriers Identified by the leaders:
1. What is the leader's self-assessment of the overall success of the QI projects? 2. What are the leader's insights into why one QI project was more successful than the other?	1. What concerns and barriers to success does the leader identify for the most and least successful QI projects?
• How did the leader identify his or her most-successful and least-successful QI projects? • What is the leader's self- assessment of why the QI project goal was met or not met? • What is the score of the QI project based on the QI project progress score? • Was the change sustained?	• What concerns and barriers to success does the leader identify for the QI projects described? • How did the leaders respond to the barriers encountered?

Appendix C: Semi-Structured Interview of Front-Line Maternity Physician and Nurse Leader Most Successful and Least Successful Complex Quality Improvement (QI) Projects

Appendix C: Semi-Structured Interview of Front-Line Maternity Physician and Nurse Leader Most Successful and Least Successful Complex Quality Improvement (QI) Projects

University of North Carolina-Chapel Hill
Semi-Structured Questionnaire
Adult Participants

_____

IRB Study #	**University of North Carolina:** 919-966-7879, hre.unc.edu
	IRB Approval Date: May 2008 IRB Expires: May 2009
IRB Study #	**Stanford University:** 650-724-7141, IRBeducation@stanford.edu
	IRB Approval Date: May 2008 IRB Expires: May 2009
IRB Study #	**Sutter Health:** 415-296-1808, www.shirb.org
	IRB Approval Date: May 2008 IRB Expires: May 2009

Semi-Structured Questionnaire Version Date: 7/22/08
Title of Study: Measuring and Increasing the Quality Improvement Effectiveness of Quality Improvement Change Practices of Front-Line Maternity Physician and Nurse Leaders

Study Participants: Hospital Site, Decision-Making Model, and Leader's Characteristics

Name, gender, email, phone number, address, hospital name, and hospital address will be kept separate from all of the other data collected. All data will be de-identified and given a code for study participant and study hospital.

First I am going to ask you some general questions:

Name:_____ **Gender:**_____

Degrees & Certifications:_____

Email:_____ **Phone Number:**_____

Preferred Snail Mail Address:_____

Hospital Name:_____

Hospital Address:_____

Number of Deliveries a year:____Title:_____

What are your area(s) of administrative responsibility: L&D Triage☐   Antepartum☐

Intrapartum☐ Post-partum☐ Well Baby Nursery☐   NICU/Special Care Nursery☐
Other:_____

What is your primary clinical training? Mark **ONE** answer that best describes your current status.

○ Obstetric Attending/Staff Physician   ○ Registered Nurse - Administration/Management
○ Maternal Fetal Medicine Specialist   ○ Registered Nurse – Clinical Nurse Specialist
                                                               ○ Registered Nurse – Clinical Nurse Educator

How long have you worked in your current specialty or profession?

       ○ a. Less than 1 year   ○ d. 11 to 15 years
       ○ b. 1 to 5 years   ○ e. 16 to 20 years
       ○ c. 6 to 10 years   ○ f. 21 years or more

How long have you been in your current position?

       ○ a. Less than 1 year   ○ d. 11 to 15 years
       ○ b. 1 to 5 years   ○ e. 16 to 20 years
       ○ c. 6 to 10 years   ○ f. 21 years or more

How long have you been in a supervisory position?

       ○ a. Less than 1 year   ○ d. 11 to 15 years
       ○ b. 1 to 5 years   ○ e. 16 to 20 years
       ○ c. 6 to 10 years   ○ f. 21 years or more

Have you had any formal Quality Improvement training? ○ Yes ○ No
Please describe:
If yes, workshop/classroom days: _____
The year of the first training was:_____ The year when you last attended an education session:_____

       Have you had other QI training? ○ Yes ○ No
           If yes, please describe: i.e., on-the-job, mentor, self-taught

       Have you published any articles about Quality Improvement? ○ Yes ○ No
       If yes, please give references:

       Have you published any articles about Quality Improvement projects? ○ Yes ○ No
       If yes, please give references:

On a scale of 1-5 with 5 being you strongly agree, how would you rank the following statement:	Strongly Disagree ▼	Disagree ▼	Neither ▼	Agree ▼	Strongly Agree ▼
I am a Quality Improvement expert	①	②	③	④	⑤

Interview Introduction

In the last one to three years did you lead or participate in any maternal focused quality improvement (QI) activities at the hospital(s) where you work? ◯Yes ◯No

   a. *If yes*, I would like to obtain detailed information about two QI/change projects you led or participated in during the past one to three years. I would like one of the QI/change projects you describe to be what you consider a success and one that you describe to be what you consider to be the least-successful.

I would appreciate it if you would first answers questions about the most successful complex QI project you led or participated in during the past one to three years. What I mean by your most successful COMPLEX QI project is that it is a project where you really tried and took more than 4 months to complete, involved multiple staff, had more than one discipline involved, i.e., nurses, unit clerks, nurses aides, operating room technicians, pharmacy, physicians, and may have involved more than one unit.

General Instructions:
There are 4 broad categories that the questions fit into:
General description of the QI Project
Change practices you used
Barriers and practices, and insights
Overall assessment

The interview is semi-structured and open-ended, which means two things:
1. You can tell me as much as you want.
2. You can go back to a previous question at any time.

I will ask you the same questions for both your most successful and least successful QI Projects.

Do you have any questions at this point?

Most Successful Section One: Project Topic

Please describe what the QI or change project was trying to improve? (What was the QI topic?)

When was the QI project started?

Is the QI project complete? ○ Yes   ○ No   If yes, when?_____

Please describe why the (state the QI topic)_____ was chosen as a QI project?

Most Successful Section Two: QI Project Complexity:

Approximately how much staff was affected by the QI project (state topic)?

Number of Units Involved: List all of the units affected by the QI project (state topic):

When did the different units get involved in the QI project? (month/year)

What was the role you played in involving other units in the QI project?

Number of Professional Groups Involved:

List the different professional groups affected by the QI project (state topic):

QI Project Overall Measure of Success: Based on the goal (*restate goal*), on a scale of 1-5, with 5 being strongly agree, how would you answer the following statement:	**Strongly Disagree** ▼	**Disagree** ▼	**Neither** ▼	**Agree** ▼	**Strongly Agree** ▼
The quality improvement goal was met...	①	②	③	④	⑤
Based on the goal (*restate goal*), on a scale of 1-5, with 5 being strongly agree, how would you answer the following statement:	**Strongly Disagree** ▼	**Disagree** ▼	**Neither** ▼	**Agree** ▼	**Strongly Agree** ▼
The quality improvement was successful...	①	②	③	④	⑤

Most Successful Section Three: Leader's QI Change Practices

Baldrige Communication Criteria:

Did you develop a score for the QI project? ○Yes   ○No

Were the staff provided with a QI score? ○Yes   ○No   (Copy Provided ○Yes ○No ○Not Available)
Please elaborate as needed:

Were the staff provided with QI trends over time?
○Yes   ○No   (Copy Provided ○Yes ○No ○Not Available) Please elaborate as needed:

Were the staff shown how the current state compared to the QI goal? ○Yes ○No (Copy Provided ○Yes ○No ○Not Available)
Please elaborate as needed:

Were the staff given a target date for meeting the goal? ○ Yes   ○ No (Copy Provided ○Yes ○No ○Not Available)
Please elaborate as needed:

General Change Practices and Barriers:

What barriers to the change were identified and what type of change practices were used to address each barrier? (list all that apply, prompt as needed, and if possible record the date and frequency for each item listed.)

This is a list of possible categories and specific change practices that have been identified in the literature and will be used to prompt the leader as needed.

Strategy:	Describe:	Month(s) and Year (s):
Continuing Education		
Grand rounds		
Classes - on site		
Simulation Training		
Conferences – off site		
Posted on the unit private location for staff only		
Posted on the unit public location for visitors & staff		
Other		
Team Training (please describe)		
Audit and Feedback		
Group		
Individuals		
Reminders		
Computer Reminders		
Paper Reminders		
Triggers		
Directed Verbal Discourse		
Staff Meetings		
Town Hall Meetings		
Discussion Forum		
End of Shift Announcement		
Academic Detailing (A knowledgeable person visits each target clinician to explore a problem & local solutions, discuss their concerns, provide summary of key facts.)		
Written Discourse		
Newsletters		
Flyers		
Discourse Book		

Rewards		
Award, i.e., hospital, professional (please describe)		
Other types of recognition (please describe, i.e., gift certificates)		
Professional opportunities (please describe)		
Financial (please describe)		
Celebration		
Non-monetary perks (please describe) i.e., days off, off-unit work time		
Professional Recognition		
Disciplinary Action (please describe)		
Verbal Warning		
Written Warning		
Suspension		
Termination		
Other		

Were there any other barriers identified?

Most Successful Section Four: Leader's Insights and Barriers

What insights did you gain regarding the QI change practices that were used?

