

The University of San Francisco
**USF Scholarship: a digital repository @ Gleeson Library |
Geschke Center**

Doctor of Nursing Practice (DNP) Projects

Theses, Dissertations, Capstones and Projects

Fall 12-11-2014

An Evidence-Based Approach to a Replacement Hospital Training Curriculum

Mark D. Beck

University of San Francisco, marcusb@sonic.net

Follow this and additional works at: <https://repository.usfca.edu/dnp>



Part of the [Nursing Administration Commons](#)

Recommended Citation

Beck, Mark D., "An Evidence-Based Approach to a Replacement Hospital Training Curriculum" (2014). *Doctor of Nursing Practice (DNP) Projects*. 36.

<https://repository.usfca.edu/dnp/36>

This Project is brought to you for free and open access by the Theses, Dissertations, Capstones and Projects at USF Scholarship: a digital repository @ Gleeson Library | Geschke Center. It has been accepted for inclusion in Doctor of Nursing Practice (DNP) Projects by an authorized administrator of USF Scholarship: a digital repository @ Gleeson Library | Geschke Center. For more information, please contact repository@usfca.edu.

An Evidence-Based Approach to a Replacement Hospital Training Curriculum

Mark D. Beck

University of San Francisco

DNP Comprehensive Project

N789

Amy Nichols, EdD, RN

Chair

KT Waxman, DNP, MBA, RN, CNL, CENP

Committee member

Sylvia Bertram, PhD, MS, RN

Committee member

Acknowledgement

The author wishes to thank James for all his loving devotion and support and putting up with this insane desire to achieve this goal, and to Jim for allowing me the wonderment of writing in the Redwood Forest of the North Coast. I could not have done this without either of you.

To Barb who wouldn't stop talking about this degree as a carpool buddy and how I needed to be in this program. You were so right.

To my team who have supported me through all these years.

To Gary without whom I would have not gained the insight into knowledge management and the power of data management. Your ability to manipulate data and make it intelligible and visual that tells a story is truly remarkable. I am truly grateful for all you have done for this project.

To Sylvia, without whom I would not have stayed sane nor completed this work. Thank you for all your encouragement and belief in me.

This is dedicated to all of you with my heart and soul.

Table of Contents

Acknowledgement	2
Table of Contents	3
Table of Figures	5
Abstract	6
Chapter 1 Introduction	8
Background Knowledge	8
Local Problem	11
Intended Improvement/Purpose of Change	12
Chapter 2 Review of the Literature/Theoretical Frameworks	13
Review Strategy	13
Conceptual/Theoretical Framework	21
Chapter 3 Methods	24
Ethical Issues	24
Setting	24
Planning the Intervention	25
Implementation of the Project	33
Planning the Study of the Intervention	35
Evaluation	37
Analysis	37
Sources of Funding	37
Chapter 4 Results	39
Program Evaluation/Outcomes	39
Chapter 5 Discussion	48
Summary	48
Relation to other evidence	50
Barriers to Implementation/Limitations	51
Interpretation	53
Conclusions	54
References	56
Appendix A Conceptual Framework	64
Appendix B Spiral of Knowledge Creation	65
Appendix C Training Team Membership	66

Appendix D Service Line Training Plan Development..... 67

Appendix E Summary Table of Evidence..... 68

Appendix F Statement of Determination 71

Appendix G Sample Communications with Transition Oversight & Regional Teams 74

Appendix H Baseline Data for Comparison of Old and New Facilities* 75

Appendix I Facility Training Curriculum Development Timeline..... 77

Appendix J Phased Training by Service Line/Departments 78

Appendix K Project Training Work Breakdown Structures* 79

Appendix L Strengths, Weaknesses, Opportunities and Threats (SWOT) 80

Appendix M Phased Training Sample 81

Appendix N Budgeted versus Scheduled Training Hours..... 82

Appendix O Cost-Benefit Analysis Knowledge Management System..... 84

Table of Figures

Figure 1 Stichler Healthcare Design Conceptual Framework (based on Donabedian) (Stichler, 2014a)...	64
Figure 2 Spiral of Knowledge Creation (Nonaka & Takeuchi, 1995)	65
Figure 3 Training Team Membership	66
Figure 4 Service Line Training Plan Development.....	67
Figure 5 Summary Table of Evidence	70
Figure 6 Sample Communication for Regional and Local Oversight Groups	74
Figure 7 Baseline Metrics for Comparison between Old and New Facilities	75
Figure 8 Facility Training Curriculum Development Timeline	77
Figure 9 Phased Training by Service Line/Departments	78
Figure 10 Work Breakdown Structure WBS Sample Dept.....	79
Figure 11 Sample of Phased Training Curriculum	81
Figure 12 Budgeted versus Scheduled Training Hours.....	83
Figure 13 Knowledge Management System [KMS] Budget and ROI.....	84

Abstract

Creation of a training and educational curriculum for a new or replacement facility is daunting in its own right, but without a repository of organizational knowledge cataloging the transfer of tacit to explicit knowledge from the organizations previous library of facility openings, the task becomes Herculean, with as many tasks and cast of characters as the original myths. Navigating the shoals, eddies and tides of the various aspects of this project revealed the need for a comprehensive knowledge management solution to training that is coupled with healthcare design principles and initiatives. This purpose of the DNP project is about the assessment, design, implementation and evaluation of a major training program to prepare for a new hospital opening.

[Keywords]: *Knowledge management, training curriculum, new facility opening,*

December 11, 2014

Copyright ©December 11, 2014

Mark D. Beck, DNPc, MSN, BS, RN-BC

Chapter 1 Introduction

Planning for a replacement healthcare facility opening is a long and arduous process spanning months to years, from the needs assessment, design, estimates and bids for construction, equipment and land acquisition, to the planning of the training of the staff on the new facility, features, equipment and safety measures inherent in the design (Battles, 2006; Geimer-Flanders, 2009; Lu & Price, 2011; Martin, 2009). Change management will need to be a part of the overall plan as new and replacement facilities inevitably change every aspect of the work environment and create responses from positive anticipation to dread as the days approach for the new change. Planning for all these variables requires a new set of skills that most in nursing education have not dealt with on this scale. Having a clear path to understanding the variables and successful and not so successful strategies will set the foundation for a repository of training knowledge management from whom all in the profession can drink.

Background Knowledge

The cost trend of an estimated \$200 billion dollars in healthcare construction spending by the end of 2015 has the healthcare industry and nursing leadership in particular, in a quandary for augmenting their leadership and design capacities to meet the new marketplace demand (Stichler, 2011; J. F. Stichler, 2012a; Stichler, 2013, 2014b, 2014c; Stichler & Gregory, 2012). The additional layer is added to the already shifting priorities in reimbursement structures as outlined in the triple AIM with the passage of the Patient Protection and Affordable Care Act (2010) (<http://www.beckershospitalreview.com/hospital-management-administration/how-the-affordable-care-act-affects-healthcare-construction.html>). In the State of California there is a regulatory imperative that was legislated following the 1994 Northridge earthquake. Senate Bill (SB) 1903 requires that all hospitals meet updated seismic standards to be licensed to operate.

hospitals and healthcare systems must meet these requirements monitored through the Office of Statewide Health Planning and Development (OSPHD)

(http://www.oshpd.ca.gov/FDD/seismic_compliance/).

Many health systems have embarked upon this quest for seismic upgrade to both existing facilities and replacing ones that are too costly to retrofit for new technologies and standards. This trend was somewhat muted during the recession of 2008-2010, but has rebounded now that the Affordable Care Act has been upheld by the Supreme Court and various political challenges (http://www.hhnmag.com/display/HHN-news-article.dhtml?dcrPath=%2Ftemplatedata%2FHFH_Common%2FNewsArticle%2Fdata%2FHFHM%2FMagazine%2F2014%2FFeb%2F0214HFH_FEA_CoverStory). The trend to utilize evidence-based hospital design (EBD) and LEAN (comes from the English translation of the Japanese word for elimination of waste *muta*) [http://en.wikipedia.org/wiki/Lean_Six_Sigma] concepts in construction are making inroads into the healthcare industry (Battles, 2006; *Building the Evidence Base: Undersanding Research in Healthcare Design*, 2014; Carr, Sangiorgi, Buscher, Junginger, & Cooper, 2011; *Integrating Evidence-Based Design: Practicing the Healthcare Design Process*, 2010; Steinke, Webster, & Fontaine, 2010; J. Stichler, 2012a; Stichler, 2007c, 2014c). The application of these concepts to the healthcare facility design are steps in the right direction for the industry establishing standards and benchmarks, however, these concepts should not be limited to design and construction phases only, but include the training and post-occupancy evaluation to the original vision and goals (Guinther, Carll-White, & Real, 2014; Kotzer, Zacharakis, Raynolds, & Buening, 2011; Steinke et al., 2010).

Some organizations have created simulation centers to test various designs and workflows. This is shared space with various disciplines to evaluate the overall performance of

design changes as well as the impact of staff efficiencies. This harkens back to Lockheed's Skunk Works established at the end of World War II to build the next generation of aircraft with stealth capabilities (http://en.wikipedia.org/wiki/Skunk_Works). The purpose of Skunk Works was to provide a space where engineers, scientists and manufacturers could experiment with what new aircraft would be and how to manufacture them. They got to play the "What If" game and created the next generation of the strategic air command. The next generation of hospitals and technology empowered health integration may well be thought of and tested in Skunk Works like environments. Having the ability to play the "What If" game with reliable data will be key to cost, operational and patient safety efficiencies heretofore not realized (McCreary, 2010).

Organizations have created templates for their hospital designs that meet the building standards and codes of various licensing and accrediting bodies such as The Joint Commission (TJC), Clinical Laboratories Institute of America (CLIA), College of American Pathologists (CAP), and in California, the Office of Statewide Health Planning and Development (OSPHD). The templates have been vetted with some of these agencies to streamline the approval process, to standardize the design construction costs, variation in the delivery of care, and to maximize resources through contracts and procurement of equipment. This process is known in some organizations as the "template hospital." Organizations have used this strategy successfully opening many facilities within a health system.

Success of the template hospital approach would give impetus for organizations to create a similar process for the design and implementation of training and orientation to new and replacement facilities in a standardized template approach. The training budget is one of the largest items in the replacement project. The literature is replete with evidence-based facility designs to incorporate infection control principles, workplace and patient safety measures, and

patient and employee satisfaction. The Journal *Health, Environments, Research & Design (HERD)* and *Healthcare Design* fills this niche approach at the nexus of design, construction and evidence-based practices. The Center for Health Design (CHD) was established to advance the case for bringing evidence-based research to healthcare design (Rabner, 2012; Shoemaker, Kazley, & White, 2010; Thompson et al., 2012; Ulrich, Berry, Quan, & Parish, 2010).

Although much has been done in this area, there is a lack of current literature reflecting the same processes for standardized training templates for new or replacement facilities from an evidence-based approach.

Local Problem

A local healthcare system embarked on opening three facilities within the same year (two replacement and one new), and set out to have a standardized approach to develop training budgets for all three projects. Facilities education/training budgets were designed based on assumptions of only training for new and different workflows, equipment and processes.

The identified leads for the training project were the Directors of the Clinical Education, Practice & Informatics (DCEPI) departments for the three facilities. This was a regional decision to be shepherded by the regional DCEPI as the facilitator and interface with the regional group in charge of the facility replacement project known as Delivery Systems Implementation (DSI) and the local Transition Oversight Team (TOT). The three DCEPIs were brought together to discuss the vision and operating principles for how to design the training budget. Once the budget was vetted and approved it was up to the local training leads to build and design that program within the established guidelines to meet the licensing and regulatory requirements for opening. The DCEPI training lead was designed the lead for the entire scope of the project not

just the inpatient nursing portion (which had been their previous domain of authority). This would require a whole new approach to coordination, resource allocation, monitoring, documentation and reporting structure than had previously been aligned within their job.

Intended Improvement/Purpose of Change

The aim of this project was to design a training program for the replacement hospital that would meet licensing, regulatory and operational requirements. The measures of success would be 1) licensing the facility on time with no issues related to training, 2) opening the facility on time with no issues related to training, 3) being within 120% of the budgeted allocation for training, 4) having a plan for those staff that missed the onboarding and training for the new facility, 5) comparison of old and new facility with nurse sensitive indicators (National Database of Nursing Quality Indicators [NDNQI]) patient falls with and without injuries, hospital acquired pressure ulcers (HAPU), central line associated blood stream infections (CLABSI), hospital acquired pneumonia (HAP), safety attitude index scores, workplace injury acceptance rates, patient day rates metrics for over and under 65, and care without delay (patient left emergency room within 60 minutes), and 6) a post-occupancy evaluation of the transition at 6, 12 and 24 months.

Chapter 2 Review of the Literature/Theoretical Frameworks

The paucity of evidence in the literature for this topic (training for a replacement or new facility) centers on lessons learned from others that have gone before and created said curriculum. There is a rich body of literature that centers on the health design principles and safety initiatives from regulatory bodies (Joint Commission, Institute for Healthcare Improvement [IHI], and the Institute of Medicine [IOM]) and from the Center for Health Design [CHD], an organization advancing health design principles and evidenced-based practices. However, this literature does not go beyond the design implication into training. Finally, there is the knowledge management literature that speaks to how to create knowledge from existing tacit knowledge into organizational explicit knowledge that becomes tacit knowledge for all workers (Davidson & Voss, 2002; Dewhurst, Hancock, & Ellsworth, 2013; Nonaka, 1991; Sutcliffe & Weber, 2003).

Review Strategy

The search strategy employed the keywords, training healthcare facility, facility design training, knowledge management, nursing, and training curriculum in the following databases, CINAHL, PubMed, Google Scholar, Fusion, ProQuest, and ABI Inform (Appendix E Summary of Evidence Table).

The Center for Health Design (CHD) was founded in Concord, California to assist with being a repository for the architectural firms that were marketing to health facilities and the regulatory agencies that influence the physical, structural and substantive aspects of medical facility design. The consortium brought together the various sources of influence on health care

design, architects, healthcare leadership, nursing, regulatory bodies and other assorted ad hoc industry leaders (technology firms and futurists).

Creation of journals that were focused on the research and evidence-based implications of designs were founded such as *Health, Environments & Research Design (HERD)*, and *Health Design* to meet this need for information. The CHD has published a series of study guides to help architects to understand what evidence-based research is and how to utilize it in making design decisions (*Building the Evidence Base: Understanding Research in Healthcare Design*, 2014; *Integrating Evidence-Based Design: Practicing the Healthcare Design Process*, 2010; *An Introduction to Evidence-Based Design: Exploring Healthcare and Design*, 2010).

Vos, Goorthius and van Merode have published an evaluation of hospital design meeting the operational goals and objectives for effectiveness and efficiencies. This was a mixed methods study design that employed a case study and simulation for an outpatient clinic within a hospital setting in the Netherlands. The purpose of the study was to 1) test an evaluation methodology for the assessment of hospital building design from the viewpoint of the operations management to assure that the building design supports the efficient and effective operating care processes now and in the future, 2) look at the feasibility of replication for differing type of simulations for decision-making design aspects (Vos, Groothuis, & van Merode, 2007, p. 357).

The results indicated that the methodology of using case study simulations for the design met the objectives and helped to establish operational efficiencies and effectiveness on any given design. The methodology will provide a means for operations to play the “what if” game with designs and to test workflows before designs are beyond the change window.

Hua, Becker, Wurmer, Bliss-Hotlz and Hedges conducted research that looked at the effects of evidence-based design (EBD) on nursing team communication patterns, quality of care

and patient safety. The pre-post research design compared centralized and decentralized nursing units with teamwork dimensions, nurse sensitive metrics and communication patterns (Hua, Becker, Wurmer, Bliss-Holtz, & Hedges, 2012). The results of the study did not find statistically significant differences in nursing team communication patterns, quality of care or patient safety issues. While the major design change was to affect patient satisfaction, which was achieved, perceptions by the nursing staff were slightly decreased in teamwork dimensions and communication with other nurses and health professionals. This adds to the body of evidence that while some objectives can be achieved with design the full impact of the design on all the participants needs to be explored to be fully understood. The unintended consequences on the dimensions that make up teamwork safety climate and work satisfaction will need more research to fully incorporate the impact to all groups and how those outcomes will be utilized (Hua et al., 2012, p. 36).

Maguire, Burger, O'Donnell, and Parnell conducted a descriptive and comparative design to evaluate how clinician's perceive, evaluate and adjust to a new hospital environment, and how much a healthy work environment helps with the practice shift toward patient-family centered care in a pediatric hospital in the southeastern portion of the United States (Maguire, Burger, O'Donnell, & Parnell, 2013). The findings of this study were that while some of the expectations of the design impact of the single-family room were not realized, nurses were less stressed as compared with other health professionals who were more stressed (dietitians, occupational therapists, pharmacists, and social workers). Employees with more than three years of service were more stressed than those with less experience; single-family rooms are very important to patients and families, but may actually increase the workload of nurses. Supporting employees

through this change process that affects every aspect of the work environment is an area that needs further investigation (Maguire et al., 2013, pp. 77-78).

Sadatsafavi and Walewski posit that one of the tenets of having a competitive advantage is to leverage how the corporate mission, vision and values are reflected in the human resources practices that interface within the environmental design interventions as displayed in a new or replacement facility (Sadatsafavi & Walewski, 2013). The authors proposed a theoretical framework for understanding how environmental factors of design can influence the multifactorial aspects of job satisfaction. This conceptual framework supports the EBD as aspects of perceived organizational support (POS) as a factor in an organization possessing a competitive advantage. The proposed framework focuses on the influence of physical features of the work environment on employee's job attitudes (Sadatsafavi & Walewski, 2013, p. 106).