Were any of the above change practices used to address barriers identified?

Why do you consider this to be an example of the most successful QI project in the past 1 to 3 years?

Is there additional information you would like me to know about the most successful QI project you just described?

Are there additional insights you gained when leading or participating in the most successful QI project?

Are there other barriers you encountered when leading or participating in this QI project that you have not already described?

QI Project Progress Score – Most Successful

Score	Process Steps	Status	Comments
1.0	**Formation**		
	0.25 - Team Formed	□ In progress □ Completed	
	0.25 – Topic Selected	□ In progress □ Completed	
	0.25 – Target Population Identified	□ In progress □ Completed	
	0.25 – Baseline Measurement Begun	□ In progress □ Completed	
1.5	**Early Planning**		
	0.25 – Team meetings held	□ In progress □ Completed	
	0.25 – Preliminary Plans Developed	□ In progress □ Completed	
2.0	**Plan Finalized**		
	0.25 – Team Actively Engaged in Research	□ In progress □ Completed	
	0.25 – QI Project Plan Finalized	□ In progress □ Completed	
2.5	**Partial Implementation of Plan No Improvements Seen Yet**	□ In progress □ Completed	
3.0	**Modest Improvements Seen, Test Cycles Completed**	□ In progress □ Completed	
3.5	**Improvement Documented**		
	0.25 – All components of the plan implemented	□ In progress □ Completed	
	0.25 – Plan revised as needed	□ In progress □ Completed	
4.0	**Significant Improvement, 75% of Change Goals Met**	□ In progress □ Completed	
4.5	**Sustainable Improvement**		
	0.25 – Sustained improvement for 75% of the goals (Specify Time)	□ In progress □ Completed	
	0.25 – Begun to Spread to a Larger Population	□ In progress □ Completed	
5.0	**Outstanding Sustainable Results**		
	0.33 – All goals reached	□ In progress □ Completed	
	0.33 – Measures at National Benchmark Levels	□ In progress □ Completed	
	0.33 – Maintenance Monitoring in Place	□ In progress □ Completed	
6.0	**Spread**		
	0.50 – Begun to Spread to Another Facility	□ In progress □ Completed	
	0.50 – Successful Spread to at least one other Microsystem or Facility	□ In progress □ Completed	

The item is not scored unless the task has been completed. In progress is to track where activity occurred, but does not bring up a higher score.

Now I would like to ask you the same questions about the least successful complex maternity QI project that you led or participated in during the past 1-3 years.

What I mean by your least successful COMPLEX QI project is that it is a project where you really tried and took more than 4 months to complete, involved multiple staff, had more than one discipline involved, i.e., nurses, unit clerks, nurses aides, operating room technicians, pharmacy, physicians, and may have involved more than one unit.

Least Successful Complex QI Project:

Least Successful Section One: Project Topic

Please describe what the QI or change project was trying to improve? (What was the QI topic?)
 I will use the term change project interchangeably with QI project throughout the interview if needed.

When was the QI project started?

Is the QI project complete? ◯ Yes   ◯ No   If yes, when?_____

Please describe why the (state the QI topic)_____ was chosen as a QI project?

Least Successful Section Two: QI Project Complexity:
Approximately how much staff was affected by the QI project (state topic)?

Number of Units Involved:
List all of the units affected by the QI project (state topic):

When did the different units get involved in the QI project? (month/year)

What was the role you played in involving other units in the QI project?

Number of Professional Groups Involved:

List the different professional groups affected by the QI project (state topic):

QI Project Measures of Success:

Based on the goal (*restate goal*), on a scale of 1-5, with 5 being strongly agree, how would you answer the following statement:	Strongly Disagree ▼	Disagree ▼	Neither ▼	Agree ▼	Strongly Agree ▼
The quality improvement goal was met...	①	②	③	④	⑤

Based on the goal (*restate goal*), on a scale of 1-5, with 5 being strongly agree, how would you answer the following statement:	Strongly Disagree ▼	Disagree ▼	Neither ▼	Agree ▼	Strongly Agree ▼
The quality improvement was successful...	①	②	③	④	⑤

Least Successful Section Three: Leader's QI Change Practices (Least Successful QI Project)
Baldrige Communication Criteria:

Did you develop a score for the QI project? ○Yes   ○No

Were the staff provided with a QI score? ○Yes   ○No   (Copy Provided ○Yes ○No ○Not Available)
Please elaborate as needed:

Were the staff provided with QI trends over time? ○Yes   ○No   (Copy Provided ○Yes ○No ○Not Available)
Please elaborate as needed:

Were the staff shown how the current state compared to the QI goal? ○Yes ○No (Copy Provided ○Yes ○No ○Not Available)
Please elaborate as needed:

Were the staff given a target date for meeting the goal? ○ Yes   ○ No   (Copy Provided ○Yes ○No ○Not Available)
Please elaborate as needed:

General Change Practices:
What barriers to the change were identified?

What type of change practices were used? (list all that apply, prompt as needed, and if possible record the date and frequency for each item listed.)

This is a list of possible categories and specific change practices that have been identified in the literature and will be used to prompt the leader as needed.

Strategy:	Describe:	Month(s) and Year (s):
Continuing Education		
Grand rounds		
Classes - on site		
Simulation Training		
Conferences – off site		
Posted on the unit private location for staff only		
Posted on the unit public location for visitors & staff		
Other		
Team Training (please describe)		
Audit and Feedback		
Group		
Individuals		
Reminders		
Computer Reminders		
Paper Reminders		
Triggers		
Directed Verbal Discourse		
Staff Meetings		
Town Hall Meetings		
Discussion Forum		
End of Shift Announcement		
Academic Detailing (A knowledgeable person visits each target clinician to explore a problem & local solutions, discuss their concerns, provide summary of key facts.)		
Written Discourse		
Newsletters		
Flyers		
Discourse Book		

Rewards		
Award, i.e., hospital, professional (please describe)		
Other types of recognition (please describe, i.e., gift certificates)		
Professional opportunities (please describe)		
Financial (please describe)		
Celebration		
Non-monetary perks (please describe) i.e., days off, off-unit work time		
Professional Recognition		
Disciplinary Action (please describe)		
Verbal Warning		
Written Warning		
Suspension		
Termination		
Other		

Least Successful Section Four: Leader's Insights and Barriers

What insights did you gain regarding the QI change practices that were used?

Were any of the above change practices used to address barriers identified?

Why do you consider this to be an example of the least successful QI project in the past 1 to 3 years?

Is there additional information you would like me to know about the least successful QI project you just described?

Are there additional insights you gained when leading or participating in the least successful QI project?

Are there other barriers you encountered when leading or participating in this QI project that you have not already described?

QI Project Progress Score – Least Successful

Score	Process Steps	Status	Comments
1.0	**Formation**		
	0.25 - Team Formed	□ In progress □ Completed	
	0.25 – Topic Selected	□ In progress □ Completed	
	0.25 – Target Population Identified	□ In progress □ Completed	
	0.25 – Baseline Measurement Begun	□ In progress □ Completed	
1.5	**Early Planning**		
	0.25 – Team meetings held	□ In progress □ Completed	
	0.25 – Preliminary Plans Developed	□ In progress □ Completed	
2.0	**Plan Finalized**		
	0.25 – Team Actively Engaged in Research	□ In progress □ Completed	
	0.25 – QI Project Plan Finalized	□ In progress □ Completed	
2.5	**Partial Implementation of Plan No Improvements Seen Yet**	□ In progress □ Completed	
3.0	**Modest Improvements Seen, Test Cycles Completed**	□ In progress □ Completed	
3.5	**Improvement Documented**		
	0.25 – All components of the plan implemented	□ In progress □ Completed	
	0.25 – Plan revised as needed	□ In progress □ Completed	
4.0	**Significant Improvement, 75% of Change Goals Met**	□ In progress □ Completed	
4.5	**Sustainable Improvement**		
	0.25 – Sustained improvement for 75% of the goals (Specify Time)	□ In progress □ Completed	
	0.25 – Begun to Spread to a Larger Population	□ In progress □ Completed	
5.0	**Outstanding Sustainable Results**		
	0.33 – All goals reached	□ In progress □ Completed	
	0.33 – Measures at National Benchmark Levels	□ In progress □ Completed	
	0.33 – Maintenance Monitoring in Place	□ In progress □ Completed	
6.0	**Spread**		
	0.50 – Begun to Spread to Another Facility	□ In progress □ Completed	
	0.50 – Successful Spread to at least one other Microsystem or Facility	□ In progress □ Completed	

The item is not scored unless the task has been completed. In progress is to track where activity occurred, but does not bring up a higher score.

<u>Hospital Quality Improvement Grade</u>
Please give this hospital an overall grade on <u>MATERNAL</u> quality improvement activities. Mark <u>ONE</u> answer:

○	○	○	○	○
A	**B**	**C**	**D**	**E**
Excellent	Very Good	Acceptable	Fair	Failing

Please give this hospital an overall grade on <u>GENERAL</u> quality improvement activities. Mark <u>ONE</u> answer:

○	○	○	○	○
A	**B**	**C**	**D**	**E**
Excellent	Very Good	Acceptable	Fair	Failing

Thank you for your participation in this research study.

I may be contacting you to verify the information or I may have some follow-up questions for you.

Let me know if you have any questions.

Appendix D: Internal Review Board Recruitment Documents and Consent for Study for Participation

The entire IRB applications for Sutter Health, Stanford University, and the University of North Carolina are not included in the appendix.

Recruitment Process

University of North Carolina-Chapel Hill
Adult Participants

_____

IRB Study #08-0434 University of North Carolina: 919-966-7879, hre.unc.edu
                       IRB Approval Date: IRB Expires: May 2009
IRB Study #13182   Stanford University: 650-724-7141, IRBeducation@stanford.edu
                       IRB Approval Date: IRB Expires: May 2009
IRB Study #   Sutter Health**:** 415-296-1808, www.shirb.org
                       IRB Approval Date: IRB Expires: May 2009

Recruitment Email Script Version: 3/12/08

Title of Study: Measuring and Increasing the Quality Improvement Effectiveness of Quality Improvement Change Practices of Front-Line Maternity Physician and Nurse Leaders

Dr. Elliott Main will introduce the potential study participants who meet inclusion criteria to

Ms. Bingham by sending an email that introduces Ms. Bingham to them. The introductory

email script is outlined below. The potential study participants will be given the opportunity

to say no to participation without any consequences to them at their own institution. The

potential study participants introduced to Ms. Bingham by Dr. Main do not need to express

interest in participating in the study prior to Ms. Bingham contacting them, since Ms.

Bingham will be cc'd on the email that Elliott Main sends.

Recruitment Email From Elliott Main

Hi _____, I am introducing you to Debra Bingham, MS, RN, who is a doctoral student at Health Policy and Administration at the School of Public Health at the University of North Carolina, Chapel Hill and conducting a research study at Sutter Health for her dissertation. Debra also works with me as the Executive Director for the California Maternal Quality Care Collaborative (CMQCC).

Debra is conducting brief interviews of front-line maternity physician and nurse leaders about their quality improvement change practices for their most successful and least successful quality improvement projects. She would like to discuss whether you are willing to participate in her dissertation study.

Your participation in Debra's research study is absolutely voluntary and you can say no to participating without any downside in your relationship to me. Debra will go over the specific details of the study and answer any questions you may have so that you can decide whether you are willing to participate.

Warm regards, Elliott

Recruitment Email From Debra Bingham

Hi _____,

My name is Debra Bingham. I work with Elliott Main, MD as the Executive Director of the California Maternal Quality Care Collaborative (CMQCC) and I am a doctoral student at the school of Health Policy and Administration at the School of Public Health at the University of North Carolina, Chapel Hill. Dr. Main provided me with your contact information. Although we will most likely work on multiple projects together in the future through my involvement with CMQCC, today I am contacting you as a doctoral student.

For my doctoral dissertation, I am conducting research to determine how front-line maternity physician and nurse leaders tailor their quality improvement change practices for their self-defined and self-selected most successful and least successful complex quality improvement project.

I would like to find a time when I can tell you more about the research study and, if you consent to participate in the study, conduct an in person interview. Your participation in this research is completely voluntary and even if you agree to meet with me you are not obligated to participate in the study. The study will take approximately 1-2 hours. If you are willing to participate, or would like additional information, please contact me to set up a mutually convenient time to meet or for a study fact sheet.

University of North Carolina-Chapel Hill- Adult Participants

Recruitment Email or Phone Contact Script Version: 2/4/08

Title of Study: Measuring and Increasing the Quality Improvement Effectiveness of Quality Improvement Change Practices of Front-Line Maternity Physician and Nurse Leaders

IRB Study #   **University of North Carolina:** 919-966-7879, hre.unc.edu
       IRB Approval Date: May 2008 IRB Expires: May 2009
IRB Study #   **Stanford University:** 650-724-7141, IRBeducation@stanford.edu
       IRB Approval Date: May 2008 IRB Expires: May 2009
IRB Study #   **Sutter Health:** 415-296-1808, www.shirb.org
       IRB Approval Date: May 2008 IRB Expires: May 2009

Title of Study: Measuring and Increasing the Quality Improvement Effectiveness of Quality Improvement Change Practices of Front-Line Maternity Physician and Nurse Leaders

Principal Investigator: Debra Bingham, MS, RN, Dr. Public Health Student
UNC-Chapel Hill Department: Health Policy and Management
Faculty Advisor: Peggy Leatt, PhD

Study Contact telephone number: 650-723-5763
Study Contact email: dbingham@email.unc.edu

_____

What are some general things you should know about research studies?

You are being asked to take part in a research study. To join the study is voluntary.
You may refuse to join, or you may withdraw your consent to be in the study, for any reason, without penalty.

Research studies are designed to obtain new knowledge. This new information may help people in the future.   You may not receive any direct benefit from being in the research study. There also may be risks to being in research studies.

Details about this study are discussed below. It is important that you understand this information so that you can make an informed choice about being in this research study. You will be given a copy of this consent form. You should ask the researchers named above, or staff members who may assist them, any questions you have about this study at any time.

What is the purpose of this study?
The purpose of this research study is to learn how front-line maternity physician and nurse leaders implement quality improvement change practices.

You are being asked to participate in this study because you are a front-line maternity physician and nurse leader.

I am conducting this research study as part of my dissertation in Health Policy and Public Administration in the Department of Public Health.

Are there any reasons you should not be in this study?
You should not be in this study if you have been in the leadership position for less than three years.

How many people will take part in this study?
If you decide to be in this study, you will be one of approximately six front-line leaders in this research study.

How long will your part in this study last?
Participating in this study will take about one to two hours of your time. I may be contacting you after the study to clarify some information and for the work I am doing through the California Maternal Quality Care Collaborative state funded program.

What will happen if you take part in the study?
During the interview, I will ask you to describe your most successful and least successful

complex quality improvement projects.

During the interview, I will ask you questions, record your answers, and take notes about

your answers.

What are the possible benefits from being in this study?
Research is designed to benefit society by gaining new knowledge. You may not benefit personally from being in this research study.

What are the possible risks or discomforts involved from being in this study?
The risks associated with this study are minimal since you will not be asked questions of a sensitive nature. In addition, as explained below, your comments will be treated confidentially, and you will have the right to refuse to answer any question or withdraw from the study at any time. There may be uncommon or previously unknown risks. You should report any problems to the researcher.

How will your privacy be protected?
I will not divulge, publish, or otherwise make known to unauthorized persons or to the public any information obtained during the research study that could identify the people who participated in the study.

I will also collect data in a way that does not identify you personally or permit someone from deducing your identity. In writing up my notes, I will record the number of years you have been a front-line leader and your professional background (e.g., physician or nurse) but I will

not record the name of the hospital where you work, your name, contact information, or any other personally identifying information.

I would like to tape record the interview so that we can more completely and more accurately capture your comments. If at any time you wish to make an "off the record" comment, I will stop the tape at your request and restart it when you are ready to continue. After the study results have been written up the tape will be destroyed.

I will not make copies of my written notes, and I will secure the typed interview notes by password protecting them on my computer. Only the Principal Investigator named above will have password access to the typed interview notes. I will delete or destroy all of these materials one the study results have been analyzed. All study records stored on my computer will be coded and de-identified. The codes that link your data to who you are and the hospital where you work will be stored in a locked file cabinet separate from where the computer is kept.

Will you receive anything for being in this study?
You will not receive anything for taking part in this study.

Will it cost you anything to be in this study?
There will be no costs for being in the study

What if you have questions about this study?
You have the right to ask, and have answered, any questions you may have about this research. If you have questions, or concerns, you should contact the researchers listed on the first page of this form.

What if you have questions about your rights as a research participant?
All research on human volunteers is reviewed by a committee that works to protect your rights and welfare. If you have questions or concerns about your rights as a research subject you may contact, anonymously if you wish, the Public Health Institutional Review Board at 919-966-9347 or by email to IRB_subjects@unc.edu.

Does the research include protected health information under the Health Insurance Portability and Accountability Act of 1996?
During the interview you will be asked to make quality improvement documents available to

the Principal Investigator. No individual patient records or identifiable individual patient

information will be reviewed as part of the study. The quality improvement documents

requested will be quality improvement data reported in the aggregate, i.e., trend charts,

meeting minutes, and flyers. Prior to showing the Principal Investigator the quality

improvement documents requested you will be asked to review the materials to ensure that

no individual patient data is visible in these documents.   You may refuse at any time to show

or copy requested documents.