While these studies are representative for the health design aspect, none of these studies ventured into the training implications that these design aspects would entail. Understanding the training implications of a design with both the initial as well as ongoing training requirements, is a key element in the overall design evaluation and its sustainability. Linking the training with the success of the design has not heretofore been asked in the literature.

The literature is replete with lessons learned from other organizations that have opened new or replacement facilities. Stichler has a column in the *Journal of Nursing Administration* called Health Facility Design that runs monthly and highlights views and issues on the role of nursing leadership in the facility design process. This column was established in 2008. The column discusses many of the aspects of design and how evidence-based approach is needed to further designs that are truly patient-centered and incorporate regulatory recommendations. The need for evidence in decision-making is emphasized within the column whoever the authors are

(Stichler, 2007a, 2007b; Stichler & Cesario, 2007; Stichler & Ecoff, 2009; Stichler & Gregory, 2012; Stichler & McCullough, 2012).

Ecoff and Thomason (2009) have published a recounting of their efforts and models that they utilized in moving into a new facility in the far southwestern portion of the United States. They employed the Donabedian model (Structure, Process and Outcomes) along with the Change Acceleration Process (CAP) promoted by General Electric (Ecoff & Thomason, 2009). The import of the publication were the strategies and lessons learned from the planning, implementation and evaluation of the move. Linkages between design and training were not addressed.

Stichler and Ecoff (2009) in the same year published their perspective on how to enable a new culture moving into a new facility. They write that moving into a new facility is the ultimate change project for all concerned (Stichler & Ecoff, 2009, p. 156). The focus of the publication was on the change processes that were utilized during the move. What was missing was a post-occupancy evaluation at regular intervals to see how the staff have accommodated and adapted to their new environment (Stichler, 2010a). These would be key in the evaluation of the effects for training both initially and ongoing as the staff and management settle into their new environment and modify processes that required a fresh look. This becomes the foundation for turning tacit knowledge into organizational knowledge in a learning organization (Nonaka, 1991; Nonaka & Knonno, 1998; Nonake & Takeuchi, 1995; Sutcliffe & Weber, 2003; Umemoto, 2002).

Stichler does propose a model for health facility design but stops with the design phase and does not carry through to training (Stichler, 2014a). Stichler utilizes Donabedian as the models framework. This model is a simplified version from a previous work by Ulrich et al

(Ulrich et al., 2010). This model adapts well to this project and perfectly defines the antecedent, structure, process and outcome variables that training will be designing and implementing for the new facility (Appendix A).

Stichler (2008) proposes a model for the calculation of the cost of a construction project. The audience is again nurse executives who are now being asked to be a part of large replacement of new facility construction design and implementations. Most of executive nursing leadership education is minimal on finance and certainly non-inclusive of design principles and construction calculations. Stichler again ends with the design phase and does not consider training as part of the calculation (Stichler, 2008). Training for a new or replacement facility is certainly one of the largest expenses in the whole project especially considering the lead time in training, salaries and resources that must be mustered and brought to bear for a successful rollout, not to be considered part of the overall project is shortsighted and part of the gap that this project will attempt to bridge.

Another seminal work on the cost and value of a facility construction project based in evidence and the business case for such a project is from Sadler (2011) who outlines the cost of improvements that new designs, technologies and efficiencies with a new facility will bring (Sadler et al., 2011; Sadler, DuBose, & Zimring, 2008). Again, this stops short of the startup cost which includes training and the long term sustainable operations. While these may not meet with current accounting rules on cost calculations, it does behoove the organization to include this type of cost in the overall project estimates given the expense that these facilities will incur over time and how long they are intended to last.

Knowledge management was born from the shear amount of information that the computing industry was able to generate with increased processing power. This advent

overwhelmed the current system of human brain processing power and spawned the growth of a new industry, knowledge management (Davidson & Voss, 2002). Knowledge management has become the buzz word with “big data” and the analytics that are required to make sense of this amount of information. Big data was born in the consumer industry first and has now arrived at healthcare industries doorstep. Big data analytics are all the rage and organizations are investing heavily into analysts that can make sense of clinical as well as patient-centric data to make strategic decisions (Anderson & Willson, 2009; Battles, 2006; Dewhurst et al., 2013; Sutcliffe & Weber, 2003).

Nonaka (1991) introduced the concept of the knowledge-creating company with organizations ability to translate, share and utilize tacit to explicit knowledge and back again to tacit knowledge for all in the organization to employ into standard operating procedures (Nonaka, 1991). Nonaka defines knowledge management as a management method used to rapidly improve the problem-solving skills within an organization by discovering the knowledge and know-how of organization members and sharing them throughout the organization (Nonaka, 1991). Knowledge management moved from being the ability to process large amounts of information to the ability to translate unique organizational knowledge based in culture, values and beliefs into the DNA fabric of the organization through what Nonaka and Takeuchi (1995) call the spiral of knowledge creation (Appendix B) (Nonake & Takeuchi, 1995). Japanese companies for the last three decades have inculcated these ideas into the very business strategies that have made them so successful (Umemoto, 2002). They have created business structures that move tacit knowledge through the spiral of knowledge creation, creating along the way organizational knowledge of product development and implementation that completes the cycle of tacit to explicit to organizational back to tacit for all to employ.

The cost of knowledge management has been in the literature as well. What is the cost to an organization for all this technology and how well managers and leaders make decisions based upon all this data? Sutcliff and Weber (2003) have estimated that there is a U-shaped curve when it comes to investing in the technology versus the ability of the manager or leader to interpret the information into meaningful organizational strategy (Sutcliffe & Weber, 2003). Increasing the capacity of leaders and managers to embed the interpretation processes and to be able to communicate them as well, is far more cost effective in organizational competitiveness than increased spending on knowledge acquisition technologies (Nonaka & Knonno, 1998; Nonaka & Takeuchi, 2011). It is the lived experience of organizational knowledge creation that makes the competitive advantage.

What are the skills of the knowledge worker within nursing? Dewhurst, Hancock and Ellsworth purport that the organizations need to take a system analysis of the gap between what their current talent pool possesses versus what will be needed for competitive advantage (Dewhurst et al., 2013). As the marketplace changes rapidly and everyone is scrambling for their foothold into that niche market that will engender success, the skills of the leadership both at the strategic executive level as well as the frontline managers will need to change and become more agile, nimble and skilled at navigating in the ambiguous waters of uncertainty and overwhelming and conflicting data. Learning to steer the ship in these waters will be the true test of leadership. Establishing a repository of knowledge from previous facility openings from within the organization that had been translated from tacit to explicit knowledge would have saved countless hours in the tacit knowledge needed for this current project.

Conceptual/Theoretical Framework

Donabedian (1966) established the seminal framework for viewing the quality of medical care delivered (Donabedian, 1966, 1968, 1969, 1976, 1978, 1979). This framework has been utilized by many authors as a cornerstone of their approaches to current problems including health care facility design (Stichler, 2014a; Ulrich et al., 2010). The simplicity of the model, structure, process and outcome, lends itself to adaptation for many discipline and in particular healthcare from which it was born.

Stichler has adapted the Donabedian model to that of a health facility design perspective (Appendix A) with definitions and examples of the requisite component elements, antecedent, structural, process and outcomes (Stichler, 2014a). She further defines outcomes from various entities; patients, providers, employees as well as organizational outcomes. This model meets the component elements for the project-training program and provides the framework within which to develop it. Establishing this model as the framework for a training program would create the foundation of an evidence-based training curriculum database. Such a database would be an organizational strategy for future decisions on the financial impact of evidence-based design and the corresponding training to support the intended efficiencies and goals of the design.

The impact of many of the antecedent variables as outlined in the model (vision, budget, schedule, regulatory; position, power & influence; barriers and restraints) were not recognized until after the training curriculum had been designed and launched. There were some that were not in the model that should have been such as technology (new LMS scanning and tracking system, and communication and monitoring systems) that were significant upgrades to the existing workflows and structure. This points out that injunction that every project needs to be

evaluated for its own set of variables as the process of developing the project progresses. What is required is a project lead that is well versed in the model and what variables can influence in structure, process and outcomes. One of the facilities was going to employ technologies only known in other advanced areas of the country (intra-operative MRI machine; first licensed within the state) during this opening. The training implications were unknown at the time of the training curriculum development.

Many unanticipated variables arose that completely altered the timelines and deliverable dates that were unforeseen such as the moving up of one of the opening dates for the second facility by 16 weeks to compensate for the possible work stoppage during that time of the expiration of a major union contract. The resources that needed to be reallocated for that to occur were completely unprecedented within the organization. The downstream effect was that additional contract resources had to be engaged to meet the deadline as the same pool had been counted on to open two major facilities one of which would be the most technologically challenging opening in the organizations history.

Development and organization of the training curriculum within this framework clearly would establish the structure, process and outcomes that were required for successful implementation. There was no template from the organization for this, despite having had 10 previous successful openings within the health system. There was no explicit data translated from the tacit knowledge of the previous openings. This is the major gap that will be filled in the opening of the facility.

The concept of knowledge management and organizational knowledge creation became evident during this project implementation. Understanding the need for translation of tacit to explicit knowledge within an organization, to codify it for further future use and the translation

of that knowledge back to tacit for the frontline staff gives organizations their competitive advantage (Nonaka & Knonno, 1998; Nonake & Takeuchi, 1995) (Appendix B).

Knowledge management has been a key driver for the success of many Japanese companies as they have made these concepts part of their business structures and strategic operations (Umemoto, 2002). Nonaka's seminal work in 1991 and subsequent development of the concept of "*Ba*" as the source for knowledge creation, Japanese organizations have worked to infuse these concepts into the business strategies and leadership development to further their competitive advantage (Nonaka & Knonno, 1998). Nonaka states,

What differentiates *ba* from ordinary human interaction is the concept of knowledge creation. *Ba* provides a platform for advancing individual and/or collective knowledge. It is from such a platform that a transcendental perspective integrates all information needed (Nonaka & Knonno, 1998, p. 40).

This becomes a reality when shared spaces are driven by shared goals and objectives. Knowledge creation becomes the responsibility of all in the organization and each person sees their role in the creation. Information is not utilized and harbored for power and influence but for the common good and attainment of organizational competitive advantage. Knowledge creation for competitive advantage will become the mantra for the healthcare industry as they try to differentiate themselves in the marketplace. Driving this endeavor will be the changing reimbursement structures outlined in the Affordable Care Act (2010). This jockeying for position is already occurring with mergers, acquisitions and affiliations.

Chapter 3 Methods

Ethical Issues

The ethical issues for this project centered more on the bringing to bear the resources to safely open the facility. While cost was the dominate issue in the formulation of the training curriculum, there was consensus from local leadership that they would expend whatever was needed to safely meet the opening and regulatory requirements. This became a reality when there was a decision to include a phase IV for the Neonatal and Pediatric Intensive Care Units for practice drills for safety reasons as well as the retraining of all the telemetry staff on the new communication devices once the alert protocol was agreed to. These decisions were made in spite of the directive that the budgeted training hours were set in stone and exceptions would need to be approved at the organizational level.

Additional ethical issues arose when the training lead was asked to include content into the curriculum which was contradicted by the organization in the agreements for the training curriculum. The training lead was ordered to include the content and to delete something else from the agreed upon curriculum.

There were no other identifiable ethical issues or conflicts of interest noted for this project. Appendix F is the approved Project Determination that was submitted for approval in March 2014 and approved by faculty and chair.

Setting

The medical center is a 349 bed licensed facility in the urban landscape of the Bay Area in Northern California. The organization is the largest and oldest health maintenance

organization in the United States. The organization treats members within its service agreements. This facility is the original facility of the largest non-profit health system in the country with its headquarters located in the same city. The organization is comprised of three separate entities which have contracted with each other since its founding, two are non-profit and one is for profit. The for-profit is the physician entity and are thus employees of the organization. The facility is part of a 21-hospital health maintenance organization located in the Northern California region. The city is an urban setting with a very diverse populations catering mostly to middle and lower socioeconomic strata that have prepaid health insurance through their employers. The catchment area includes high to low income strata, with a satellite facility in the very low socioeconomic area of an adjacent county.

Planning the Intervention

The organization had a group tasked with developing a corporate strategy for opening facilities called the National Facilities Training and Orientation (NFTO). This group created many tools for opening of facilities and these tools were stored on a website of the same name for other to access. These tools were made available for each DCEPI to evaluate and utilize as they saw fit. This group had been disbanded since the last opening (2010) through new leadership and strategic oversight. Some of the members of this original group were still working within the organization in various capacities and could be called upon as needed and tapped for information. Resources that had been aligned within this structure of NFTO had been realigned as well. Many of these templates were described by previous users as “best practices” without any tacit to explicit to organizational knowledge and its relative usefulness to the current situation or the organization.

Some of the local decisions at other facilities had influence in the decisions from a regional perspective. Case in point, originally this local facility was planning on a two-hour in seat facility orientation class with another one hour facility tour. Other facilities had made the decision to do the facility orientation as an online course and distributed to departments through the learning management system (LMS). This online version would only require one hour of time not two. This decision became part of the approved budget for facility orientation time at the regional level and thus influenced the delivery of content at the local level. This caused considerable scrambling for realignment of content and time as this local facility was almost completed with its content and project plan.

The training program was composed of the following elements: 1) Facility Orientation and Tours, 2) Change Management in-person and/or online classes, 3) Departmental Orientation and Tour, 4) Equipment training (new and different only), 5) Workflows (new and different only), 6) Simulations for teamwork with new workflows in a new building (only designated team were assigned this initial function), and finally 7) Dual learning management systems (LMS).

There was a facility orientation and tours subgroup that was formed that was a vestige of the NFTO structure. The lead for that subgroup was a member of the original NFTO group and had been part of two previous openings within the organization. The lead lent oversight in the development of content and had a dotted line to the DCEPI for this content, but reported to the Human Resources (HR) leader who was the executive sponsor for this work. The HR leader was a member of the Transition Oversight Team (TOT) who were responsible to the local executive sponsors as well as the corporate executive sponsors for this project.

The director for the imaging department, whose responsibility included the new intra-operative magnetic resonance imaging machine (iMRI) as well as the two new MRI machines

that would be installed in the new building, included within the facility orientation a basic safety module on MRI safety for all staff. This module was created as an online module for all staff to take. This required that this information be formatted so that both LMS systems could house and track this. This was not part of the budgeted hours from the corporate allocation.

The change management in-person and online courses was formulated by a director of leadership development for the leaders and managers. Given the unique situation of not being allowed to engage the frontline staff in the content development for change (corporate leaders had not formally reached out to the unions regarding the moves) so change management was confined and directed toward the leaders and managers. This module was placed on the leadership development website for all managers to complete and was assigned to be completed in the 2013, 6 months before the move. While there was talk of ongoing change management aspects there was no substantive outreach to keep this alive within management nor frontline staff.

Departmental orientation and tours is a regulatory requirement as outlined in the California administrative code known as Title 22. The department managers and their designees were responsible for leading the departmental tours. The content for these orientations were tailored and vetted by the Accreditation, Regulation and Licensure (AR&L) director to incorporate the regulatory requirements into the prepackaged presentations for their departments. Additions to the presentations were minimized to decrease variation and any of the nuances of the department were pointed out in the tours.

Releasing the managers for these orientations and tours to set performance expectations was problematic given the competing local and organizational priorities. The inpatient nursing management was spending most of their time on rounding for patient satisfaction to meet another

organizational and local goal. The Chief Nursing Officer (CNO) had to issue a requirement that each department management team would make it a priority as to who would be present daily for the ten days of the orientation during the first phase of the training (where department orientation occurred).

Equipment training would be one of the variables with the widest range of training requirements depending upon the department and the amount and type of new equipment. The variation ranged from no change in equipment to departments like the operating room where there were almost all new equipment and new technologies. The training hours were garnered by conversations with the managers and medical equipment coordinators (MEC) as to an estimation of how long the training would take. This was used in the development of the training curriculum but not the overall budget allocation. This conversation was had with each department manager to incorporate this into the overall training time and curriculum design. The initial conversations between the MEC and the department managers occurred 18 months in advance of the training curriculum design and many of those managers had substantial turnover in ranks with no handoff in knowledge of decisions. The MEC did not catalog these decisions for future reference.

The perioperative department had special challenges to overcome as the regional decision not to shut down the operating rooms for the week of estimated training time was made. This decision required creative thinking in constructing not only the curriculum but the schedule as well. A compromise was arrived at with bulk training that had to occur within the new environment would be done on Saturdays at premium time. Four designated Saturdays would be identified to get the maximum number of staff based upon the skeletons they worked. Equipment that could be in-serviced without being in the new environment was done through the

90 minute in-services in the old facility and tracked with sign-in sheets. This created a work for the LMS administrator to manually enter data rather than the use of the scanning technology.

Simulations were a stock in trade methodology that the Clinical Education, Practice and Informatics (CEPI) department was used to utilizing. The CEPI department had the first simulation lab in the Northern California regional area and had been the site of a research study funded by the Health Services Research Administration (HRSA). The CEPI department was well versed with the utilization of simulations as part of the overall quality and patient safety strategy within the local facility (Bearman et al., 2012; Capella et al., 2010; Jeffs et al., 2010; Marshall, Harrison, & Flanagan, 2009; Steinemann et al., 2011). Simulations for identified departments that would require new workflows would be used in the development of the training curriculum. Departments with new areas of responsibility would definitely have multiple simulations that would occur prior to opening and on an ongoing basis.

Superusers (staff who were expressed desire to train and were given extra time to learn the equipment/workflows and to train) were employed with identified staff from specific areas to extend the trainers and embed the training into the working knowledge of the staff. This model employed the Roger's Diffusion of Innovations (Rogers, 2002, 2004) concept and early adopters were specifically solicited for this task for which they readily accepted and signed up. This strategy proved invaluable when it came to further last minute training revisions that needed to be done due to technology use agreements that had not been previously formalized.