Study Consent

<div align="center">

Sutter Health Services Research
Institutional Review Board

CONSENT TO ACT AS A RESEARCH PARTICIPANT

</div>

<div align="center">

EXPERIMENTAL SUBJECT'S BILL OF RIGHTS

</div>

The Sutter Health Services Research Institutional Review Board (SHSR IRB) wishes you to know: Any person who is requested to consent to participate as a subject in a research study involving a medical experiment, or who is requested to consent on behalf of another, has the right to:

1. Be informed of the nature and purpose of the experiment.
2. Be given an explanation of both the procedures to be followed in the medical experiment, as well as any drug to be used in the experiment.
3. Be given a description of any attendant discomforts and risks reasonably to be expected from the experiment.
4. Be given an explanation of any benefits to the subject reasonably to be expected from the experiment.
5. Be given a disclosure of any appropriate alternative procedures, drugs or devices that might be advantageous to the subject, and their relative risks and benefits.
6. Be informed of the avenues of medical treatment, if any, available to the subject after the experiment if complications should arise.
7. Be given an opportunity to ask any questions concerning the experiment or the procedures involved.
8. Be instructed that consent to participate in the medical experiment may be withdrawn at any time, and the subject may discontinue participation in the medical experiment without prejudice.
9. Be given a copy of the signed and dated written consent form when one is required.
10. Be given the opportunity to decide to consent or not to consent to a medical experiment without the intervention of any element of force, fraud, deceit, duress, coercion, or undue influence on the subject's decision.

If you have questions regarding a research study, the researcher or his or her assistant will be glad to answer them. You may seek information from the SHSR IRB --established for the protection of volunteers in research projects--by calling (415) 296-1848 or (415) 296-1808 Monday through Friday, between 8:00 a.m. and 4:00 p.m.

_____
_

Participant's signature or legal representative, if appropriate
                    Date

Title of the Study:
Measuring and Increasing the Effectiveness of the Quality Improvement
Implementation Change Practices of Front-Line Maternity Physician and Nurse
Leaders

Participant's Name: _____Date: _____/_____/_____

The Sutter Health Care Principal Investigator: Elliott Main, MD

The Study Principal Investigator and Interviewer: Debra Bingham, MS, RN, Dr. PH

Candidate

This study was explained to you by: Debra Bingham, MS, RN, Dr. PH Candidate

A.   WHAT IS THE PURPOSE OF THIS STUDY?

You have been asked to participate in a research study because you are a maternity physician or nurse leader at Sutter Health. The purpose of this study is to determine how front-line maternity physician and nurse leaders tailor the Quality Improvement (QI) change practices they implemented for their self-selected and self-defined most successful and least successful complex Quality Improvement (QI) projects. *The study is an interview.*

B.   HOW MANY PEOPLE WILL PARTICIPATE?

Approximately 6, [3 physician and 3 nurse leader], participants who work at 3 hospitals with labor and delivery units at Sutter Health will take part in this study.

HOW LONG WILL YOU BE IN THIS STUDY?

If you agree to take part in this study, you will be asked a series of questions about your most successful and least successful Quality Improvement projects. The interview will take about 2 to 4 hours. I may be contacting you after the interview to clarify some information obtained during the interview. It is anticipated that the study analysis will be completed by May 2009.

D. *WHAT WILL HAPPEN TO YOU DURING THIS STUDY?*

<u>Guidelines:</u>

- The interview will take place at a location and time that is convient for you.

- I will ask you to provide me a copy of Quality Improvement (QI) documents that do not contain individual protected health information and are identified by you during the interview. Only the documents that you discuss during the interview will be requested. The type of documents that will be requested are charts, data collection forms, and unit specific QI documents.

If you prefer not to provide a copy of the QI documents I will request the opportunity to review the documents on site. If you prefer not to provide me a copy or allow me to review the documents on-site, that does not exclude you from the study.

E. *WHAT ARE THE RISKS OF THIS STUDY TO YOU?*

<u>Guidelines:</u>

The risks associated with this study are loss of confidentiality, potential embarrassment, and loss of time. However, since you will not be asked questions of a sensitive nature these risks are only minimal and the steps taken to reduce these risks will be outlined in Section I.

<u>Are there any Unforeseen Risks?</u>

There may be uncommon or previously unknown risks. You should report any problems to the researcher.

F. <u>WHAT ARE THE POTENTIAL BENEFITS TO ME AND OTHERS?</u>

The Benefits Directly to You: Participation in this study offers certain benefits. Those benefits are:

- Potential for increased personal insight into how you currently tailor QI implementation practices.

- Potential for increased knowledged regarding how to increase your ability to have more successful QI projects in the future.

The Benefits to Health Care in General:

- Your insights regarding what has worked or not worked for you when leading Quality Improvement (QI) has the potential for increasing the QI effectiveness of other front-line leaders. This is a significant contribution since it is estimated that it currently takes 17 years for research to be translated in to practice.

H.   <u>WHAT HAPPENS IF I AM INJURED OR HARMED IN SOME WAY BY THE STUDY?</u>

Sutter Health, the Sutter Health Services Research IRB, Stanford IRB, the University of North Carolina, and the Investigators have no special program to provide compensation if injury occurs during the research. If you are harmed in any way as a result of participation in this study, treatment will not be made available. Because insurance companies may not pay for research-related costs, they may not pay for an injury resulting from your participation in this study. Any costs not paid by your insurance company will be your responsibility.

In the event of a research-related injury, you should contact Debra Bingham at 650-521-4518. This is a 24-hour number.

HOW CONFIDENTIAL ARE YOUR RECORDS?

Due to the fact that the research is conducted by interview it is impossible for the information to be anonymous to the interviewer, Debra Bingham. However, all study materials, including the digital voice recordings, will be de-identified and coded. Study consents and study codes will be kept separate from the study responses. No copies of the written notes will be made, and the typed interview notes will be de-identified and stored on a password protected study computer.

Only Debra Bingham will have access to the codes that identify the study participants and the study hospitals. All study materials will be stored in a secure office, in a locked file cabinet at Stanford University.

All data will be discussed and reported in a confidential and de-identified manner and you will not be identified as a study participant. The hospital where you work will not be identified as a study site.

No health information will be requested or reviewed for you as one of the study participants or for any Quality Improvement documents reviewed.

You will have the right to refuse to answer any question or withdraw from the study at any time.

J.   IS BEING IN THIS STUDY VOLUNTARY?

Taking part in this research study is completely voluntary. You may choose not to take part at all. If you decide not to be in this study, or if you stop participating at any time, you won't be penalized or lose any benefits for which you otherwise qualify.

K.   WILL I BE PAID FOR PARTICIPATING?

You will not be paid for being in this research study.

L.   WHO IS FUNDING THIS STUDY?

Office space and funds for document transcription are provided to Debra Bingham to conduct the study and secure the study documents at Stanford University. There are no financial benefits to the researchers or Stanford University.

WILL IT COST ME ANYTHING TO BE IN THIS STUDY?

You will not have any costs for being in this research study other than the time you spend during the interview.

WILL I RECEIVE NEW INFORMATION ABOUT THE STUDY WHILE PARTICIPATING?

You will be provided with a copy of the analysis and synthesis of the study findings.

O.   <u>**EXPERIMENTAL SUBJECT'S BILL OF RIGHTS**</u>

A copy of the Experimental Subject's Bill of Rights and a copy of this consent form will be given to you for your own use.

P.   *WHAT IF I HAVE QUESTIONS?*

We encourage you to ask questions. If you have any questions about the research study itself, please contact: Debra Bingham, MS, RN, Dr. PH Candidate at 650-723-5763.

Should you have any comments or complaints about the study or questions about your rights as a research participant, you may call the Institutional Review Board which is concerned with protection of volunteers in research projects, between 8 a.m. and 4 p.m., Monday through Friday, at (415) 296-1884 or by writing: Sutter Health Services Research Institutional Review Board, SHIRE, 345 Califronia Street, Suite 2000, San Francisco, CA 94104.

SIGNATURE OF RESEARCH SUBJECT OR LEGAL REPRESENTATIVE

I have read (or someone has read to me) the information provided above. I have been given an opportunity to ask questions and all of my questions have been answered to my satisfaction. I have been given a copy of this consent form; the Subject's Experimental Bill of Rights; and a copy of the Authorization for the Use and Disclosure of Protected Health Information for Research form.

BY SIGNING THIS FORM, I WILLINGLY AGREE TO PARTICIPATE IN THE RESEARCH IT DESCRIBES.

_____

Participant's Name (print)

_____

Participant's Signature   **Date**

_____

Signature of Person Conducting Consent Discussion   Date

Please check and initial the appropriate box regarding the use of digital voice recording instruments during the interview:

☐   Yes, I give permission to record my voice during the interview. I understand that I can ask that the recording device be turned off or withdraw this permission to record at any time during the interview.

☐   No, I do not give permission to record my voice.

IRB Study #   **University of North Carolina:** 919-966-7879, hre.unc.edu
                IRB Approval Date: May 2008   IRB Expires: May 2009
IRB Study #   **Stanford University:** 650-724-7141, IRBeducation@stanford.edu
                IRB Approval Date: May 2008   IRB Expires: May 2009
IRB Study #   **Sutter Health:** 415-296-1808   www.shirb.org

IRB Approval Date: May 2008   IRB Expires: May 2009

Appendix E:

Hospital and Leader Comparison Tables of QI Implementation Tactics Used, Not Used, or Not Applicable for Most and Least Successful QI Projects

Table 10a: Hospital 1 Leaders' QI Practices - Education and Data Tactics

Leaders A and B	A Most Successful	A Least Successful	B Most Successful	B Least Successful
QI Project Topics and Goals	100% of patients will wait less than 15 minutes from the time they check-in to the time they are put in an exam room	Eliminate all routine episiotomies for women greater than 37 weeks giving birth for the first time	Meet all First Pregnancy and Delivery (FPAD) process and outcome goals	Improve rapidity of diagnosis and treatment of women in premature labor
QI Project Progress Score	6	4	4	2.5
Education				
Grand Rounds or Division Meetings	Yes	Yes	Yes	No
Classes or Conferences	No	Yes	No	Yes
Simulation Training	No	No	No	No
Team Training (please describe)	Yes	Yes	Yes	Yes
Competency validation, e.g., learning fair	N/A	No	No	No
Data: Audit and Feedback				
Re-work general data to be more unit specific	Yes	Yes	Yes	Yes
Data posted in a private location for staff only	Yes	No	Yes	No
Data posted in a public location for visitors & staff	No	No	No	No
Group data feedback	Yes	Yes	Yes	Yes
Individual data feedback	Yes	Yes	No	No
Second opinion	N/A	No	No	N/A
Leader Designated Change Champion	No	No	No	No
Applicable Education and Data Tactics Used (Total Applicable Discourse Tactics)	6 (10)	6 (12)	5 (12)	4 (12)

N/A= Not Applicable. The N/A category was determined by the PI and N/A tactics are not included in the denominator.
Data Modifiers: Implementation phase and amount of leader effort.

Table 10b: Hospital 1 Leaders' QI Implementation Practices - Discourse Tactics

Leaders A and B	A Most Successful	A Least Successful	B Most Successful	B Least Successful
QI Project Topics and Goals	100% of patients will wait less than 15 minutes from the time they check-in to the time they are put in an exam room	Eliminate all routine episiotomies for women greater than 37 weeks giving birth for the first time	Meet all First Pregnancy and Delivery (FPAD) process and out-come goals	Improve rapidity of diagnosis and treatment of women in premature labor
QI Project Progress Score	6	4	4	2.5
Discourse: Meetings and One-to-One Discussions				
System Leader to Front Line Leader	Yes	Yes	Yes	No
Front Line Leader to Staff	Yes	Yes	Yes	Yes
Clinician to Clinician	Yes	No	No	Yes
Academic Detailing	No	No	Yes	No
Discourse: Reminders				
Check Lists	No	No	No	No
Computer Reminders	Yes*	No	No	Yes
Paper Reminders	No	No	No	No
Other Triggers	No	No	No	No
Discourse: Written				
Newsletters/Flyers	No	Yes	No	Yes
Posters/Bulletin Boards	No	No	Yes	No
Emails	No	No	No	No
Discourse: External Rewards				
Award or other public recognition for staff	No	No	No	No
Professional opportunities	No	No	No	No
Financial	No	No	No	No
Celebration	No	No	No	No
Non-monetary perks	No	No	No	No
Professional Recognition	No	No	No	No
Discourse: Disciplinary				
Verbal Warning	No	No	Yes	Yes
Written Warning	No	No	Yes	No
Suspension	No	No	No	No
Termination	No	No	No	No
Number of Applicable Discourse Tactics Used (Total Applicable)	4 (12)	3 (12)	6 (12)	5 (12)

N/A= Not Applicable. The N/A category was determined by the PI and N/A tactics are not included in the denominator.
Data Modifiers: Implementation phase and amount of leader effort.

Table 11a: Hospital 2 Leaders' QI Implementation Practices - Education and Data Tactics

Leaders C, D, and E	C Most Successful	C Least Successful	D&E* Most Successful	D&E* Least Successful
QI Project Topics and Goals	Eliminate all routine episio-tomies for women greater than 37 weeks giving birth for the first time	Decrease. admission rates of primips at less than 3 centimeters cervical dilation	100% of RN staff will chart and communicate Fetal Heart Rate (FHR) monitoring patterns using national standards	Increase breast-feeding rates for healthy newborns
QI Project Progress Score	4.8	4.8	5.5	2.5
Education				
Grand Rounds or Division Meetings	Yes	No	Yes	Yes
Classes or Conferences	No	Yes	Yes	Yes
Simulation Training	No	No	Yes	Yes
Team Training (please describe)	Yes	Yes	Yes	Yes
Competency validation, e.g., learning fair	No	No	Yes	Yes
Data: Audit and Feedback				
Re-work general data to be more unit specific	Yes	Yes	Yes	Yes
Data posted in a private location for staff only	Yes	No	Yes	No
Data posted in a public location for visitors & staff	No	No	No	No
Group data feedback	Yes	Yes	Yes	Yes
Individual data feedback	Yes	No	Yes	Yes
Second opinion	No	N/A	N/A	N/A
Leader Designated Change Champion	No	No	No	Yes
Applicable Education and Data Tactics Used (Total Applicable Education and Data Tactics)	6 (12)	4 (11)	9 (11)	9 (11)

N/A= Not Applicable. The N/A category was determined by the PI and N/A tactics are not included in the denominator. Data Modifiers: Implementation phase and amount of leader effort. *Leaders D and E were interviewed simultaneously and responses shown above are based on the consensus they reached during the interview.

Table 11b: Hospital 2 Leaders' QI Implementation Practices - Discourse Tactics

Leaders C, D, and E	C Most Successful	C Least Successful	D&E* Most Successful	D&E* Least Successful
QI Project Topics and Goals	Meet all First Pregnancy and Delivery (FPAD) process and outcome goals	Decrease. admission rates of primips at less than 3 centimeters cervical dilation	100% of RN staff will chart and communicate Fetal Heart Rate (FHR) monitoring patterns using national standards	Increase breast-feeding rates for healthy newborns
QI Project Progress Score	4.8	4.8	5.5	2.5
Discourse: Meetings and One-to-One Discussions				
System Leader to Front Line Leader	Yes	No	No	Yes
Front Line Leader to Staff	Yes	Yes	Yes	Yes
Clinician to Clinician	No	No	Yes	No
Academic Detailing	No	No	No	No
Discourse: Reminders				
Check Lists	No	No	No	No
Computer Reminders	No	No	Yes	No
Paper Reminders	No	No	No	No
Other Triggers	No	No	Yes	No
Discourse: Written				
Newsletters/Flyers	Yes	Yes	Yes	No
Posters/Bulletin Boards	No	No	No	No
Emails	No	No	Yes	No
Discourse: External Rewards				
Award or other public recognition for staff	Yes	No	No	No
Professional opportunities	No	No	No	No
Financial	No	No	No	No
Celebration	No	No	No	No
Non-monetary perks	No	No	No	No
Professional Recognition	No	No	No	No
Discourse: Disciplinary				
Verbal Warning	No	No	Yes	Yes
Written Warning	No	No	Yes	No
Suspension	No	No	No	No
Termination	No	No	No	No
Applicable Discourse Tactics Used (Total Applicable Discourse Tactics)	4 (12)	2 (12)	8 (12)	3 (12)

N/A= Not Applicable. The N/A category was determined by the PI and N/A tactics are not included in the denominator.
Data Modifiers: Implementation phase and amount of leader effort. *Leaders D and E were interviewed simultaneously and responses shown above are based on the consensus they reached during the interview.

Table 12a: Hospital 3 Leaders' QI Implementation Practices - Education and Data Tactics

Leader F	F Most Successful	F Least Successful
QI Project Topics and Goals	Eliminate non-medically indicated inductions prior to 41 weeks for first pregnancies	Deep vein thrombosis prophylaxis for 100% of scheduled, 90% of urgent, and 50% of stat cesarean sections
QI Project Progress Score	**5**	**4**
Education		
Grand Rounds or Division Meetings	**Yes**	**Yes**
Classes or Conferences	**Yes**	**Yes**
Simulation Training	No	**Yes**
Team Training (please describe)	**Yes**	**Yes**
Competency validation, e.g., learning fair	No	**Yes**
Data: Audit and Feedback		
Re-work general data to be more unit specific	**Yes**	**Yes**
Data posted in a private location for staff only	No	No
Data posted in a public location for visitors & staff	**Yes**	No
Group data feedback	**Yes**	**Yes**
Individual data feedback	**Yes**	**Yes**
Second opinion	No	N/A
Leader Designated Change Champion	No	**Yes**
Number of Applicable Education and Data Tactics Used (Total Applicable Education and Data Tactics)	**6** **(12)**	**9** **(11)**

N/A= Not Applicable. The N/A category was determined by the PI and N/A tactics are not included in the denominator.
Data Modifiers: Implementation phase and amount of leader effort.