An unanticipated antecedent variable came into play when the organization decided to move the second facility opening up by 16 weeks to avoid a work stoppage crisis due to the expiration of a major union contract. This decision coupled with a major offline upgrade to the organizations homegrown LMS system had a ripple effect with training decisions and resource

allocations. Those two events forced the organization to go with one LMS system (the new contracted one) that would be the transcript of record. Given that this local facility had already launched the online training models in both systems it would be very arduous to channel the training into only one system. This would require tracking in two different systems and the manpower associated with that much record keeping and reporting. The training coordinators that were hired to track this information were spending 80 percent of their time on continuous data scrubbing and updates, as this process occurred over 6 months and there were continuous updates in staff and management responsibilities.

This also required that staff who were not previously in the new contracted LMS had to have information loaded and paid for by the organization (usage was on a per seat basis). There was also learning the new system that was going to present a minor challenge to the training team. The advantage to using the new contracted LMS was the increased capacity for electronic scanning of participants and the elimination of paper records.

The new directive also had consequences with loading information into the new contracted LMS system and the validity and reliability of that data. The information had to be manually coded to load into the new LMS (automatic interface would be three months in the making) creating many obstacles to overcome. Managers were responsible to keep the HR database up to date and accurate so that the data feed to the LMS system would be as well. Many man hour resources were required to keep the database accurate. Identification of this problem was the initial insight into structuring information in a knowledge management approach that would have simplified this work (Dewhurst et al., 2013). Approaching this work in this manner would serve the organization as a standardized approach to linking the training to the personnel and begin establishing benchmarks for training. Decisions made for future

openings would not be as fraught with ambiguity and have a clearer decision-making matrix for the introduction of new technologies with realistic timelines and budgets.

One of the initial processes to be dealt with was how many people needed to be trained for this new replacement facility. This was thought to be an easy topic to address by conducting a query on the HR database by cost center within the facility location. Those data were then sent to managers for verification of accuracy. This simple process revealed many issues with the reliability and validity of the data extraction. The DSI team further asked for the trainees to be categorized by the particular job codes that they were in to estimate training budgets. Furthermore, when aligning the data extraction from the HR system to that of the scheduling system [no interface between them for accuracy verification] they were found to be inconsistent with data validity. This was a problem that had to be solved early on in the planning for the training. These numbers would be key in the planning of the number of sessions for each of the units; numbers that can be released and fulfill the dual goals of staffing the current hospital as well as meeting the training timelines; number of superusers per training session needed; number of staff per session based on type and methodology required, and the volume that the building and units could accommodate per training session.

A consultant was engaged by the DCEPI to help with the data integrity issues that were encountered. What became clear from the consultants viewpoint was the need for a knowledge management solution. Knowledge management is how an organization will gather, analyze, utilize and share information within to increase its organizational competitiveness.

The use of dual LMS systems presented a challenge to the CEPI department as this also required developing the curriculum into a format that would work with the LMS for tracking. There was also the directive from the organization to build these courses at the regional level to

ensure standardization which was the intended goal for the use of the technology. Many of the members of the CEPI department are technologically challenged and the introduction of these new processes with the deadlines presented challenges for understanding and compliance. The CEPI department was within one week to create all content with supporting documentation for the courses that would be taught in the various aspects of the training. This presented challenges on multiple levels. Because of the phased approach to training (Appendix J), many of the courses had not been conceived of nor articulated at the time of the deadline. Many of the CEPI staff had not had their training in order to build the content within the phased training. This presented many real challenges both logistically as well as philosophically. Many hours were spent on working through these seemingly contradictory priorities. The phased approach was identified as the best way to keep dual operations running and not impact staffing, and minimize the number of travelers needed for backfill for the trainees. Appendix D is a sample of the decision making process that included service directors, unit managers and the staffing office manager to construct the training plan.

Appendix I shows the process and deadlines for the formulation of the facility training curriculum timeline development. As noted above, many of the assumptions that this training curriculum was built upon were continuously in play and had to be reworked on an ongoing basis. The curriculum development was particularly challenging when the organization needed to make a decision on whether this local facility could have its opening date moved up by a month. Monthly meetings were established once the training was underway to report progress and barriers if any to both the regional oversight group as well as the Transition Oversight Team (TOT). There was a dual reporting structure as the (TOT) required that biweekly reports of

progress were completed with the same criteria. Sample communications for the TOT and regional oversight group are shown in Appendix G.

In order to ensure success in this very dynamic project with all parts moving separately and in their own rhythm, integration with the entire project was needed to be successful. Some of the lessons learned from the opening of the medical office building (MOB) was when a department was truly completed and ready for occupancy. When one project arm was completed with its work and reported done that perhaps meant that another project arm needed to start or finish its portion of the work. Not having awareness that all work was completed by all project arms created delays in functionality and operations of some portions of the MOB. In order to avoid those issues again, the project leader employed a consultant firm that tracked the status updates of all the arms of the project into one integrated hospital systems (HIS) team report structure that met weekly. The work breakdown structure (WBS) (Appendix K) for training was integrated into the HIS weekly report to be discussed at the weekly meeting and with senior and regional leadership. Many identified barriers were dealt with at this meeting where all could see the impending issues.

Implementation of the Project

Once the training curriculum was developed by the constituent parties and vetted and approved by the Transition Oversight Team (TOT), implementation began.

With all the staff that needed to be schedule on the inpatient nursing side as well as the superusers that needed to be backfilled and taken out of staffing to train, working with the staffing office on a daily basis was required. The number of trainers that would be needed was based on the types of training that were required with each phase of the training and the ratio of

trainers-to-training needed. Since that was totally dependent on the numbers of staff that could be released per day and still run the dual operations, the staffing office would be the gatekeeper for this function. The goal was to have all inpatient staff through each phase of the training with as minimal reschedules as possible. This would require accurate real-time data that was responsive to changes in census and staffing. A process was created with the staffing office by which the office would supply the names of the trainees and the trainers based on staffing by the end of business day prior to the training day (EOB Tuesday for Wednesday's training). Having to have essentially 4 full-time people mapping, scheduling, verifying and scrubbing data on a daily basis for 90 days was what it took to ensure that the dual goals of getting staff through the required training and keeping the hospital running and safe staffing was monumental. The consultant was also involved to screen for duplications and counting of staff by departments. This was also reported at the HIS meeting weekly so that barriers would be engaged with senior leadership before they became issues.

The non-Patient Care Services departments [PCS] had the assigned project lead from the training team meet with the managers to design their content and strategy plan for completion of the training (Appendix C). Each manager was believed to be the content expert in the operation and training needs for their departments. From these discussions curriculum was developed as well as the training plan for completion by the allotted timeframes. These curriculum were then amalgamated into the larger project work breakdown structure for tracking of completion (Appendix K).

The same process for the Ambulatory departments and physicians was utilized for completion of their training curriculum and plan. The physicians were paired with the departments that they worked with [e.g. OB-GYN worked with the departments of L&D,

Maternity and Perioperative services]. The physician department that didn't have a manager nor real home was that of the Hospital-Based Physicians. They worked within the Adult and the Emergency Services departments and planned their training with these departments.

Planning the Study of the Intervention

The intervention was the curriculum that was designed and implemented. This curriculum was designed with the knowledge at hand in December of 2013. There were still many unknowns at that time for the design and would have to be addressed as information become known and available. From the regional operations perspective it was left up to the local facility to design and implement their curriculum that they had vetted locally. There was no plan from a regional operations perspective to do a post-occupancy evaluation other than an informal lessons learned session. There was no plan to formalize this knowledge into a structure that would translate the tacit knowledge of the design and implementation into explicit organizational knowledge for use as a benchmark in future openings.

The assignment of the training lead by regional PCS leadership to the DCEPI was based on the assumption that they have developed, executed and evaluated training curriculum in the past. The DCEPI had these skills but not on the scale of such a project. The coordination of all the variables that encompassed this project was on a level never known to any of the DCEPIs. While there were persons who were hired as project managers, they did not have formal training nor certification in the field of project management. This required that the local DCEPI acquire these skills set while doing the project. The local DCEPI enlisted an outside consultant with a wealth of large project management experience to assist the guidance on this project. A SWOT analysis was done to ascertain the readiness of the DCEPI and CEPI team for this task (Appendix

L). It was determined the skill set required for knowledge management was lacking and a consultant was engaged to fill that skills gap.

The consultant's experience assisted with the sorting of the HR data, augmented the data management skills of the training coordinators, assisted with the creation of the work breakdown structure [WBS] that was the guide to resource allocation for the various aspects of the project and its completion (Appendix K). The consultant was able to augment the project management skills that the local training lead had not yet acquired. The consultant was able to guide the local DCEPI in the acquisition of this skill set.

The consultant introduced the local DCEPI to the concepts of knowledge management in the acquisition and management of information within the organization that would have greatly streamlined decision-making and resource allocations. Through this relationship with the consultant and the local doctoral education program, the DCEPI began to understand the nature of the knowledge management and its significance to nursing beyond beside into the realm of management on an executive management level. Operations were being impacted by the ability to manipulate complex data sets within complex adaptive systems to make strategic decisions (Scott, 2007).

Proposal by the local DCEPI and consultant were initiated with the regional DSI team to engage them in the prospects of a knowledge management system could accomplish for the third facility training planning that had yet to get underway. This offer was not met with enthusiasm. The same process for the third facility training curriculum planning was replicated like the first two. Lessons learned were not codified nor categorized for data management and knowledge transfer.

Evaluation

Comparison of the identified metrics pre-move and post-occupancy would be the method of evaluation. These metrics would be parsed for influences regarding training and design as noted in the complaints regarding such. These metrics are organizational metrics and thus would be easy to garner.

Analysis

Analysis would consist of compare and contrast the organizational metrics that are within the elements of the conceptual framework (Appendix H). These metrics would not be completely available until December 2014. The metrics would be gathered at the 6, 12 18 and 24 month intervals to note any changes within the organizational metrics. The nurse sensitive metrics (Nursing Database for Nursing Quality Indicators [NDNQI]) are reported publically as well as the organizational metrics. Accompanying the metrics would be any complaints regarding the design or training and analysis for relevance. The caveat to this analysis is that given the fact that this is a union contract negotiating year, the relevance of the claims for training have been skewed as this has been part of the union claims of lack of training for the new facilities. These claims have been part of the union's media campaign during the negotiating period. Survey results and reports may have been influenced as part of the negotiations. Further analysis of this information would have to be done to verify validity of claims. Report of any never events will also be included in the analysis to evaluate the influence of training on the issues.

Sources of Funding

Funding for the training program for each of the replacement hospitals that were being constructed and opened in 2014 was done through the regional Deliver Systems Implementation [DSI] Department within each facilities startup budgets. Funding was based upon a regionally

decided matrix for the type of specialties that each facility would have and the estimated time for training that would be required for the aggregated new and different equipment. Estimates for the training time were derived from vendor recommendations (if there were any) and regional expert opinions based upon past experiences. No clear methodology for estimation from previous opening data was gathered. The matrix was created by the Clinical Education, Practice & Informatics teams at each facility and then submitted to the DSI team for vetting. DSI also vetted the proposed matrixes with the regional Patient Care Services [PCS] leadership from the respective domains of service [e.g. Maternal Child Health, Adult & Critical Care, Perioperative, etc.] for final recommendations.

The final budget matrixes were then distributed to the Transition Leaders at each facility for working with the facility Area Finance Leader and the Transition Oversight Teams [TOT]. The identified responsible party for implementation of the training program for each medical center was the Director of Clinical Education, Practice & Informatics [DCEPI].

The training budget was never shared with the DCEPI. All the training hours that were scheduled were recharged to the training start up budget. It was a coordinated effort on the part of the staffing and payroll departments. The local DCEPI would have been the authority to have established the variances between the budgeted and actual knowing the changes that happened and would be in the position to categorize the variances for making explicit what was tacit knowledge. No other funding sources were utilized.

Chapter 4 Results

Program Evaluation/Outcomes

The goals of the project were met with the opening of the facility on time. The facility was licensed without any contingencies. This was accomplished during the survey by the California Department of Public Health (CDPH) on June 16-17. There were no contingencies of any kind with the licensure. There was particular scrutiny regarding some of the new technologies given the history of the facility with past issues around telemetry monitoring and training. The training plans were scrutinized for completeness and demonstrations by staff were done to the satisfaction of the surveyor.

There were no contingencies related to training of any kind nor the record keeping. Continued scrubbing of the data will continue until the reaccreditation by the Joint Commission will be accomplished in the 4th quarter of 2014.

Since there is no access to the budgeted or actual training expenses there cannot be an assessment of the training variances. If there is a variance analysis done it has not been shared despite repeated requests at both the regional and local levels.

Analysis would include how the various trainings were modified and under what circumstances for achieving their intended outcomes. Examples would include the new telemetry monitoring and nurse communication systems that were rolled out from the vendor, were not in the finalized configuration for utilization when the training was implemented. This required a project manager to assist with the reconfiguration of the systems and then schedule retraining for all those staff affected by the reconfiguration. This is an example of tacit knowledge becoming part of explicit and organizational knowledge management for future facility openings. Doing this survey should be done relatively soon as the detailed memory of

the circumstances for the variances diminishes with time. Post-occupancy metrics is recommended between 6 months and 2 years for institutional memory to be gleaned and recorded for future use (Stichler, 2010a).

Analysis of the metrics as indicated in would be done from the pre-, post-occupancy at 6, 12, 18 and 24 months intervals (J. Stichler, 2012a, 2012b; Stichler, 2009a, 2009b, 2010b; J. F. Stichler, 2012a, 2012b). The metrics would look at the influence of training in the new environment for a causal relationship.

All never events post-occupancy will be analyzed for root cause (Blue et al., 2010; Bowie, Skinner, & de Wet, 2013; Connelly, 2012; Day, Dalto, Fox, & Turpin, 2006; Harrison, 2014). Part of the analysis will be the training surrounding the events and the workflows in the new facility (Stephenson, 2011; Watson, 2010).

The training budget was never shared with the local DCEPIs. The role was responsible for creating the training content and alignment of the training hours with the budgeted time allotments. The Transition Project Leader [TPL] was the responsible party to the DSI team for the budget. Inquiries regarding organizational training variance data on the 10 previous facility openings was nil. The executive director of the DSI indicated that these analyses were not done so there was no way to know what training curriculums were more successful than others in meeting the programs and organizational goals and objectives (personal communication S Brown, June, 2014).

The DSI team had requested to have information related to the number of training hours per job code. This request was not revealed as to the nature of the inquiry but from a budgetary resource viewpoint, costing out training per job code is a short-sighted strategy. The assumptions were that jobs codes would receive the same type of training within and between

cost centers. This assumption was inaccurate as the same job codes perform differing functions within and across cost centers. While there is commonality there is nuanced training requirements within service lines and departments so any conclusions for the cost would be erroneous. It would however give a gross estimation of the cost per job code.

Vendors have, as part of their contracts with organizations various training requirements and training plans. These are based on the models of initial and sustainable training needs of the frontline and management staff who would utilize the training. Training modalities and time allotments are negotiated at the corporate level long before the training planning has begun. None of this contract information was available to the DCEPIs for each facility. The training curriculum for the new technologies and vendor support models were built on hearsay and past training assumptions in conversations with the medical equipment coordinators (MEC) and educators for input. There was no corporate database for this information, even after repeated requests for such information be gleaned for utilization. So training content and length of training on some of the most important technologies and equipment was built without a knowledge of what and how it would be covered. A full appreciation of the extent of the technologies changing workflow and processes was not fully understood when they were purchased.

An assessment of the training resources available within the CEPI department as well as within the medical center, common approaches to training was identified as a strategic initiative.

The compendium from the 10 previous facility openings contained only the explicit data of how many training hours that were allotted in the budget. There was no organizational knowledge from analyses of the budgeted versus actual training variances. The injunction that “imitation was not innovation” was meaningless without translation of the tacit knowledge from

the lived experience of the trainers with post-occupancy evaluations for relevance and variances. The organization lacks the desire or capacity at this time to make informed decisions based on evidence. The building of an evidence-based approach to training should be an organizational imperative.

Once the budget hours were finalized the process of alignment of the training hours with the budget was undertaken (Appendix I & N). Modifications were made in the phased training plan to reflect the alignment. As the variables changed due to other project influences, modifications to the training were made to accommodate.

The actual dollars for the proposed training and actual variances should be broken down and analyzed. This would give the organization a way to translate the tacit knowledge that was learned in the implementation of the program into organizational explicit knowledge for future facility openings (Ferguson & Day, 2005; Freshwater & Stickley, 2004; Lundgren & Berg, 2011; Paton, 2007; Schutz, 2007). Neither of the proposed nor actual expenditures were available to the local DCEPI despite repeated requests from the regional as well as local facility leadership.

Safety concerns were expressed by some of the physicians on the TOT regarding the lack of additional training hours for very new processes. The local DCEPI was in agreement with the physicians and a proposal for doing additional training for some of the most changed workflow areas was presented to TOT and approved. Additional phased training was incorporated to the most affected areas. This again was not reflective of organizational knowledge decision-making and would be lost in the explicit data if previous models would be employed.

The number of new and upgraded technologies that were a part of this replacement facility was a quantum leap from the old facility. These technologies were part of making the delivery of care more integrated with patients and families, but also to increase efficiencies and

affect cost savings with the availability information in real time for real-time decision-making. The knowledge load that was incurred in the adoption of these technologies was vastly underestimated from the planning of the training curriculum.