Table 12b: Hospital 3 Leaders' QI Implementation Practices - Discourse Tactics

Leader F	F Most Successful	F Least Successful
QI Project Topics and Goals	Eliminate non-medically indicated inductions prior to 41 weeks for first pregnancies	Deep vein thrombosis prophylaxis for 100% of scheduled, 90% of urgent, and 50% of stat cesarean sections
QI Project Progress Score	**5**	**4**
Discourse: Meetings and One-to-One Discussions		
System Leader to Front Line Leader	Yes	Yes
Front Line Leader to Staff	Yes	Yes
Clinician to Clinician	Yes	Yes
Academic Detailing	No	No
Discourse: Reminders		
Check Lists	No	No
Computer Reminders	No	No
Paper Reminders	No	Yes
Other Triggers	No	Yes
Discourse: Written		
Newsletters/Flyers	No	No
Posters/Bulletin Boards	Yes	Yes
Emails	No	No
Discourse: External Rewards		
Award or other public recognition for staff	Yes	Yes
Professional opportunities	Yes	Yes
Financial	No	No
Celebration	No	No
Non-monetary perks	No	No
Professional Recognition	No	No
Discourse: Disciplinary		
Verbal Warning	Yes	Yes
Written Warning	No	No
Suspension	No	No
Termination	No	No
Number of Applicable Discourse Tactics Used (Total Applicable Discourse Tactics)	**7** **(12)**	**9** **(12)**

Data Modifiers: Implementation phase and amount of leader effort.

Table 13a: Hospital 4 Leaders' QI Implementation Practices - Education and Data Tactics

Leaders G	G Most Successful	G Least Successful
QI Project Topics and Goals	Less than 19% episiotomy rates for women greater than 37 weeks giving birth for the first time	Less than 16% induction rates and less than 20% admission rates for first pregnancies greater than 37 weeks that have cervical dilatation less than 3 centimeters on admission
QI Project Progress Score	**5**	**3.5**
Education		
Grand Rounds/ Division Meetings	**Yes**	**Yes**
Classes/Conferences	**Yes**	No
Simulation Training	No	No
Team Training (please describe)	**Yes**	**Yes**
Competency validation, e.g., learning fair	No	No
Data: Audit and Feedback		
Re-work general data to be more unit specific	**Yes**	**Yes**
Data posted in a private location for staff only	No	No
Data posted in a public location for visitors & staff	No	No
Group data feedback	**Yes**	**Yes**
Individual data feedback	**Yes**	**Yes**
Second opinion	No	No
Leader Designated Change Champion	No	No
Number of Applicable Education and Data Tactics Used (Total Applicable Education and Data Tactics)	**6** **(12)**	**5** **(12)**

Data Modifiers: Implementation phase and amount of leader effort.

Table 13b: Hospital 4 Leaders' QI Implementation Practices - Discourse Tactics

Leader G	G Most Successful	G Least Successful
QI Project Topics and Goals	Less than 19% episiotomy rates for women greater than 37 weeks giving birth for the first time	Less than 16% induction rates and less than 20% admission rates for first pregnancies greater than 37 weeks that have cervical dilatation less than 3 centimeters on admission
QI Project Progress Score	**5**	**3.5**
Discourse: Meetings and One-to-One Discussions		
System Leader to Front Line Leader	**Yes**	**Yes**
Front Line Leader to Staff	**Yes**	**Yes**
Clinician to Clinician	No	No
Academic Detailing	**Yes**	No
Discourse: Reminders		
Check Lists	No	No
Computer Reminders	No	No
Paper Reminders	No	No
Other Triggers	No	No
Discourse: Written		
Newsletters/Flyers	**Yes**	**Yes**
Posters/Bulletin Boards	No	No
Emails	No	No
Discourse: Rewards		
Award or other public recognition for staff	No	No
Professional opportunities	No	No
Financial	No	No
Celebration	No	No
Non-monetary perks	No	No
Professional Recognition	No	No
Discourse: Disciplinary		
Verbal Warning	No	No
Written Warning	No	No
Suspension	No	No
Termination	No	No
Number of Applicable Discourse Tactics Used (Total Applicable Discourse Tactics)	**3** **(12)**	**3** **(12)**

Data Modifiers: Implementation phase and amount of leader effort.

Appendix F: Quality Improvement Implementation Barriers

Leader Barriers:

Leaders' Knowledge Barriers
- QI Conceptualization, planning, and implementation
- QI self-awareness
- Software and analysis

Leaders' Attitude Barriers
- Non-data driven assumptions affect topic selection, topic goals, and implementation tactics selected
- Attitudes affect leaders' definition of QI success

Leaders' Practice Barriers
- Lack of leader clarity of QI project goals
- Backing down when the QI Project goals are challenged
- Inadequate amount of authority to enforce compliance
- Lack of adequate resources of both time and staff
- Leaders stop trying
- Inadequate practices to deal with new hires and staff returning from vacation or a leave of absence

Clinician Barriers:

Clinician Knowledge Barriers
- Lack of clinician knowledge about their own practices
- Lack of QI project knowledge
- New staff and less experienced staff

Clinician Attitude Barriers
- Clinicians were not persuaded to change
- Clinicians want autonomy

Clinician Practice Barriers
- Inertia
- Changes add more work and slow down QI projects, likely demonstrated in the project patterns

Characteristics of the QI Project:
- Clinician income
- Clinician time
- Perception of desirability of change to patients

Implementation Climate
- Hospital
- Corporation
- Community or Patients

Implementation Resources

- Data barriers
- Lack of leader time and adequate support personnel
- Financial constraints

Appendix G: Quality Improvement Project Diagrams

Figure 14: Leader A's Most Successful QI Project Diagram

Leader A – Most Successful Groups Affected (3):
Doctors
Front Office Staff
Back Office Staff

Pre-Implementation

Patient Satisfaction Data System Leaders

~2 years
Minimal to no change practices currently being implemented.
Number of Tactics: 10
Number of Barriers: 3

100% of patients will wait less than 15 minutes from the time they check-in to the time they are put in an exam room

100% of Providers and Staff Persuaded at time of Implementation
Increased Income
Reduced work time

Data Barriers

Minimal or No Improvement

Make Changes

Impact:
Providers: ~250
Staff: ~450
Total: 700
Patients: Not Determined
Progress Score: 6

Real Time Computer Display Implemented

100% Compliance in *1 Week*

Change Spread to ~250 Providers and ~400 staff

Figure 15: Leader A's Least Successful QI Project Diagram

Leader A – Least Successful Group Affected (1):
Providers (OB Doctors and Midwives)

Pre-Implementation

Research, Benchmark Data, System Leaders

~8 years
Minimal to no change practices currently being implemented.

Number of Tactics: 9

Number of Barriers: 10

Eliminate all routine episiotomies for women greater than 37 weeks giving birth for the first time

Group only partially persuaded in the need for change at time of implementation

Benchmark & Individual Data Shared

Resisters

Adopters

4 Non-Compliant (Refuse to Change)

Outside Expert Presentation

4 Non-Compliant (Refuse to Change)

On-Going Monitoring

Change Maintained

Impact:
Providers: 36
Patients: 1,200-2,000 births per year

Progress Score: 4

268

Figure 16: Leader B's Most Successful QI Project Diagram

Leader B – Most Successful
Groups Affected (2):
Providers (OB Doctors and Midwives)
Nurses

Pre-Implementation

Research, Benchmark Data, System Leaders

Group only partially persuaded in the need for change at time of implementation

Meet all First Pregnancy and Delivery (FPAD) process and outcome goals

Benchmark & Individual Data Shared

~8 years
Minimal to no change practices currently being implemented.

Number of Tactics: 12

Number of Barriers: 12

Resisters

Adopters

Outside Expert Presentation

Impact:
Providers: 35
Nurses: 130
Total: 165
Patients: 1,200-2,000 deliveries per year
Progress Score: 4

On-Going Monitoring

A Few Non-Compliant (Refuse to Change)

Change Maintained

Figure 17: Leader B's Least Successful QI Project Diagram

Leader B – Least Successful
Groups Affected (2):
OB Doctors
Neonatologists Nurses

Pre-Implementation

Clinical Data Front-Line Leaders

Group persuaded in the need for change at time of implementation

Improve rapidity of diagnosis and treatment for women in premature labor

~5 months

Number of Tactics: 9

Number of Barriers: 10

Group Meeting – New Order Set Developed Other behavioral changes not yet determined

New Computer Pre-Term Labor Order Set Implemented

Impact:
Providers: 38
Nurses: 130
Total: 168
Patients: 1,200-2,000 deliveries per year
Progress Score: 2.5

100% compliance of using the new order set
More changes needed, not developed, not implemented

Figure 18: Leader C's Most Successful QI Project Diagram

Leader C – Most Successful
Group Affected (1):
Providers (OB Doctors and Midwives)

Pre-Implementation

Research, Benchmark Data, System Leaders

Eliminate all routine episiotomies for women greater than 37 weeks giving birth for the first time

Group only partially persuaded in the need for change at time of implementation

Benchmark & Individual Data Shared

~8 years
Minimal to no change practices currently being implemented.