The impact to operations of these technologies was not fully appreciated until the actual rollout of the training. At that time, it became clear that the agreed upon “clinical reviews” that were done with the vendors 2 years prior was woefully inadequate to what the current needs were going to be. This became problematic and needed a resolution for the training to be successful. The CNO appointed a project manager to deal with the enormity of the impact of the not only the training issue, but the technology integration within operations. These systems required an enormous amount of systems administration and oversight on a daily basis. That insight was not planned for in the initial rollout. The regional team oversight was not aware of the enormity nor impact of this issue.

To further compound the situation, configuration of the units as described in the antecedent variables, became a real safety, training and compliance issue for these units that were mixed units [one-half was telemetry (1:4) and the other half was medical-surgical (1:5)]. Even though this was constructed as an acuity adaptive room configuration, two different systems for communication was built for the differing units (J. F. Stichler, 2012a). This made training for these communication devices challenging and confusing for the staff. They had different ways of assigning the devices and rules on escalation. With the inevitability of the staff floating between units with different communication devices and configurations, the staff would have to remember which unit they were working in that day and how to configure those devices. This would all have to be monitored and assigned by someone. The decision as who should assign was made after the training was done. This necessitated retraining of the staff for their

roles and responsibilities just prior and after the opening. The impact will be affected in the post-occupancy evaluation of training with credibility, safety climate, and the budgetary impact on the actual costs.

Training of the staff for these different communications devices and software became problematic after the move and the rebidding of the positions due to the changes in unit configurations. This meant that staff initially trained for one unit and their devices would now have to be trained on another device and software. Staff that floated between units would have to be trained on all the devices. Knowing which units staff would be assigned would have mitigated much of the retraining and anxiety.

It became obvious very quickly once the true magnitude of the technical requirements that these technologies required would have major impact upon the operations. Any new staff or transferring or terminations would all have to be loaded manually into these systems. There was no provision to have this information automatically loaded from the active directory functionality of the Human Resources database. As noted above, the decision as to whom would be responsible for daily inputting of assignments as well as the actual system maintenance was not decided until just prior to the move into the new facility. This caused considerable confusion with the training of the superusers and the frontline staff when it came to the time of the actual training. Much of the training had to be updated and retrained to once the new configuration was decided upon.

What became clear prior to the launch of the training program was that information technology [IT] and the CEPI department would have to be joined at the hip to accommodate the rapid pace of the ever changing landscape that was this implementation of these technologies. The DCEPI and the IT lead met every Monday morning and as needed at the beginning of the

day to assess the status of the equipment and the challenges that were being faced by both departments. The real-time dialogue that occurred changed the game from one of defense to offense in the tackling of the IT issues. Working with the project manager as the decisions were made the training was then modified to reflect the new training and operational reality.

A regional decision was made that tracking of the training for the replacement facility would be done in a new LMS system that was initially purchased for tracking and trending of nurse education and training. This was expanded to include all trainees. This decision would mean that a new interface for feeding the new LMS system from the HR database would have to be written, tested and verified. This would also increase the cost of the licenses for the LMS for the remainder of 2014. The decision would impact the actual costs of the project not just from the purchasing of seats in the LMS but with the hidden cost of LMS administrative time.

In order for the scanning technology to work, new badges would have to be printed with the trainee's unique identifying code (known as a National User Identification (NUID)) for the scanning technology to be effective. New badge printing would require resources and time and coordination with the security department who issued the badges. This was challenging, as the security database was not up-to-date with information on staff, and decisions on distribution were to be negotiated with all entities and service lines, becoming a barrier to successful tracking of the training project due to lack of consistent records for training and manual input of a great deal of the data.

The decision to go with the new LMS and tracking was made when the organizations' version of the LMS was going to be down for upgrades in the middle of the training rollout for the first two facility openings. The decision was made after the initial rollout of the existing LMS online portions of the training. The local facility was initially slated to be the first opening

in the sequence of openings. This necessitated the release of the online trainings in the month of December 2013. Once the decision was made to have the new LMS be the tracking system of record, dual tracking of the online content was to be conducted. Verification of HR data became even more important with dual systems that initially didn't have interface for communication.

Uploading of the data was more labor intensive than initially realized. The training command center was the epicenter of the how the scanners were assigned, tracked and retrieved for uploading by the LMS administrator and designated trained staff.

The decision to use the new LMS required that all training curriculum be built in a certain way for the process to be tracked for uploading using the scanning technology to be effective. This would necessitate the having an LMS administrator for this function to keep all the curriculum in the correct formatting and sequencing. This role was filled by an administrative assistant who supported the department but was the expert for the LMS. The training coordinators would be experts in the old LMS system and would interface with the new LMS administrator.

The decision to move to the new LMS within the short timeframe assigned created training issues for new staff that would be required to utilize this new LMS. This was particularly problematic for the entities that were not going to be a part of the ongoing use of the new LMS after the opening happened. Given the dual nature of the LMS situation, a decision by the DCEPI was made that the format that the staff were originally assigned would be the LMS that the staff would be tracked in. This decision greatly diminished the anxiety over the training of staff, tracking and reporting of staff completion rates.

The new technologies would require that training on these systems have a training environment that was setup on a continuous basis in order to meet the demand of new staff,

retraining of those who have been on leave, and other scenarios. This need for dedicated training space was not recognized in the original planning of the building nor in the supply of equipment. The required space was not the issue as there was shelved space on one of the units. The equipment would be the resource intensive requirement. As this was beyond the startup budget, these resources would have to come from operational dollars yet to be assigned. This would require a business case for such equipment. Training environments would need to be established as most of the technologies can't be trained within the production environments.

Chapter 5 Discussion

Summary

Not having the underlying goals and objectives for the new hospital design as part of the training curriculum design was a significant handicap. As a health system that will be investing more in new and replacement facilities in the near future, establishment of a knowledge repository of how hospital design and training curriculum meet the overall goals and objectives should be an organizational strategic objective. Being data driven in so many aspects of the new paradigm and not with the effectiveness and efficiencies of new training for hospital designs is a huge gap that needs to be filled. This gap is key to maintaining an organizational competitive advantage in the marketplace.

Currently there is not a common repository of knowledge on training design associated with new and replacement facilities as there is with hospital design. The Center for Health Design, located in Concord, California, was founded to meet the goal of being a repository for research within healthcare and architects in meeting the 21st design goals and objectives of new facilities (<https://www.healthdesign.org/search/articles>). While the design for the new templated and non-templated hospitals were worked out in a simulation environment within this organization's Innovation Center, the tacit knowledge from those discussions have not been categorized, cataloged nor available to the DCEPIs at either the local or regional levels for training curriculum design. The enormity of opening three facilities within the same calendar year would have been streamlined and *muta* or waste in the system would have been minimized according to LEAN principles had this repository from the other 10 openings been available. This gap in knowledge needs to have senior leadership vision and resources to ensure that its full competitive advantage is maximized.

Understanding the types of training that need to be created and the most efficient methodologies (e.g. simulations, psychomotor time-on-task, or affective domain courses dealing with culture, values and beliefs) are critical to know and have in the quiver of educational options for any particular training team. Evidence of what type of trainings are effective and why are critical to furthering the knowledge based of not only the organization but of the nursing profession in general.

Evaluation of the effectiveness of post-occupancy evaluations to nurse sensitive and organizational metrics will be another key piece to this knowledge management strategy. As the providers and patients gain more experience within the environments, subtleties emerge from the working conditions that were not previously seen nor anticipated. Capturing that knowledge and making it part of the tacit knowledge transfer is a critical step in further refining the knowledge repository for healthcare design and training. Training is inseparable from design. Treating them as mutually exclusive has been contributed to *muta* within this project.

The inability for the different parts of the project to share and guard information was truly eye opening. Even at venues that had been established for the sole purpose of information sharing to accomplish what was believed to be common goals, continued to the absolute end of the project to be a struggle. This DCEPI had lost track of the wasted hours of reworked data within this project and can only surmise the budgetary implications. This project exemplified the need for this organization to really understand what is meant by a knowledge creation company, where tacit knowledge of frontline workers is turned into explicit organizational knowledge and is socialized within the company and made tacit again with frontline workers (Kaiser & Fordinal, 2010; Nonaka & Knonno, 1998; Nonaka & Takeuchi, 2011).

Relation to other evidence

This project has clearly elucidated the lack of knowledge management within this organization as noted by the incredible waste created by redundant and discreet information systems. The lack of valid and reliable data, as noted in the continuous reworking of HR data for training and scheduling, and the man hours that required, illuminates the lack of a global understanding of the role that knowledge plays in establishing competitive advantage. While there are organizations, such as the Center for Health Design, which are repositories of knowledge related to health facility design based on evidence-based research, there is no such repository for training with regards to facility and technology design. This would be an opportunity for any health system to begin to build their repository of evidence-based pre and post-occupancy design evaluations with regards to intended design goals and objectives, user acceptance both from the patient and family perspective as well as the providers [nurses, physicians' and healthcare employees], and the effects of adoption of new technologies on workflow, efficiencies and user satisfaction. (Balakas, Potter, Pratt, Rea, & Williams, 2009; Potter et al., 2004; Potter & Grant, 2004; Potter et al., 2005). Understanding the relationship of design to training is key in creating a competitive advantage in the marketplace. As the industry consolidates in the wake of the Affordable Care Act (2010), now would be the time to establish a knowledge management system to revision nursing culture as a knowledge creation and utilization responsibility of everyone in the company (Porter-O'Grady, 2014; Weberg, 2012; Weberg & Weberg, 2014).

Having a framework from which to filter all aspects of the project, not just the training aspects, would have been exceedingly helpful. Much of the rework could have been avoided and

better decisions made in a timely less costly manner. Every project should have a framework that is tacit to all project managers and driven by the project leader.

Barriers to Implementation/Limitations

The chief barrier to implementation was the inability to get valid and reliable data upon which to base the project plan without having to rework and scrub the data constantly. A glaring flaw in the organization is the paucity of valid and reliable data that all leaders and managers can believe and base decisions upon. The behavior bears out this fact in that managers recreated the data according to their perspective and assumptions. Countless man-hours were employed recalculating the “N” for the entire timeline of the project. Nearly 80 percent of the training coordinators time was spent in the validation and cleaning of data for accurate records. This continued even after the opening. So at any given time there was a less than 80 percent reliability that the data presented to the oversight groups was accurate and reliable. The source of this issue was firmly laid in the training leads lap not in the data sources themselves. Despite the reporting of weekly data for three months, senior and midlevel leadership only became engaged with the attainment of the completion goals the Friday before the licensing survey.

There was clear information hoarding that became evident in the process of implementation. Despite the appointment of a training lead, many of the departments went about their own direction to create their training plan. They created their own tracking of the result without integration with the training lead. This further compounded the issue of data reliability within the organization.

There were many issues with technology that created huge barriers to completion. First and foremost was the introduction of so many new technologies that required so much

integration and agreement prior to the implementation. The root cause of these issues was that agreement on workflow and operations had been done 20 months prior to the training planning and the rapid change over in leadership on all levels of the project and operations, guaranteed that there was no one who had made the decisions were present during the implementation. There was no plan for codifying the tacit knowledge of the decisions into organizational knowledge back to tacit knowledge for implementation. Case in point was the agreement on the communication system for notification between the two major systems of arrhythmia and call light notification and the code structure notification. Only two of the original leadership were present with the final implementation agreement with the vendor, thus having no codified tacit knowledge of how that agreement was originally structure and decisions made. A special project manager was appointed when this issue surfaced and became a point of concern at the senior leadership level. The project manager had to recreate and codify all the agreements and updates to the system and then interface with training. The rework that was involved with this effort was enormous. There was no one tracking this agreement and its implication on operations and workflow until the time of training.

One of the most useful concepts that were operationalized during this implementation was the training command center. This became the hub of the training and interface with all the project arms and central distribution point for the scanning technology, gathering of data, distribution of data, incident command decisions and central location for logistics of training over 3000+ staff. Daily variances and accommodations to the every changing landscape of the project as it unfolded could be dealt with at the unit level through the command center. The information from this command center would feed the project command center and appraise senior leadership of progress and barriers in a timely manner.

Interpretation

What seemingly was a simple task for creating a training curriculum for replacement facility from known designs and vendors was much more nuanced and complicated. Without an effective knowledge management system to have multiple entities, project leaders, senior sponsors and the frontline staff having access to common information, the project became one of a seemingly Sisyphean endeavor. Common assumptions proved to be outdated and non-applicable to the current paradigm. Post-industrial leadership models and skills sets were not able to keep up with the incredible data overload and manipulation that was required to keep all the moving parts moving in a common direction with a common goal, that being opening on time without delay or contingencies (Porter-O'Grady & Malloch, 2009).

Inculcating within the organization with a process for continuously learning, what the organization knows and refining that into structures, processes will establish the foundation for the outcomes that are desired. The conceptual framework should be foundational to all the organizational metrics and well communicated to every member of the organization. Managers and leaders need to become adroit at interpreting the vision, mission and values and driving the acquisition of knowledge through the conceptual framework (Sutcliffe & Weber, 2003). The heart of a learning organization is the spiral of knowledge creation (Nonaka & Takeuchi, 2011). This will employ knowledge management and fuel the fire of knowledge creation to establish competitive advantage in the marketplace. Establishing this culture will require diligence, determination and a whole new way of thinking and looking at problems. Nonaka (states that "Creating new knowledge is as much about ideals as it is about ideas." (Nonaka, 1991, p. 97).

This will require leadership on all levels to reexamine their structure, strategies and ultimately goals.

Future work would be to have the pre-design structure, processes and outcomes aligned with the post-occupancy evaluations with everyone knowing what that would be. There is a need for more diligent research in every project to learn how it effects all the constituencies not just the patients or workers. As organizations are complex adaptive systems, operations needs to learn to manage with the principles of complexity leadership (Weberg, 2012). Creation of a repository for the ongoing evaluation of the research and its implications should be done at an organizational level with knowledge management implications.

Conclusions

As the healthcare industry moves in the direction of the triple AIM (quality, affordability and patient-centered care delivery) evidence-based models will be shifting current models and paradigms (Baillie, 2010; Stichler, 2009b). As health systems grapple with the cost of new and replacement facilities, design and training for these new facilities will present new challenges that meet the goals of the triple AIM. Design initiatives should be coupled with the training methodologies that accompany them to ascertain the true impact of the design and budgetary influences. Both design and training initiatives should be looked at from the evidence that spawned them, the future directions that they are headed, room for the future “what if”, and sustainability for the long term (Martin, 2009; Porter-O'Grady & Malloch, 2009; Rabner, 2012; Sadler et al., 2008).

Accomplishing these lofty goals will require a new approach and skill set of leadership and of the organizations themselves. The digital age has arrived and with it new paradigms for managing, manipulating, understanding and most important of all sharing tacit knowledge of

organizational knowledge (Porter-O'Grady, 2014). This paradigm shift will require a new approach to management of organizational knowledge. A systematic approach to the spiral of knowledge creation will be required of all leadership and involve everyone within the healthcare organization (Kaiser & Fordinal, 2010; Nonaka & Knonno, 1998). It is time for the advent of an evidence-based training repository based on organizational knowledge.

Organizations need to establish their own knowledge management systems to engage in the spiral of knowledge creation that makes them unique with the gifts and values that they offer.

References

- Anderson, J., & Willson, P. (2009). Knowledge Management;: Organizing Nursing Care Knowledge. *Critical Care Quarterly*, 32(1), 1-9.
- Baillie, J. (2010). Unparalleled changes require new approach. *Health Estate*, 64(10), 21-24, 26-28.
- Balakas, K., Potter, P., Pratt, E., Rea, G., & Williams, J. (2009). Evidence Equals Excellence: The application of an evidence-based practice model in an academic medical center. *Nurs Clin North Am*, 44(1), 1-10, ix. doi: 10.1016/j.cnur.2008.10.001
- Battles, J. B. (2006). Quality and safety by design. *Qual Saf Health Care*, 15 Suppl 1, i1-3. doi: 10.1136/qshc.2006.020347
- Bearman, M., O'Brien, R., Anthony, A., Civil, I., Flanagan, B., Jolly, B., . . . Nestel, D. (2012). Learning surgical communication, leadership and teamwork through simulation. *J Surg Educ*, 69(2), 201-207. doi: 10.1016/j.jsurg.2011.07.014
- Blue, A. V., Charles, L., Howell, D., Koutalos, Y., Mitcham, M., Nappi, J., & Zoller, J. (2010). Introducing students to patient safety through an online interprofessional course. *Adv Med Educ Pract*, 1, 107-114. doi: 10.2147/AMEP.S13350
- Bowie, P., Skinner, J., & de Wet, C. (2013). Training health care professionals in root cause analysis: a cross-sectional study of post-training experiences, benefits and attitudes. *BMC Health Serv Res*, 13, 50. doi: 10.1186/1472-6963-13-50
- Building the Evidence Base: Undersanding Research in Healthcare Design*. (2014). (3rd ed. Vol. 2). Lafayette, California: The Center for Health Design.
- Capella, J., Smith, S., Philp, A., Putnam, T., Gilbert, C., Fry, W., . . . Remine, S. (2010). Teamwork training improves the clinical care of trauma patients. *J Surg Educ*, 67(6), 439-443. doi: 10.1016/j.jsurg.2010.06.006
- Carr, V. L., Sangiorgi, D., Buscher, M., Junginger, S., & Cooper, R. (2011). Integrating evidence-based design and experience-based approaches in healthcare service design. *HERD*, 4(4), 12-33.
- Connelly, L. M. (2012). Root cause analysis. *Medsurg Nurs*, 21(5), 316, 313.