Number of Tactics: 10

Number of Barriers: 8

Resisters

Adopters

Tailored Directive Conversations

Clinicians Adopt Change

On-Going Monitoring

Follow-up Discussions

100% Compliance Maintained

Impact:
Providers: 11
Nurses: 71
Total: 82
Patients: 2,000-2,500 deliveries per year
Progress Score: 4.8

Figure 19: Leader C's Least Successful QI Project Diagram

Leader C – Least Successful
Groups Affected (3):
Providers (OB Doctors and Midwives)
Nurses
Patients

Pre-Implementation

Research, Benchmark Data, System Leaders

Decrease admission rates of first pregnancies greater than 37 weeks that have cervical dilation less than 3 centimeters on admission

Groups only partially persuaded in the need for change at time of implementation

Benchmark Data Shared
Individual MD Data Shared
(Unable to provide individual RN Data)

~8 years
Minimal to no change practices currently being implemented.

Number of Tactics: 9

Number of Barriers: 14

Data Barriers:
Patient
Provider
Nurse
Timing
Volume

Minimal Improvement Made

Make Changes

Impact:
Providers: 14
Nurses: 71
Others: Not Identified
Total: 85
Patients: 2,000-2,500 deliveries per year
Progress Score: 4.8

270

Figure 20: Leaders D and E's Most Successful QI Project Diagram

Leaders D&E – Most Successful
Group Affected (1):
Nurses

Pre-Implementation ← National Standards

100% of RN staff will chart and communicate Fetal Heart Rate (FHR) monitoring patterns using national standards

Computer Charting Options Changed
Other Implementation Tactics

Resisters → Adopters

Disciplinary Warning

100% Compliance

On-Going Monitoring

~3 years
Minimal to no change practices currently being implemented.

Number of Tactics: 17

Number of Barriers: 9

Group only partially persuaded in the need for change at time of implementation

Impact:
Providers: 11
Nurses: 71
Total: 82
Patients: 2,000-2,500 deliveries per year
Progress Score: 5.5

Figure 21: Leaders D and E's Least Successful QI Project Diagram

Leaders D&E – Least Successful
Groups Involved (3):
Nurses
Mothers
Families

Pre-Implementation ← Research System Leaders

Increase breast-feeding rates for healthy newborns

Major Shift in Nursing Routines Needed
Minimal Number of Nurses Persuaded
Behavior goals still vague
No baseline data or clear source of data
Minimal implementation tactics

Minimal to No Compliance

Re-group to develop new implementation plan

~3 years
Minimal to no change practices currently being implemented.

Number of Tactics: 7

Number of Barriers: 12

Group only partially persuaded in the need for change at time of implementation

Impact:
Providers: 11
Nurses: 71
Total: 82
Patients: 2,000-2,500 deliveries per year
Progress Score: 2.5

Figure 22: Leader F's Most Successful QI Project Diagram

Leaders F – Most Successful
Groups Affected (2):
Nurses
OB Doctors

Pre-Implementation ← Research, Hospital Data, System Data

Eliminate non-medically indicated inductions prior to 41 weeks for first pregnancies

Group only partially persuaded in the need for change at time of implementation

Not allowed to book elective inductions prior to 41 weeks (structural barriers)

~8 years
Minimal to no change practices currently being implemented.

Number of Tactics: 13

Number of Barriers: 13

Resisters → Adopters

Data on cesarean section rates Negotiations

QI Committee review of all providers who are non-compliant

Impact:
Providers: 21
Nurses: 40
Other: 74
Total: 134
Patients: 1,200-2,000 deliveries per year
Progress Score: 5

100% Compliance

On-Going Monitoring

Figure 23: Leader F's Least Successful QI Project Diagram

Leader F – Least Successful
Groups Affected (3):
Nurses
OB Doctors
Nurses Aides

Pre-Implementation ← National Standards System Leaders

Deep vein thrombosis prophylaxis for 100% of scheduled, 90% of urgent, and 50% of stat cesarean sections

~1.3 years
Minimal to no change practices currently being implemented.

Number of Tactics: 7

Number of Barriers: 7

All Persuaded

Education (simulation training)
Group and Individual Data Feedback
New Charting Forms and Other Reminders
New Equipment

Impact:
Providers: 21
Nurses: 40
Other: 5
Total: 66
Patients: 1,200-2,000 deliveries per year
Progress Score: 4

Meeting 80% of Goals

On-Going Monitoring; Group and Individual Feedback

Figure 24: Leader G's Most Successful QI Project Diagram

Leader G – Most Successful Group (1):
OB Doctors and Midwives

Pre-Implementation ← Research, Benchmark Data, System Leaders

Eliminate all routine episiotomies for women greater than 37 weeks giving birth for the first time

Benchmark & Individual Data Shared

Resisters → Adopters

A Few Non-Compliant (refuse to change)

On-Going Monitoring

Change Maintained

Group only partially persuaded in the need for change at time of implementation

Impact:
Providers: 45
Total: 45
Patients: 2,000-2,500 deliveries per year
Progress Score: 5

~ 8years
Minimal to no change practices currently being implemented.

Number of Tactics: 10

Number of Barriers: 12

Figure 25: Leader G's Least Successful QI Project Diagram

Leader G – Least Successful Groups Affected (3):
Providers (OB Doctors and Midwives)
Nurses
Patients

Pre-Implementation ← Research, Benchmark Data, System Leaders

Decrease admission rates of first pregnancies greater than 37 weeks that have cervical dilation less than 3 centimeters on admission

Benchmark Data Shared
Minimal Individual MD Data Shared
(Unable to provide individual RN Data)

Data Barriers:
Patient
Provider
Nurse
Timing

Minimal Change   Make Changes

Group only partially persuaded in the need for change at time of implementation

Impact:
Providers: 45
Total: 45
Patients: 2,000-2,500 deliveries per year
Progress Score: 3.5

~ 8years
Minimal to no change practices currently being implemented.

Number of Tactics: 18

Number of Barriers: 13

273

Appendix H: Quality Improvement Implementation Log

Pre-Implementation:

Date QI topic exploration began:_____

Date: Aims/Mission Statement:

Date: List who is working with you during pre-implementation (names and titles):

            List who else you plan to mobilize (names and titles):

Date: List anticipated barriers:

Four Baldrige Communication Criteria:

1. What is your QI project outcome score? (Please give the date it was finalized.)
What behaviors do you want to change? For example: 100% of women giving birth for the first time will be allowed to have labor begin on it's own prior to 41 weeks.

2. What is the current state?
For example: How many women giving birth for the first time are currently allowed to have labor begin on it's own?
Perform a baseline projected, project diagram and other baseline assessments. Please describe, take pictures, keep a detailed record of where you started and how the change project progresses.

3. How often will you provide feedback and trend charts showing the amount of compliance with the outcome score or objective?

4. What is your target completion date?

Implementation:

Date QI Project Implemented: _____

Name and Title of Implementation Team:

Implementation Log Sheets

Instructions: During active implementation, e.g., less than 75 percent compliance, complete the implementation tracking form at least every month. Once there is greater than 75 percent change compliance, complete the implementation tracking form at least every quarter.

Date: _____

Percent Compliance: _____ (attach trend charts)
QI Project Progress Score (*refer to Appendix A*): _____

Current Implementation Team Members:

Barriers Identified:
Instructions: Outline barriers based on the list provided. Add to the list as indicated.

Implementation Tactic(s) and Rationale(s):
Instructions: Describe tactics used and outline the rationale for their use. Select tactics used from the list provided, add to the list as indicated.

Quality Improvement Implementation Barriers

Do not feel constrained by this list. Feel free to improvise and expand the list.

Leader Barriers:

Leaders' Knowledge Barriers
- QI Conceptualization, planning, and implementation
- QI self-awareness
- Software and analysis

Leaders' Attitude Barriers
- Non-data driven assumptions affect topic selection, topic goals, and implementation tactics selected
- Attitudes affect leaders' definition of QI success

Leaders' Practice Barriers
- Lack of leader clarity of QI project goals
- Backing down when the QI Project goals are challenged
- Inadequate amount of authority to enforce compliance
- Lack of adequate resources of both time and staff
- Leaders stop trying
- Inadequate practices to deal with new hires and staff returning from vacation or a leave of absence

Clinician Barriers:

Clinician Knowledge Barriers
- Lack of clinician knowledge about their own practices
- Lack of QI project knowledge
- New staff and less experienced staff

Clinician Attitude Barriers
- Clinicians were not persuaded to change
- Clinicians want autonomy

Clinician Practice Barriers
- Inertia
- Changes add more work and slow down QI project progress

Characteristics of the QI Project:
- Clinician income
- Clinician time
- Perception of desirability of change to patients

Implementation Climate:
- Hospital
- Corporation
- Community or Patients

Quality Improvement Implementation Strategies and Tactics

Do not feel constrained by this list. Feel free to improvise and expand the list.