- Davidson, C., & Voss, P. (2002). *Knowledge Management: An Introduction to creating competitive advantage from intellectual capital*. Auckland, New Zealand: Tandem Press.
- Day, S., Dalto, J., Fox, J., & Turpin, M. (2006). Failure mode and effects analysis as a performance improvement tool in trauma. *J Trauma Nurs*, 13(3), 111-117.
- Dewhurst, M., Hancock, B., & Ellsworth, D. (2013). Redesigning Knowledge Work. *Harvard Business Review*(January-February), 59-64.
- Donabedian, A. (1966). Evaluating the quality of medical care. *Milbank Mem Fund Q*, 44(3), Suppl:166-206.
- Donabedian, A. (1968). The evaluation of medical care programs. *Bull N Y Acad Med*, 44(2), 117-124.
- Donabedian, A. (1969). Quality of care: problems of measurement. II. Some issues in evaluating the quality of nursing care. *Am J Public Health Nations Health*, 59(10), 1833-1836.
- Donabedian, A. (1976). A frame of reference. *QRB Qual Rev Bull*, 2(6), 5-8, 30-32.
- Donabedian, A. (1978). The quality of medical care. *Science*, 200(4344), 856-864.
- Donabedian, A. (1979). The quality of medical care: a concept in search of a definition. *J Fam Pract*, 9(2), 277-284.
- Ecoff, L., & Thomason, T. (2009). Moving Into a New Hospital. *Journal of Nursing Administration*, 39(12), 499-503.
- Ferguson, L., & Day, R. A. (2005). Evidence-based nursing education: myth or reality? *J Nurs Educ*, 44(3), 107-115.
- Freshwater, D., & Stickley, T. (2004). The heart of the art: emotional intelligence in nurse education. *Nurs Inq*, 11(2), 91-98. doi: 10.1111/j.1440-1800.2004.00198.x
- Geimer-Flanders, J. (2009). Creating a healing environment: rationale and research overview. *Cleve Clin J Med*, 76 Suppl 2, S66-69. doi: 10.3949/ccjm.76.s2.13
- Guinther, L., Carll-White, A., & Real, K. (2014). One size does not fit all: a diagnostic post-occupancy evaluation model for an emergency department. *HERD*, 7(3), 15-37.

- Harrison, E. M. (2014). Quality and safety education for nurses: a nursing leadership skills exercise. *J Nurs Educ*, 53(6), 356-361. doi: 10.3928/01484834-20140512-01
- Hua, Y., Becker, F., Wurmer, T., Bliss-Holtz, J., & Hedges, C. (2012). Effects of Nursing Unit Spatial Layout on Nursing Team Communication Patterns, Quality of Care and Patient Safety. *Health m Environements Research & Design Journal*, 6(1), 8-38.
- Integrating Evidence-Based Design: Practicing the Healthcare Design Process*. (2010). (2nd ed. Vol. 3). Lafayette, California: The Center for Health Design.
- An Introduction to Evidence-Based Design: Exploring Healthcare and Design*. (2010). (Second ed. Vol. 1). Lafayette, California: Center for Health Design.
- Jeffs, L., Espin, S., Shannon, S. E., Levinson, W., Kohn, M. K., & Lingard, L. (2010). A new way of relating: perceptions associated with a team-based error disclosure simulation intervention. *Qual Saf Health Care*, 19 Suppl 3, i57-60. doi: 10.1136/qshc.2009.036418
- Kaiser, A., & Fordinal, B. (2010). Creating a ba for generating self-transcending knowledge. *Journal of Knowledge Management*, 14(6), 928-942.
- Kotzer, A. M., Zacharakis, S. K., Reynolds, M., & Buening, F. (2011). Evaluation of the built environment: staff and family satisfaction pre- and post-occupancy of the Children's Hospital. *HERD*, 4(4), 60-78.
- Lu, J., & Price, A. F. (2011). Dealing with complexity through more robust approaches to the evidence-based design of healthcare facilities. *HERD*, 4(4), 3-7.
- Lundgren, S. M., & Berg, L. (2011). The meanings and implications of receiving care. *Scand J Caring Sci*, 25(2), 235-242. doi: 10.1111/j.1471-6712.2010.00815.x
- Maguire, D., Burger, K., O'Donnell, P., & Parnell, L. (2013). clinician perceptions of a changing hospital environment. *Health Environment, Research & Design*, 6(3), 69-79.
- Marshall, S., Harrison, J., & Flanagan, B. (2009). The teaching of a structured tool improves the clarity and content of interprofessional clinical communication. *Qual Saf Health Care*, 18(2), 137-140. doi: 10.1136/qshc.2007.025247

- Martin, C. S. (2009). The challenge of integrating evidence-based design. *HERD*, 2(3), 29-50.
- McCreary, L. (2010). Kaiser Permanente's Innovation on the Front Lines. *Harvard Business Review*(September), 92-97.
- Nonaka, I. (1991). The knowledge-creating company. *Harvard Business Review*(November-December), 96-104.
- Nonaka, I., & Knonno, N. (1998). the Concept of "Ba": Building a Foundation for Knowledge Creation. *California Management Review*, 40(3), 40-54.
- Nonaka, I., & Takeuchi, H. (1995). *The Knowledge-Creating Company: How Japanese companies create the dynamics of innovation*. New york: Oxford University Press.
- Nonaka, I., & Takeuchi, H. (2011). The Wise Leader. *Harvard Business Review*(May), 58-67.
- Nonake, N., & Takeuchi, H. (1995). *The Knowledge-Creating Company*. New York: Oxford University Press.
- Paton, B. I. (2007). Knowing within: practice wisdom of clinical nurse educators. *J Nurs Educ*, 46(11), 488-495.
- Porter-O'Grady, T. (2014). Getting past widgets and digits: the fundamental transformation of the foundations of nursing practice. *Nurs Adm Q*, 38(2), 113-119. doi: 10.1097/NAQ.0000000000000021
- Porter-O'Grady, T., & Malloch, K. (2009). Leaders of innovation: transforming postindustrial healthcare. *J Nurs Adm*, 39(6), 245-248. doi: 10.1097/NNA.0b013e3181a72ace
- Potter, P., Boxerman, S., Wolf, L., Marshall, J., Grayson, D., Sledge, J., & Evanoff, B. (2004). Mapping the nursing process: a new approach for understanding the work of nursing. *J Nurs Adm*, 34(2), 101-109.
- Potter, P., & Grant, E. (2004). Understanding RN and unlicensed assistive personnel working relationships in designing care delivery strategies. *J Nurs Adm*, 34(1), 19-25.

- Potter, P., Wolf, L., Boxerman, S., Grayson, D., Sledge, J., Dunagan, C., & Evanoff, B. (2005). Understanding the cognitive work of nursing in the acute care environment. *J Nurs Adm*, 35(7-8), 327-335.
- Rabner, B. S. (2012). How to help hospitals achieve their mission through good design. *HERD*, 5(3), 7-11.
- Rogers, E. M. (2002). Diffusion of preventive innovations. *Addict Behav*, 27(6), 989-993.
- Rogers, E. M. (2004). A prospective and retrospective look at the diffusion model. *J Health Commun*, 9 Suppl 1, 13-19. doi: 10.1080/10810730490271449
- Sadatsafavi, H., & Walewski, J. (2013). Corporate Sustainability: The Environmental Design and Human Resource management Interface in Healthcare Settings. *Health Environment, Research & Design*, 6(2), 98-118.
- Sadler, B. L., Berry, L. L., Guenther, R., Hamilton, D. K., Hessler, F. A., Merritt, C., & Parker, D. (2011). Fable hospital 2.0: the business case for building better health care facilities. *Hastings Cent Rep*, 41(1), 13-23.
- Sadler, B. L., DuBose, J., & Zimring, C. (2008). The business case for building better hospitals through evidence-based design. *HERD*, 1(3), 22-39.
- Schutz, S. (2007). Reflection and reflective practice. *Community Pract*, 80(9), 26-29.
- Scott, K. A. (2007). Managing the threat of lost knowledge through technology and teamwork. *Nurs Adm Q*, 31(1), 17-21.
- Shoemaker, L. K., Kazley, A. S., & White, A. (2010). Making the case for evidence-based design in healthcare: a descriptive case study of organizational decision making. *HERD*, 4(1), 56-88.
- Steinemann, S., Berg, B., Skinner, A., DiTulio, A., Anzelon, K., Terada, K., . . . Speck, C. (2011). In situ, multidisciplinary, simulation-based teamwork training improves early trauma care. *J Surg Educ*, 68(6), 472-477. doi: 10.1016/j.jsurg.2011.05.009
- Steinke, C., Webster, L., & Fontaine, M. (2010). Evaluating building performance in healthcare facilities: an organizational perspective. *HERD*, 3(2), 63-83.

- Stephenson, J. (2011). No excuse for 'never events'. *Nurs Times*, 107(8), 2-3.
- Stichler, J. (2012a). Building new evidence for nursing unit designs. *HERD*, 6(1), 3-7.
- Stichler, J. (2012b). Designs for the most vulnerable of patients. *HERD*, 5(4), 60-63.
- Stichler, J. F. (2007a). Enhancing safety with facility design. *J Nurs Adm*, 37(7-8), 319-323.
- Stichler, J. F. (2007b). Leadership roles for nurses in healthcare design. *J Nurs Adm*, 37(12), 527-530.
doi: 10.1097/01.NNA.0000302390.29485.7a
- Stichler, J. F. (2007c). Nurse executive leadership competencies for health facility design. *J Nurs Adm*, 37(3), 109-112. doi: 10.1097/01.NNA.0000262738.08285.74
- Stichler, J. F. (2008). Calculating the cost of a healthcare project. *J Nurs Adm*, 38(2), 53-57. doi:
10.1097/01.NNA.0000310718.61215.c0
- Stichler, J. F. (2009a). Lessons learned from the design experience. *J Nurs Adm*, 39(7-8), 305-309. doi:
10.1097/NNA.0b013e3181ae9525
- Stichler, J. F. (2009b). Wicked problems in designing healthcare facilities. *J Nurs Adm*, 39(10), 405-408.
doi: 10.1097/NNA.0b013e3181b9228f
- Stichler, J. F. (2010a). Predesign and postoccupancy evaluation. *J Nurs Adm*, 40(2), 49-52. doi:
10.1097/NNA.0b013e3181cb97c2
- Stichler, J. F. (2010b). Putting the cart before the horse. *HERD*, 3(3), 7-10.
- Stichler, J. F. (2011). Patient-centered healthcare design. *J Nurs Adm*, 41(12), 503-506. doi:
10.1097/NNA.0b013e3182378a3b
- Stichler, J. F. (2012a). The new standard: single family room design. *J Nurs Adm*, 42(10), 447-450. doi:
10.1097/NNA.0b013e31826a1cd2
- Stichler, J. F. (2012b). Patient-centered care: a healthcare reform imperative and a hospital design opportunity. *HERD*, 5(2), 24-28.
- Stichler, J. F. (2013). Applying different processes for evidence-based design. *HERD*, 7(1), 8-13.
- Stichler, J. F. (2014a). A conceptual model for healthcare facility design. *J Nurs Adm*, 44(6), 321-325.
doi: 10.1097/NNA.0000000000000076

- Stichler, J. F. (2014b). Facility design and healthcare-acquired infections: state of the science. *J Nurs Adm*, 44(3), 129-132. doi: 10.1097/NNA.0000000000000039
- Stichler, J. F. (2014c). Using an EBD Approach for Healthcare Design. *HERD*, 7(2), 5-8.
- Stichler, J. F., & Cesario, S. (2007). Preparing nurses for a leadership role in designing healthcare facilities. *J Nurs Adm*, 37(6), 257-260. doi: 10.1097/01.NNA.0000277726.84821.9b
- Stichler, J. F., & Ecoff, L. (2009). Joint optimization: Merging a new culture with a new physical environment. *J Nurs Adm*, 39(4), 156-159. doi: 10.1097/NNA.0b013e31819c9b95
- Stichler, J. F., & Gregory, D. (2012). Nurse leaders in healthcare design. *J Nurs Adm*, 42(6), 305-308. doi: 10.1097/NNA.0b013e3182573973
- Stichler, J. F., & McCullough, C. (2012). Same-handed patient room configurations: anecdotal and empirical evidence. *J Nurs Adm*, 42(3), 125-130. doi: 10.1097/NNA.0b013e318248073d
- Sutcliffe, K., & Weber, K. (2003). The High Cost of Accurate Knowledge. *Harvard Business Review*(May), 74-82.
- Thompson, D. R., Hamilton, D. K., Cadenhead, C. D., Swoboda, S. M., Schwindel, S. M., Anderson, D. C., . . . Petersen, C. (2012). Guidelines for intensive care unit design. *Crit Care Med*, 40(5), 1586-1600. doi: 10.1097/CCM.0b013e3182413bb2
- Ulrich, R. S., Berry, L. L., Quan, X., & Parish, J. T. (2010). A conceptual framework for the domain of evidence-based design. *HERD*, 4(1), 95-114.
- Umemoto, K. (2002). Managing Existing Knowledge is Not Enough: Knowledge management theory and practice in Japan. In C. Choo & N. Bonitis (Eds.), *Strategic Management of Intellectual Capital & Organizational Knowledge* (pp. 463-476). New York: Oxford University Press.
- Vos, L., Groothuis, S., & van Merode, G. (2007). Evaluating hospital design from an operations perspective. *Health Care Management Science*, 10, 357-364. doi: 10.1007/s10729-007-9034-7
- Watson, D. S. (2010). Patient safety first. Never events in health care. *AORN J*, 91(3), 378-382. doi: 10.1016/j.aorn.2009.12.019

Weberg, D. (2012). Complexity leadership: a healthcare imperative. *Nurs Forum*, 47(4), 268-277. doi:
10.1111/j.1744-6198.2012.00276.x

Weberg, D., & Weberg, K. (2014). Seven behaviors to advance teamwork: findings from a study of
innovation leadership in a simulation center. *Nurs Adm Q*, 38(3), 230-237. doi:
10.1097/NAQ.0000000000000041

Appendix A Conceptual Framework

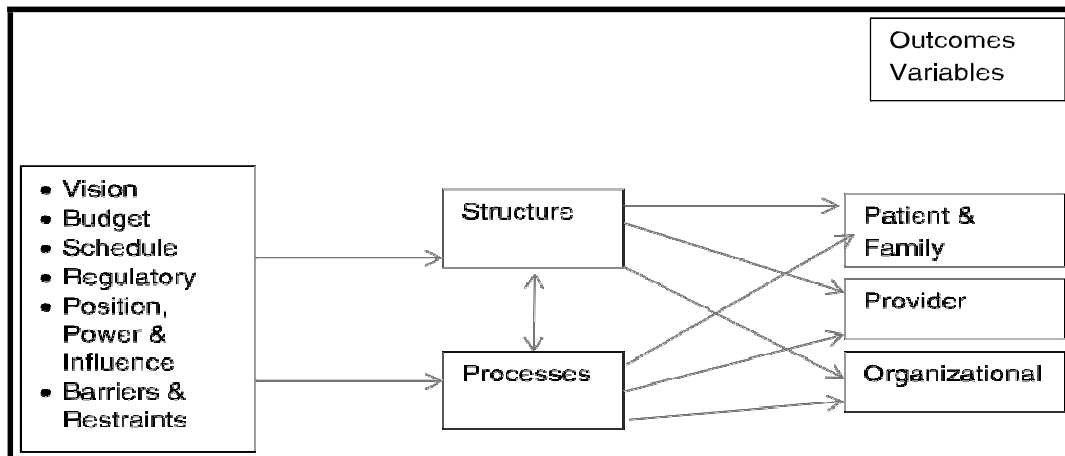


Figure 1 Stichler Healthcare Design Conceptual Framework (based on Donabedian) (Stichler, 2014a)

The model is adapted from Donabedian (1966) as applied to the healthcare design sector (Stichler, 2014a; Ulrich et al., 2010).

The antecedents as noted in this model on the left side of the model, all apply to the needs of this project. The structure process and outcomes as noted in the model fit well within nurse sensitive metrics as well as organizational goals that have been established for the organization. These metrics are tracked on a regularly and will form the basis of the comparison of the old and new facilities.

This model adapts well to training design and implementation based upon the goals and objectives the design phase. This model provides the structure within which to model all future training projects that are based on new or replacement facilities.

Coupling this model with the spiral of knowledge creation will create organizational knowledge that can be utilized for competitive advantage.

Appendix B Spiral of Knowledge Creation

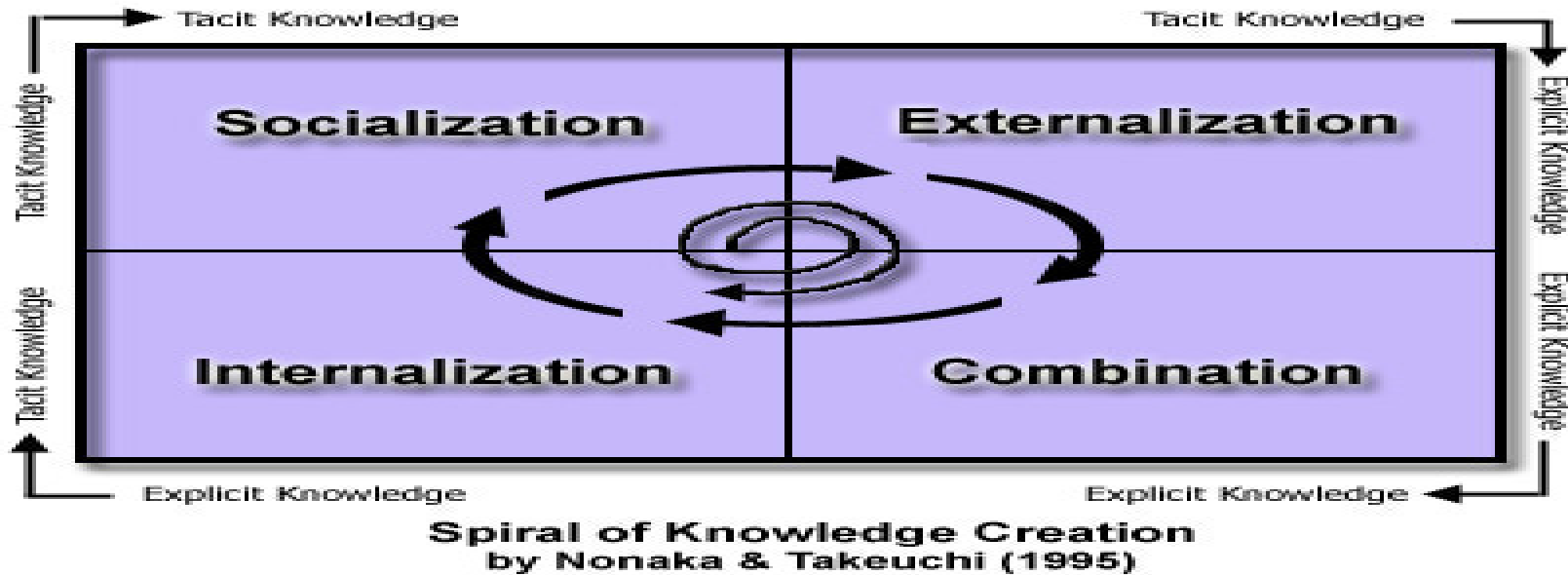


Figure 2 Spiral of Knowledge Creation (Nonaka & Takeuchi, 1995)

This model becomes the process within which the training becomes organizational knowledge and back to being tacit knowledge for use by the trainers. The previous trainings from openings should have been translated from the tacit knowledge of the trainers into explicit knowledge for the organization. Understanding this explicit knowledge could have been further translated into organizational knowledge by trainers for future openings. It would have also clarified some of the ambiguity with the training curriculum development and implementation and standardized the evaluation piece thus beginning to build the competitive advantage of organizational knowledge.

Appendix C Training Team Membership

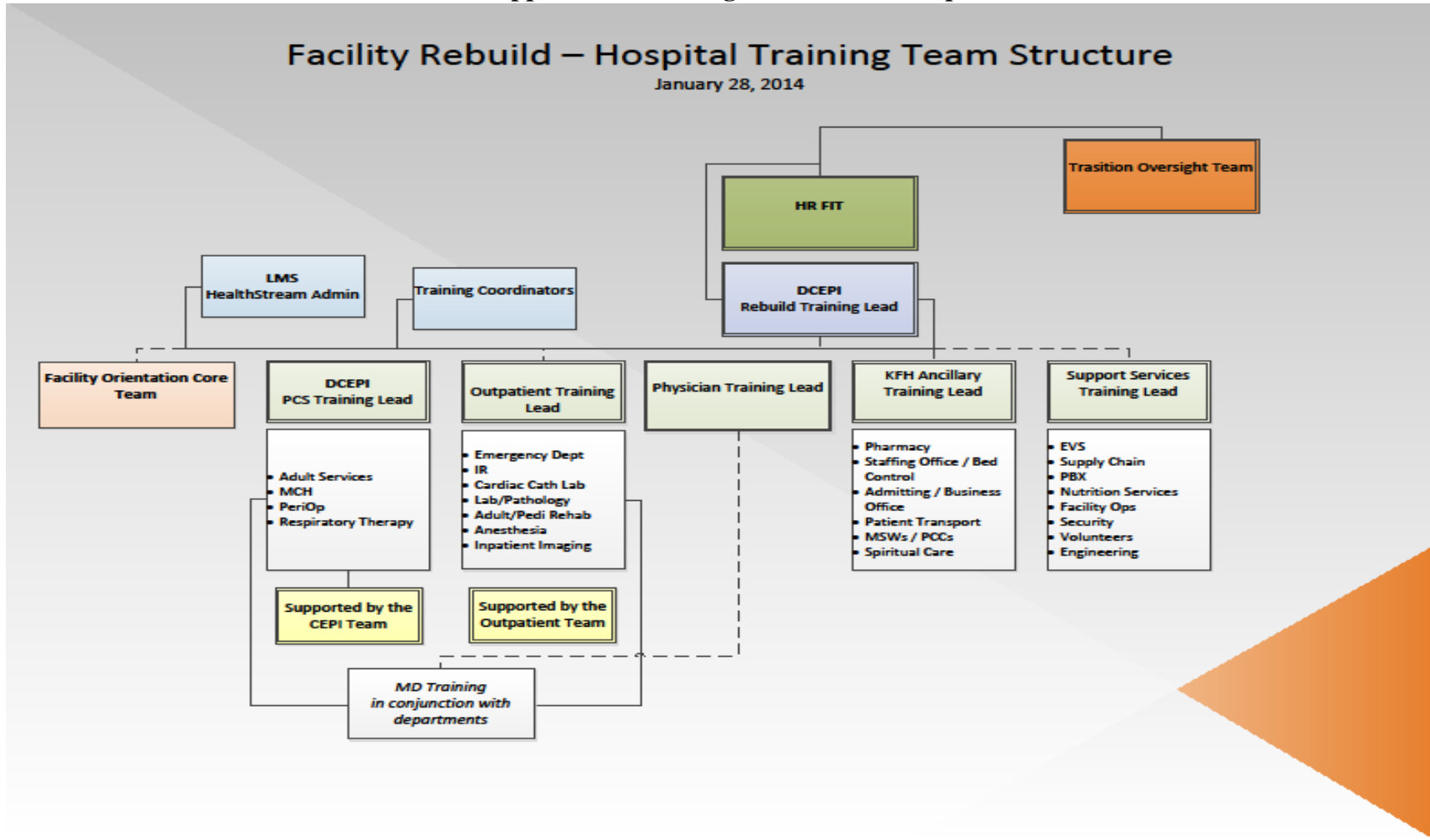


Figure 3 Training Team Membership

Appendix D Service Line Training Plan Development

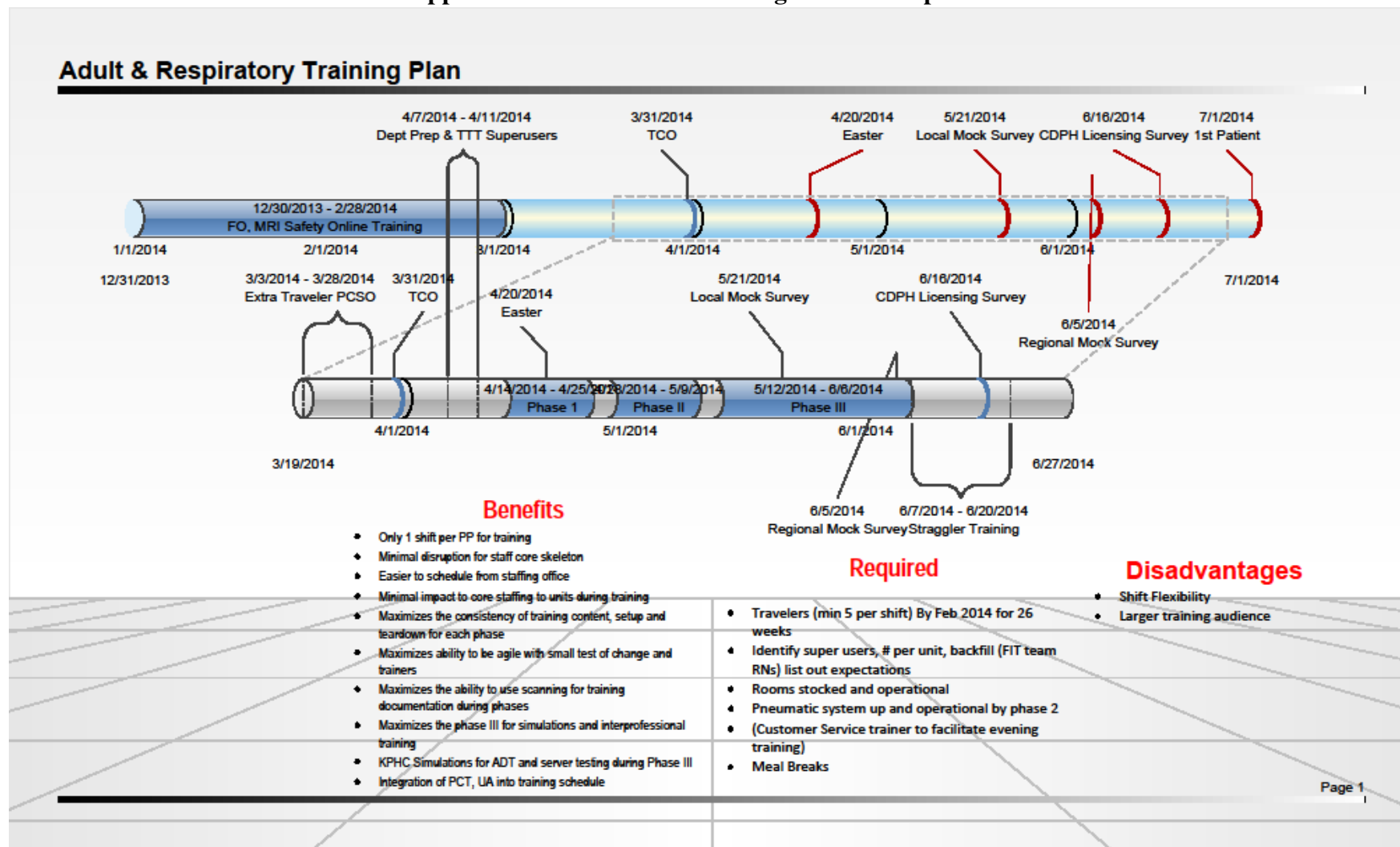


Figure 4 Service Line Training Plan Development

Appendix E Summary Table of Evidence

Study	Method	Sample	Intervention	Outcomes/ Recommendations	Strength of Evidence	Quality of Evidence
Vos, et al (2007)	Case study and simulation	New Dutch Hospital replacement of two hospitals with new ambulatory clinics	Case studies to evaluate flow of the design and test efficiencies; testing the methodology for impact of design on operations	21 st century airport design for flexibility and efficiencies; methodology sound. Training not part of the assessment.	III	B
Hua, et al (2012)	Pre-Post Move Evaluation of teamwork and communications on the nursing units between nurses and other members of the healthcare team.	Adult units in a new hospital in central New Jersey.	Comparisons of metrics on communication, teamwork, organizational metrics with one unit being the control	New design did not significantly improve nurse job satisfaction scores, decreased number of steps walked, no significant effect on organizational or clinical outcomes, can increase feelings of isolation within new design units. Training not part of the assessment.	II	A
Sadatsafavi and Walewski (2013)	Theoretical	None	None	Model Framework	V	C
Reno et al, (2014)	Qualitative, post-occupancy cross-case study design for competencies in facility design involvement	Five organizations from across the country responded to participate	Team interviews with semi-structured interview questions	Concepts from lessons learned: 1) development of guiding principles, 2) stakeholder involvement, 3) Simulations as Mock-up for design development, 4) design development metric formation, and 5) adaptability or future-proofing. Training not part of the assessment.	III	B
Maguire et al, (2013)	Descriptive comparative design	All clinicians with direct patient care in a large pediatric hospital in the southeast US	Surveys with Perceived Stress Scale, Single-Patient Room (SPR) Nursing Survey, and Patient-Family Centered Care (PFCC) Benchmark Survey	Nurses were less stressed while other care providers were more stressed with new design; employees with more than 3 years of experience were more stressed than those with less than 3 years; staff expectations working in SPR were not realized; SPR are very important to patients and families but may increase nursing workloads; perceived stress increased in the new design; how to support employees through a change process that affects every aspect of the work environment	III	B
Sadler et al,	Theoretical	None	None	Model for calculation of costs of improvements to hospital design and the ROI. Does not	V	C

(2011)				include training as part of the calculation.		
Rashid (2013)	Theoretical	None	None	How to evaluate the evidence-based design process with trans disciplinary sources of knowledge.	V	C
Ecoff and Thomason (2009)	Theoretical	None	None	Description of strategies for a successful hospital move and its component elements	V	C
Stichler, (2008)	Theoretical	None	None	Model for calculation of a new hospital construction project. Does not include training as part of the calculation.	V	C
Stichler and Ecoff (2009)	Theoretical	None	None	Description of the components of culture change during a move to a new hospital.	V	C
Stichler (2010)	Theoretical	None	None	Describes the need for a comprehensive pre-design and post-occupancy strategies that align with goals and objectives. Training is not a part of the strategies.	V	C
Guzman, Nering & Salmandra, (2008)	Theoretical	None	None	Describes the operational guide to a transition from one old facility to a new one. Training not part of the assessment.	V	C
Stichler, (2014)	Theoretical	None	None	Conceptual model for health care design process outlining the antecedent, structure, process and outcome variables. Training not a part of the model.	V	C
Jones and Leonard, (2009)	Theoretical	None	None	Theoretical model of knowledge management as part of organizational knowledge creation.	V	C
Irick, (2007)	Theoretical	None	None	Describes the management of tacit knowledge formation and sharing within an organization for competitive advantage.	V	C
Umemoto, (2002)	Theoretical	None	None	Describes the use of knowledge management principles within Japanese business units for creation of organizational knowledge as part of establishing competitive advantage.	V	C
Nonaka, (1991)	Theoretical	None	None	Seminal work that established the principles of knowledge management in the formation of organizational knowledge for competitive advantage.	V	C

Nonaka and Konno, (1998)	Theoretical	None	None	Seminal work in the establishment and description of the concept of knowledge creation from tacit to explicit knowledge with the development of the concept of “Ba”.	V	C
---------------------------------	-------------	------	------	--	---	---

Level I = Experimental study/randomized controlled trial (RCT) or meta-analysis of RCT

Level II = Quasi-experimental study

Level III = Non-experimental study, qualitative study, or meta-synthesis

Level IV = Opinion of nationally recognized Experts based on research evidence or expert consensus panel (systematic review, clinical practice guidelines)

Level V = Opinion of individual expert based on non-research evidence. (Includes case studies; literature review; organizational experience e.g. Quality improvement and financial data; clinical expertise, or personal experience)

A = High Research—consistent results with sufficient sample size

Summative Reviews—well-defined, reproducible search strategies

Organizational—well-defined methods using a rigorous approach

Expert Opinion—Expertise has been clearly evident

B = Good Research—reasonably consistent results, sufficient sample size

Summative Reviews—reasonably thorough and appropriate search

Organizational—well-defined methods

Expert Opinion—expertise has been clearly evident

C = Low Quality or Major Flaws Research—little evidence with inconsistent results, insufficient sample

Summative Reviews—undefined, or poorly defined methods

Organizational—adequate reliability or validity

Expert Opinion—expertise has not been discernable

Newhouse, R., Dearholt, S., Poe, S., Pugh, LC. White, K., *Johns Hopkins Evidence-Based Practice Appraisal.*

Figure 5 Summary Table of Evidence

Appendix F Statement of Determination

Student Project Approval: Statement of Determination

Student Name: Mark D. Beck, BS, MSN, RN-BC__

Title of Project:

An Evidence-Based Approach to a Replacement Hospital Training Curriculum.

Brief Description of Project:

Creation of a training curriculum to meet the regulatory, budgetary and safety requirements from internal and external agencies and the timelines to meet the milestones for the move date.

A) Aim Statement:

Create a training curriculum that meets both internal and external agencies licensing requirements for regulatory, budgetary and safety aspects to meet the move milestone of July 1st, 2014.

B) Description of Intervention:

Clinical Education, Practice and Informatics department will aggregate data on the training requirements for new equipment, workflows and simulations needed to meet the licensing requirements of the internal and external agencies. This curriculum will also meet the organizations budgetary requirements with a variance process. The process will consist of focus groups with all the constituent groups responsible for this aspect of the project.

C) How will this intervention change practice?

Aggregating and normalizing the data required to meet the licensing and organizational budgetary requirements will set the standard for knowledge management for opening a new or replacement hospital. Normalize data will allow for what if scenarios based on the unique specialties and services that each facility will have. This allows for greater standardization in the allocation and efficient use of resources and can serve as a start of the benchmarking process within the industry.

D) Outcome measurements:

A standardized curriculum that will be created that meets the unit specific needs for licensing bodies and to meet the organizational budgetary requirements for opening a new facility. This begins the process of data normalization for a data repository to establish a benchmark for opening a new facility.

To qualify as an Evidence-based Change in Practice Project, rather than a Research Project, the criteria outlined in federal guidelines will be used:

<http://answers.hhs.gov/ohrp/categories/1569>

X This project meets the guidelines for an Evidence-based Change in Practice Project as outlined in the Project Checklist (attached). Student may proceed with implementation.

This project involves research with human subjects and must be submitted for IRB approval before project activity can commence.