Education
Grand Rounds or Division Meetings
Classes or Conferences
Simulation Training - *Simulation training is education that allows clinicians to practice skills and knowledge through a fabricated situation that mimics a complicated situation that they will face and need to practice how to respond.*
Team Training - *Broadly defined as any type of training that involves more than one discipline.*
Competency validation - *e.g., learning fair, tests, return demonstrations.*
Competency validation - *Clinicians are required to demonstrate their knowledge of a new concept or demonstrate their ability to perform a specific skill.*

Data
Meaningful data - *Accurate and timely data. Thus, one task of the front-line leaders is to check and validate data accuracy.*

Localization of Data:
Collecting or re-working data so that the data is specific to the hospital, unit, or individual
Data posted in a private location for staff only
Private reporting is defined as showing data to the clinicians who work within each group
Data posted in a public location for visitors & staff
Group data feedback
Individual data feedback
Second opinion
Leader Designated Change Champion
A change champion is someone who will embrace a change and then promote this change to others.

Discourse
Meetings and One-to-One Discussions
System Leader to Front Line Leader
Front Line Leader to Staff
Clinician to Clinician
Formalized clinician to clinician discourse is defined as QI Project communications that were designed to be an implementation tactic.
Academic Detailing
Academic detailing is defined as a review of relevant academic research by one leader meeting with one clinician at a time.

Discourse: Reminders
Checklists
Computer Reminders
Paper Reminders
Paper reminders are defined as signs or other types of written reminders that are located near to where the care is provided.
Other Triggers

Discourse: Written
Newsletters/Flyers
Posters/Bulletin Boards
Emails

Discourse: External Rewards
When an award or other public recognition is used to encourage clinicians to comply with a QI project
Award or other public recognition for staff
Professional opportunities
Financial
Celebration
Non-monetary perks
Professional Recognition

Discourse: Disciplinary
Verbal Warning
Written Warning
Termination

Appendix I: Definitions

Academic Detailing: A review of relevant academic research by one leader meeting with one clinician at a time.

Audit and Feedback: Collecting, summarizing, and providing data about processes, structures, and outcomes to individuals, groups, or organizations.

Climate: The prevailing factors that influence the culture or character of a group.

Collaborative: "A cooperative, inter-organizational relationship that relies on neither market nor hierarchical mechanisms of control." (Lawrence et al., 1999)

Communication: The exchange of ideas among individuals. Communication is a component of discourse. As defined below, discourse includes all types of communication vehicles, e.g., conversations, photos, meeting minutes, all written materials.

Computers and Quality Improvement:
> **Direct Use:** Computers having a specific function that facilitates the front-line leaders' QI change strategy.
>
> **Indirect Use:** The use of computers to facilitate QI project initiatives, but not as a QI project tactic, e.g., the reports and trend charts are developed using computers and software.
>
> **Source of Feedback:** Computers that summarize and display information to the leaders and clinicians to show them how close they are to meeting their goal. The feedback is developed by the types of data entered into the computer.
>
> **Audit Tool:** Use of automated computer software to collect and generate QI audits and reports based on either pre-determined or customized variables.
>
> **Reminders to Clinicians:** Computer sending the team or individual clinician an automated reminder message to chart or complete another task. The reminder is sent based on the type of data the clinicians entered and is programmed to automatically trigger the reminder message.

Culture: The set of assumptions and the practices of a group of people who have a similar "approach, outlook, and priorities". (Weick & Sutcliffe, 2003)

Diffusion of Innovation: The diffusion of the innovation is the adoption by an individual or a group of the new behavior or new technology (including the removal of a behavior or technology).

Discourse: All types of communication vehicles, e.g., conversations, photos, meeting minutes, all written materials.

Effective Quality Improvement Leadership: Leaders who guide individuals and organizations in a forward-looking way with the motivation and capacity to collaboratively and continuously improve outcomes, processes, and structures in such a way that improvements are sustained**.**

Formalized Clinician-to-Clinician Discourse: A discussion about a QI project that is designed to be an implementation tactic. For example, Leader E included the placement and removal of sequential compression devices as one item that all nurses were supposed to include in their end of shift report.

Front-line Clinician Leader: A physician or nurse who oversees the day-to-day operations of a hospital clinical unit, e.g., Labor and Delivery, and is responsible for developing, implementing, and updating clinical policies and procedures and maintaining quality patient care.

Innovation: Anything that is new to an individual or group.

Localization of Data: Collecting or re-working data so that the data is specific to the hospital, unit, or individual.

Meaningful data: Data that is granular enough to inform the QI project change goals, e.g., individual or group, and data that is also accurate, and timely.

Microsystem: Nelson, E. C., Batalden, P. B., Huber, T. P., Mohr, J. J., Godfrey, M. M., Headrick, L. A. and Wasson, J. H. hypothesize that clinical microsystems within larger health care organizations can be identified based on the following criteria: 1) a "small" group of health care people who work together within a larger organization, 2) a discrete sub-population of patients, and 3) linked aims, processes, and shared information among the patients and the health care people who work together to collectively produce an outcome. (Nelson et al., 2002)

Nurse Maternity Leader: The labor and delivery nurse leader who is responsible to hire and fire the nurses who work in labor and delivery, is responsible for the labor and delivery nursing policies and procedures, i.e., a nurse manager, and has been in this leadership role for at least the previous three years.

Outlier: A clinician who refuses to follow a clinical guideline, despite the fact that the majority of clinicians he or she works with are compliant.

Paper Reminders: Signs or other types of written discourses that are located close to the point where care is provided.

Physician Maternity Leader: A physician who is responsible for the physician labor and delivery policy and procedures, e.g., a Labor and Delivery medical director who has been in this leadership role for at least the previous three years.

Private Reporting: Showing individuals their own data either alone or as a comparison with others (whose identities are not divulged).

Process Research: "A type of data-gathering and analysis that seeks to determine the sequence of a set of events over-time." (Rogers, 2003) Qualitative research methods are superior methods for answering the process how and why questions.

Quality Improvement (QI): A change process that involves identifying problems, implementing improvements, performing on-going assessments and making rapid adjustments to the implementation plan based on feedback that is obtained. The steps within the on-going rapid QI cycles are often described as: **M**obilize, **A**ssess, **P**lan, **I**mplement, **T**rack (MAP-IT) (Guidry et al.) or **P**lan, **D**o, **S**tudy, **A**ct (PDSA). (Langley et al., 1996) QI is focused on making something better or becoming better at something by improving structures, processes, and outcomes.

Quality Improvement Complexity: Quality Improvement projects lasting longer than four months to complete that met the following criteria: 1) there were at least two units involved in the QI project, and 2) there were more than one discipline involved in the change, i.e., nurses, unit clerks, aides, operating room technicians, physicians, pharmacy, child birth educators.

Quality Improvement Implementation Practices: Strategies and tactics leaders employ to promote routine use of an innovation. The type of strategies and tactics leaders utilize are critical to the success of a QI projects.

Quality Improvement Implementation Strategy: A plan the leader develops to meet QI project goals. Strategies include the use of a variety of tactics. For example, a leader develops an implementation discourse strategy that includes tactics such as writing a newsletter or making a poster.

Quality Improvement Implementation Tactics: The actual means or processes the leader uses to execute a strategy.

Quality Improvement Leader Self-Awareness: Leaders' ability to articulate their QI implementation strategy and to choose different types of QI implementation tactics within the overall strategy. Further, it encompasses their ability to give a rationale for their decisions, and to describe the barriers they anticipate and encounter.

Quality Improvement Project Conceptualization: The leaders' ability to select, out of a myriad of possible priorities, the QI project(s) they will work on and also to further decide what the measurable QI project objectives will be.

Quality Improvement Project Topic Expert: A clinician leader who had successfully implemented a specific type of QI project elsewhere.

Spread: The implementation of the same QI project objectives at another site or unit.

Sustainability: A continuation of QI project changes such that the changes become standard procedure.

System Leader to Front-line Leader Meetings: Formal gatherings that a system leader, such as the corporate leaders from Sutter Health, organize to specifically discuss, guide, or support individual hospital leaders' QI projects.

Team Training: Any type of training that involves more than one discipline.

Variance Research: "A type of data gathering and analysis that consists of determining the co-variances (or correlations) among a set of variables, but not their "time order" that usually utilizes quantitative research methods. (Rogers, 2003)

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