Comments:

EVIDENCE-BASED CHANGE OF PRACTICE PROJECT CHECKLIST *

Instructions: Answer YES or NO to each of the following statements:

Project Title:	YES	NO
An Evidence-Based Approach to a Replacement Hospital Training Curriculum		
The aim of the project is to improve the process or delivery of care with established/ accepted standards, or to implement evidence-based change. There is no intention of using the data for research purposes.	X	
The specific aim is to improve performance on a specific service or program and is a part of usual care . ALL participants will receive standard of care.	X	
The project is NOT designed to follow a research design, e.g., hypothesis testing or group comparison, randomization, control groups, prospective comparison groups, cross-sectional, case control). The project does NOT follow a protocol that overrides clinical decision-making.	X	
The project involves implementation of established and tested quality standards and/or systematic monitoring, assessment or evaluation of the organization to ensure that existing quality standards are being met. The project does NOT develop paradigms or untested methods or new untested standards.	X	
The project involves implementation of care practices and interventions that are consensus-based or evidence-based. The project does NOT seek to test an intervention that is beyond current science and experience.	X	
The project is conducted by staff where the project will take place and involves staff who are working at an agency that has an agreement with	X	

USF SONHP.		
The project has NO funding from federal agencies or research-focused organizations and is not receiving funding for implementation research.	X	
The agency or clinical practice unit agrees that this is a project that will be implemented to improve the process or delivery of care, i.e., not a personal research project that is dependent upon the voluntary participation of colleagues, students and/ or patients.	X	
If there is an intent to, or possibility of publishing your work, you and supervising faculty and the agency oversight committee are comfortable with the following statement in your methods section: <i>“This project was undertaken as an Evidence-based change of practice project at X hospital or agency and as such was not formally supervised by the Institutional Review Board.”</i>	X	

ANSWER KEY: If the answer to **ALL** of these items is yes, the project can be considered an Evidence-based activity that does NOT meet the definition of research. **IRB review is not required. Keep a copy of this checklist in your files.** If the answer to ANY of these questions is **NO**, you must submit for IRB approval.

*Adapted with permission of Elizabeth L. Hohmann, MD, Director and Chair, Partners Human Research Committee, Partners Health System, Boston, MA.

STUDENT NAME (Please print): Mark D. Beck, BS, MSN, RN-BC

Signature of Student: _____ **DATE** _____

SUPERVISING FACULTY NAME (Please print): Dr Amy Nichols

Signature of Supervising:
: _____ **DATE** _____

Appendix G Sample Communications with Transition Oversight & Regional Teams

Regional Education and Training Team Report Out

– May 5, 2014

Submitted by DCEPI Local Facility



Accomplishments/Highlights (task completed, decisions made)	Items Requiring Escalation																																																			
<ul style="list-style-type: none"> ▪ DCEPI updates his work plan biweekly and prn ▪ PCS Phase 1 training has a 93% completion ▪ ED Phase 1 has 90% completion for staff and MDs ▪ Rebadging completed for medical center and working ▪ VendorMate process for FLS has been uploaded. ▪ Vendor FLS process established for training in command center. ▪ OR Phase 1 completed Phase 2 begun. To be completed 5/17. ▪ Worked with Finance on recharges for training. 	<ul style="list-style-type: none"> ▪ Comtel/IEM and Cisco phone project manager assigned to P Doran by C Boyer. ▪ No schedule or content for training by EVS, PBX or supply chain. Escalated to M Grace 5/5 for resolution. ▪ Additional admin support for HS back loading and downloading. ▪ Liko lift problems in some rooms with dead batteries. McCarthy notified. 																																																			
New or Ongoing Challenges/Barriers/Risk	Critical Milestones and Activities (30 days)																																																			
<ul style="list-style-type: none"> ▪ Back loading of in-person courses into KP Learn since hiatus [complete 5/2/14]. KP Learn has reporting issues that are being resolved. ▪ Not enough admin support for the downloading and verification for HS scanning. Slowing up reporting and rescheduling of staff. 	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #f2f2f2;">Deliverable</th> <th style="background-color: #f2f2f2;">Due Date</th> <th style="background-color: #f2f2f2;">% Complete</th> <th style="background-color: #f2f2f2;">Status</th> </tr> </thead> <tbody> <tr> <td>End-user training has begun Phase 1 completed</td> <td>4/14</td> <td>95%</td> <td style="text-align: center;">●●●●●</td> </tr> <tr> <td>All curriculum for all courses to be submitted for entry into HealthStream</td> <td>5/2</td> <td>95%</td> <td style="text-align: center;">●●●●●</td> </tr> <tr> <td>Online FO, MRI Safety and Cisco Phone training launched</td> <td>12/23/13</td> <td>86%</td> <td style="text-align: center;">●●●●●</td> </tr> <tr> <td>PCS End User training starts 4/14</td> <td>6/6</td> <td>50%</td> <td style="text-align: center;">●●●●●</td> </tr> <tr> <td>Ancillary, TPMG and Support Svcs training has started</td> <td>4/28</td> <td>35%</td> <td style="text-align: center;">●●●●●</td> </tr> <tr> <td>GETWELL/IEM superuser training</td> <td>4/14</td> <td>100%</td> <td style="text-align: center;">●●●●●</td> </tr> <tr> <td>Phase 2 PCS training begun</td> <td>4/28</td> <td></td> <td style="text-align: center;">●●●●●</td> </tr> <tr> <td>Physician training has begun</td> <td>4/9</td> <td></td> <td style="text-align: center;">●●●●●</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>				Deliverable	Due Date	% Complete	Status	End-user training has begun Phase 1 completed	4/14	95%	●●●●●	All curriculum for all courses to be submitted for entry into HealthStream	5/2	95%	●●●●●	Online FO, MRI Safety and Cisco Phone training launched	12/23/13	86%	●●●●●	PCS End User training starts 4/14	6/6	50%	●●●●●	Ancillary, TPMG and Support Svcs training has started	4/28	35%	●●●●●	GETWELL/IEM superuser training	4/14	100%	●●●●●	Phase 2 PCS training begun	4/28		●●●●●	Physician training has begun	4/9		●●●●●												
Deliverable	Due Date	% Complete	Status																																																	
End-user training has begun Phase 1 completed	4/14	95%	●●●●●																																																	
All curriculum for all courses to be submitted for entry into HealthStream	5/2	95%	●●●●●																																																	
Online FO, MRI Safety and Cisco Phone training launched	12/23/13	86%	●●●●●																																																	
PCS End User training starts 4/14	6/6	50%	●●●●●																																																	
Ancillary, TPMG and Support Svcs training has started	4/28	35%	●●●●●																																																	
GETWELL/IEM superuser training	4/14	100%	●●●●●																																																	
Phase 2 PCS training begun	4/28		●●●●●																																																	
Physician training has begun	4/9		●●●●●																																																	
Watch List Items	<div style="display: flex; justify-content: space-between; font-size: small;"> ● On schedule or completed ● Cautionary: monitoring ● Delayed with major roadblocks </div>																																																			
Updates on Last Month Challenges/Barriers/Risks & Watch List Items	<p>Training rooms readied for training by IT and facilities. EVS support arranged to accommodate training needs.</p>																																																			

Figure 6 Sample Communication for Regional and Local Oversight Groups

Appendix H Baseline Data for Comparison of Old and New Facilities*

Table 1*	HCAHPS RN	Surgical	HAP Rate	Workplace	% Left ED	30-Day	Patient Day	PDR Under
HCAHPS	Communication	Safety		Safety	within 60	Readmission	Rate [PDR]	65
[9-10]				Accepted	min	Rate	Over 65	
				Claims				
Target	Various	0	<=5.3	<=3.3	=>70%	<=8.0	Various	Various

- **Metrics from the August report with lag time from June and July 2014. Regional metrics taken from the organizational scorecard.*

Figure 7 Baseline Metrics for Comparison between Old and New Facilities

Various

Region	73.2	75.6	11	6.0	5.2	72%	9.6	696	163
Local	59.9	68.1	0	7.3	6.3	73	9.4	707	155

Appendix I Facility Training Curriculum Development Timeline

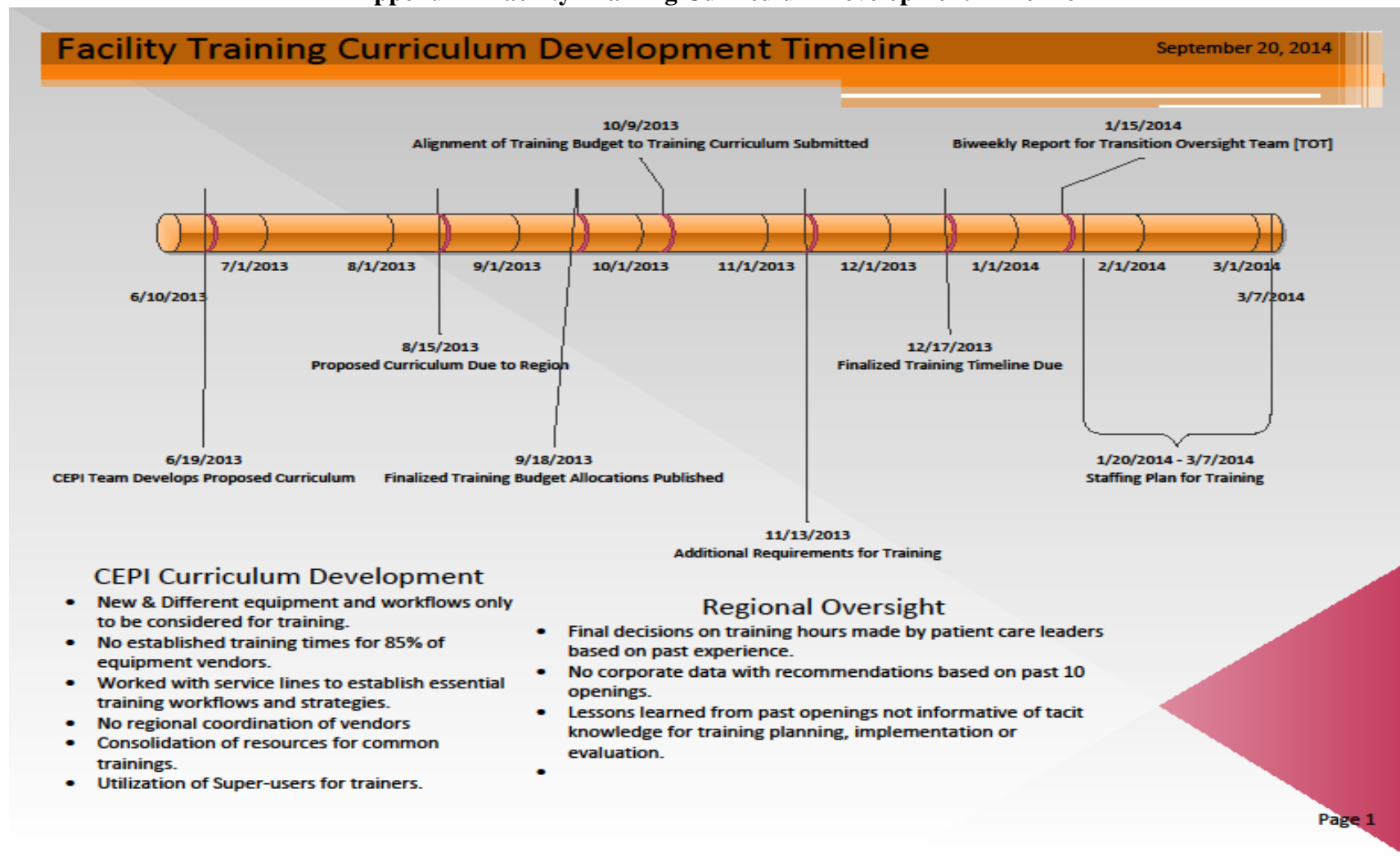
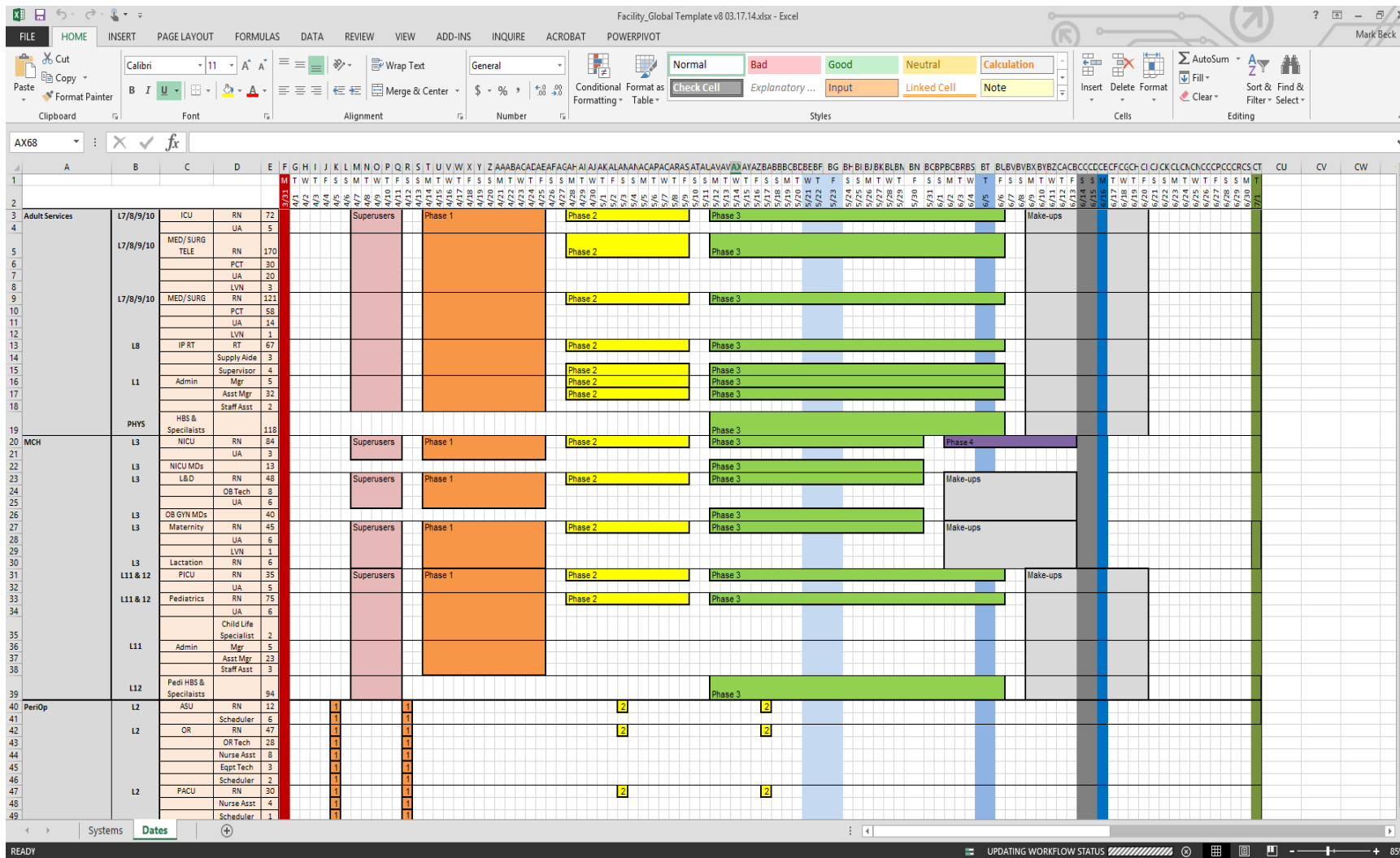


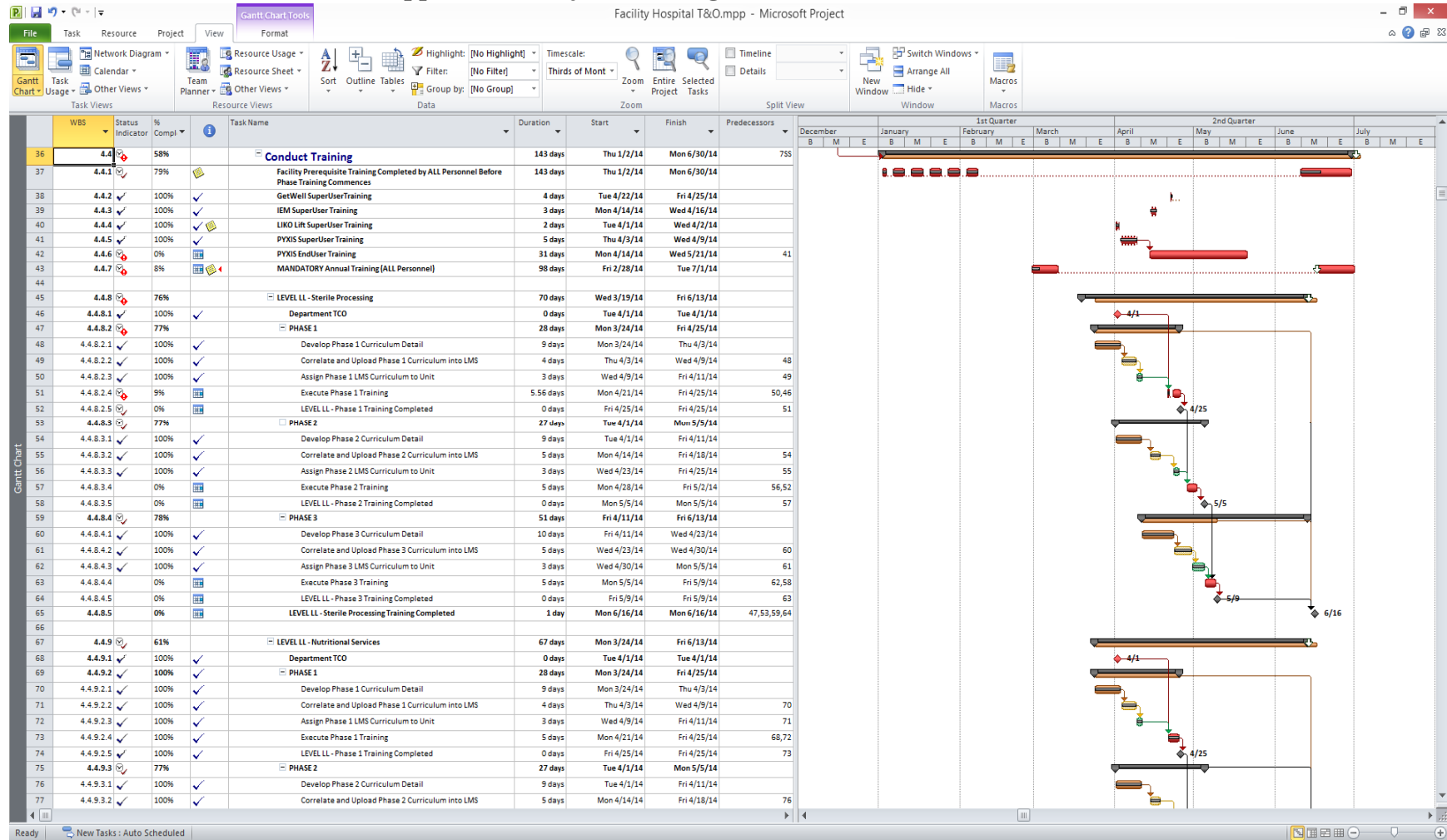
Figure 8 Facility Training Curriculum Development Timeline

Appendix J Phased Training by Service Line/Departments

Figure 9 Phased Training by Service Line/Departments



Appendix K Project Training Work Breakdown Structures*



- *Work Breakdown Structure (WBS) for one segment of training. The MS Project goes on for 18 pages with WBS for every department.

Figure 10 Work Breakdown Structure WBS Sample Dept.

Appendix L Strengths, Weaknesses, Opportunities and Threats (SWOT)

<p>Strengths</p> <ul style="list-style-type: none"> • Explicit data on hospital opening training budgets within the last 5 years • Have software licenses to build a knowledge management system without capital investment. • Excellent working relationship with staffing office for scheduling • Project management support with local oversight 	<p>Weaknesses</p> <ul style="list-style-type: none"> • No standardized way to estimate current training requirements • Training requirements left to facilities for proposal and then vetted with senior leadership with best guess of past practices • No normalization of data across multiple datasets that are utilized for decision-making • No formal knowledge management strategy • Equipment decisions with equipment manager and dept. manager not captured for training plan • No tacit knowledge from previous openings — lessons learned library • Rework of the same data set by different constituencies with varying reliability and validity results • No standardized training cost per employee • No ability to do “what if” analysis for efficiency or cost
<p>Opportunities</p> <ul style="list-style-type: none"> • Create benchmark for forecasting training budgets, plans and implementation strategies for future applications • Ability to create “what if” scenarios from normalized data 	<p>Threats</p> <ul style="list-style-type: none"> • Competition facing the same issues with rebuilding infrastructure • Competition not as heavily unionized making agile decision-making easier • Competitive advantage lost from not being responsive to the marketplace in a timely manner or behind the curve.

Appendix M Phased Training Sample

PCS PHASE ONE - DAY ONE COMMON - April 14 - 25 _{as of 3-31-14}													NICU	Unit Assistant	Respiratory Therapy											
7:30 - 8:00	Agenda, Expectations, Assignments, Scan In						7:30 - 8:00	Agenda, Expectations, Assignments, Scan In						7:30 - 8:00	Agenda, Expectations, Assignments, Scan In						Agenda, Expectations, Assignments, Scan In- NICU with MCH, RT with Adults, UA's with either MCH or Adult					
8:00 - 9:00	Care Experience - Adult Services (1/2) - LL Conference Room A						8:00 - 9:00	Care Experience - Adult Services (1/2) - LL Conference Room B						8:00 - 9:00	Care Experience - MCH- LL Conference Room C						Care Experience - NICU with MCH, RT with Adults, UA's with either MCH or Adult					
9:00 - 9:05	Transition						9:00 - 9:05	Transition						9:00 - 9:05	Transition						Transition					
9:05 - 9:35	Department Orientation (Classroom Portion) Adult Services - SMOB LL Conference Room A												9:05 - 9:35	Department Orientation (Classroom Portion) MCH - SMOB LL Conference Room C						Department Orientation (Classroom Portion) - NICU with MCH, RT with Adults, UA's with either MCH or Adult						
9:35 - 9:50	Break						9:35 - 9:50	Break						9:35 - 9:50	Break						Break					
9:50 - 10:00	Transition						9:50 - 10:00	Transition						9:50 - 10:00	Transition						Transition					
10:00 - 11:00	Department Orientation (Continued on the Unit) - Department Tour, Life Safety, Basic Scavenger Hunt, etc.						10:00 - 11:00	Department Orientation (Continued on the Unit) - Department Tour, Life Safety, Basic Scavenger Hunt, etc.						10:00 - 11:00	Department Orientation (Continued on the Unit) - Department Tour, Life Safety, Basic Scavenger Hunt, etc.						Department Orientation (Continued on the Unit) - NICU with MCH, RT with Adults, UA's with either MCH or Adult					
11:00 - 11:05	Transition						11:00 - 11:10	Transition						11:00 - 11:10	Transition						Transition					
11:05 - 12:05	Facility Tour			Facility Tour			11:10 - 11:40	Nurse Call-Comtel Responder 5	Nurse Call-Comtel Responder 5	Nurse Call-Comtel Responder 5	Nurse Call-Comtel Responder 5	Nurse Call-Comtel Responder 5	Nurse Call-Comtel Responder 5	11:10 - 12:40	Liko Lift-Ceiling Lift Demo and Return Demo	Liko Lift-Ceiling Lift Demo and Return Demo	Liko Lift-Ceiling Lift Demo and Return Demo	Liko Lift-Ceiling Lift Demo and Return Demo	Liko Lift-Ceiling Lift Demo and Return Demo	Liko Lift-Ceiling Lift Demo and Return Demo	NICU Equipment	Unit Workflow, Arm Banding - Annual Blood Management	TBD			
							11:40 - 12:00	P Tube	P Tube	P Tube	P Tube	P Tube	P Tube		NICU Basic Workflows											
12:05 - 12:50	Lunch						12:00 - 12:20	Cisco portable phones	Cisco portable phones	Cisco portable phones	Cisco portable phones	Cisco portable phones	Cisco portable phones	Lunch						Lunch						
12:50 - 12:55	Transition						12:20 - 1:05	Lunch						12:40 - 1:25	Lunch						Lunch					
12:55 - 2:25	Liko Lift-Ceiling Lift Demo and Return Demo	Liko Lift-Ceiling Lift Demo and Return Demo	Liko Lift-Ceiling Lift Demo and Return Demo	Liko Lift-Ceiling Lift Demo and Return Demo	Liko Lift-Ceiling Lift Demo and Return Demo	Liko Lift-Ceiling Lift Demo and Return Demo	1:05 - 1:15	Transition						1:25 - 1:35	Transition						Transition					
							1:15 - 2:15	Facility Tour			Facility Tour			1:35 - 2:05	Nurse Call-Comtel Responder 5	Nurse Call-Comtel Responder 5	Nurse Call-Comtel Responder 5	Nurse Call-Comtel Responder 5	Nurse Call-Comtel Responder 5	Nurse Call-Comtel Responder 5	Based on numbers of staff, they will be added into sessions for Nurse Call-P,Tube, and Cisco Portable Phones, and Facility Tour					
2:25 - 2:40	Break						2:15 - 2:30	Break						2:25 - 2:45	Cisco portable phones	Cisco portable phones	Cisco portable phones	Cisco portable phones	Cisco portable phones	Cisco portable phones		Based on numbers of staff, they will be added into sessions for Nurse Call-P,Tube, and Cisco Portable Phones, and Facility Tour				
2:40 - 2:50	Transition						2:45 - 3:00	Break						2:45 - 3:00	Break											
2:50 - 3:20	Nurse Call-Comtel Responder 5	Nurse Call-Comtel Responder 5	Nurse Call-Comtel Responder 5	Nurse Call-Comtel Responder 5	Nurse Call-Comtel Responder 5	Nurse Call-Comtel Responder 5	2:30 - 4:00	Liko Lift-Ceiling Lift Demo and Return Demo	Liko Lift-Ceiling Lift Demo and Return Demo	Liko Lift-Ceiling Lift Demo and Return Demo	Liko Lift-Ceiling Lift Demo and Return Demo	Liko Lift-Ceiling Lift Demo and Return Demo	Liko Lift-Ceiling Lift Demo and Return Demo	3:00 - 4:00	Facility Tour			Facility Tour								
3:20 - 3:40	P Tube	P Tube	P Tube	P Tube	P Tube	P Tube																				
3:40 - 4:00	Cisco portable phones	Cisco portable phones	Cisco portable phones	Cisco portable phones	Cisco portable phones	Cisco portable phones																				
KEY:	Department Orientation - Classroom Sessions will be two large group sessions. One will be all Adult Services: MedSurg-TeleCritical Care-Recuperation Skills-Wound Care-PICC Nurses-and Adult House Supervisors. One session will be Pedi/PICU, NICU, Maternity and Maternal Child Health, Labor and Delivery, and Pediatric House Supervisors. Unit Assistants and Patient Care Technicians will attend with their respective units.																									
	Department Orientation - Will be conducted on respective units. Adult Services locations TBD.																									
	NICU, Unit Assistants and Respiratory Therapy staff numbers are included in 108 total for the day. Based on number who attend, they will attend regular modules except for Liko Lift.																									
NOTE:	Recuperative Skills, PICC and Wound Nurses will attend Phase 1 on April 16th and April 18th (5 each day). On the day Wound Nurses attend (probably April 16) we will need Tino or a SuperUser to train on Beds and Stryker Gurneys instead of P-Tubes and CISCO Portable Phones.																									

Figure 11 Sample of Phased Training Curriculum

Appendix N Budgeted versus Scheduled Training Hours

Area [KFH]	# Personnel	Training Hours Budgeted	Facility Prerequisites / Pre-Work	Phase I (Common)	PH II	PH III	PH IV/In-Svcs	Total Hours	Unit Total Budgeted Hours	Unit Total Scheduled Hours	Budgeted vs. Scheduled
Admit/Staff/Business Ofc	26	10.75	2.0	3.5				5.5	279.5	143	51.16%
ASU	18	22.75	3.3	8.0	8.0	8.0		27.3	409.5	490.5	119.78%
Bed Control & House Sup	19	22.75	2.0	8.0	7.5	8.0		25.5	432.25	483.55	111.87%
BioMed/Clin Tech	12	10.75	2.0	7.0				9.0	129	108	83.72%
EVS	197	10.75	2.3	7.5				9.8	2117.75	1920.75	90.70%
Facility Ops	34	10.75	2.3	3.5				5.8	365.5	195.5	53.49%
Hosp Administration	63	10.75	2.0	3.5				5.5	677.25	346.5	51.16%
Inpatient Equipment	12	10.75	2.0	8.0				10.0	129	120	93.02%
L&D	62	22.75	3.5	8.0	8.0	8.0		27.5	1410.5	1705	120.88%
Landscape	6	10.75	2.0	3.0				5.0	64.5	30	46.51%
Supply Chain	48	10.75	2.3	10.0				12.3	516	588	113.95%
Maternity	58	22.75	3.3	8.0	8.0	8.0		27.3	1319.5	1580.5	119.78%
MedSurg Tele-CCU	607	22.75	3.0	8.0	8.0	8.0		27.0	13809.25	16389	118.68%
NICU	87	32	3.8	8.0	8.0	8.0	8.0	35.8	2784	3110.25	111.72%
Nursing Administration	15	10.75	2.0	5.0				7.0	161.25	105	65.12%
Nutritional Services	52	120	2.3	41.5	27.0	36.5	1.5	108.8	6240	5655	90.63%
OR	88	40	3.0	8.0	8.5		23.0	42.5	3520	3740	106.25%
PACU	35	22.75	3.3	8.0	8.0	8.0		27.3	796.25	953.75	119.78%
PBX	17	10.75	2.3	9.5				11.8	182.75	199.75	109.30%
PEDI-PICU	154	32	3.5	8.0	8.0	8.0		27.5	4928	4235	85.94%
IP Rx	79	10.75	3.0	7.5				10.5	849.25	829.5	97.67%
PT. Transport	18	10.75	2.3	6.5				8.8	193.5	157.5	81.40%
Recuperative Skills	12	22.75	2.0	8.0	6.5			16.5	273	198	72.53%
Respiratory Therapy	78	22.75	2.0	8.0				22.8	1774.5	1287	72.53%
Security	67	10.75	2.0	3.5				5.5	720.25	368.5	51.16%
Social Work & PCCs	82	10.75	2.0	6.5				8.5	881.5	697	79.07%

SPD	43	22.75	2.0	8.0	8.0			18.0	978.25	774	79.12%
Volunteer Services	67	10.75	2.0	5.0				7.0	720.25	469	65.12%
		Total Phase Hours	69.0	227.0	113.5	100.5	32.5	555.2	46662.25	46879.55	100.47%
Total Personnel	2056										

Area [TPMG]	# Personnel	TrainingHoursBudgeted	Facility Prerequisites /Pre-Work	Phase I(Comm on)	PH II	PH III	PH IV/In-Svcs	TotalHours	Unit TotalBudgeted Hours	Unit TotalScheduled Hours	Budgeted vs.Scheduled
Adult HBS Specialists	118	16	2.0	4.5	2.5			9.0	1888	1062	56.25%
Anesthesia	85	16	2.3	5.0	2.5			9.8	1360	828.75	60.94%
ED	281	16	2.3	9.0	8.0	8.0		27.3	4496	7657.25	170.31%
GME	114	16	2.0	2.5				4.5	1824	513	28.13%
IR, Cath Lab	29	60	2.8	96.5	10.3	19.5	2.0	131.0	1740	3799	218.33%
IP Lab	118	25	2.5	4.5	104.5	30.5		142.0	2950	16756	568.00%
Pathology	26	10.75	2.0	5.5				7.5	279.5	195	69.77%
PEDI HBS Specialist/NICU	107	22.75	2.5	5.0	4.0			11.5	2434.25	1230.5	50.55%
RAD MDs	22	10.75	2.0	3.0				5.0	236.5	110	46.51%
Radiology All	105	10.75	2.0	7.5				9.5	1128.75	997.5	88.37%
Surgical MDs	78	22.75	2.0	7.0				9.0	1774.5	702	39.56%
TPMG Phy Therapist	21	10.75	2.0	9.5				11.5	225.75	241.5	106.98%
		Total Phase Hours	24.3	150.0	131.8	58.0	2.0	366.0	20111.5	33851	168.32%
Total Personnel	1104										

Figure 12 Budgeted versus Scheduled Training Hours

Appendix O Cost-Benefit Analysis Knowledge Management System

Category	Description	Value			
		Year 1	Year 2	Year 3	3yr Average
	KMS Design, Development & Implementation	\$ 500,000.00	\$ 150,000.00	\$ 75,000.00	\$ 241,666.67
	KMS Personnel Salary & Benefits (internal)	\$ 300,000.00	\$ 457,500.00	\$ 541,650.00	\$ 433,050.00
Annual Investment in	KMS Out-Sourced Salary & Benefits	\$ 850,000.00	\$ 410,125.00	\$ -	\$ 420,041.67
KMS Content Delivery	KMS Training & Administration (recurring)	\$ 25,000.00	\$ 26,500.00	\$ 26,500.00	\$ 26,000.00
	KMS Evaluation (Future Project)		\$ 25,000.00	\$ 30,000.00	\$ 27,500.00
	KMS Annual Costs	\$ 1,675,000.00	\$ 1,069,125.00	\$ 673,150.00	\$ 1,139,091.67
Annual Investment in	KMS User Constituency [NCAL Region]	11400	9490	8640	9843
Employees	Cost per User for KMS Delivery	\$ 146.93	\$ 112.66	\$ 77.91	\$ 112.50
	Average User Salary & Benefits (per person)	\$ 95,000.00	\$ 96,425.00	\$ 97,871.38	\$ 96,432.13
	Total Hours Saved per Week (attributable to KMS usage) NOTE: Lower bound, minimal estimate based on expected survey results.	6840	9490	12960	9763
	Annual Value of KMS Time Savings	\$ 16,243,905.60	\$22,537,231.60	\$30,777,926.40	\$ 23,186,354.53
	Total Employee Population (appx) [NCAL Region]	76000	73000	72000	73667
Estimated KMS Impact Results	Proposed Survey Population (15%) NOTE: Based on current management-level positions.	11400	9490	8640	9843
	Anticipated Response (50%)	5700	4745	4320	4922
	Penetration Rate/Sample Group (80%)	4560	3796	3456	3937
	Annual Cost of KMS Delivery to Sample	\$ 837,500.00	\$ 534,562.50	\$ 336,575.00	\$ 569,545.83
	ROI (based on time savings metric)	870%	2008%	4472%	2450%

Figure 13 Knowledge Management System [KMS] Budget and ROI

Appendix O: Assumptions for the ROI

- Based upon start up with outside KMS consultants [5 @ \$100k and 5@ \$75k] 50% reduction in Year 2 and eliminated in Year 3. Increase in familiarity.
- Survey to assess time savings as reported by constituent population. Year 1 is assumed to have 3.5 hours saved per week. Year 2 average familiarity.
- Due to market forces total EE population has been right sized for operational need in years 2-3.

- Increases in salary for year 2 2.5% and year 3 1.5%
- Training costs remain steady as the systems are upgrade
- KMS will be primarily for the managers throughout the organization and these calculations are based on these assumptions not just the training cohort. The same resources to startup the KMS for the training would be the same for throughout the organization.
- The assumptions include training not just for the training replacement curriculum but from an organizational perspective for all training impact.
- This training will meet the required licensure for opening and accreditation.
- The KMS will be able to be utilized beyond the opening of the three facilities for creation of the training repository for future facilities.