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Stacey Morgan Schlafly Date

AN ASSESSMENT OF PEDIATRIC INPATIENT QUALITY AND SAFETY AT MONROE CARELL JR. CHILDREN'S HOSPITAL AT VANDERBILT UTILIZING THE LEAPFROG HOSPITAL SURVEY

BY

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M.P.H., Emory University, 2013
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Abstract

AN ASSESSMENT OF
PEDIATRIC INPATIENT QUALITY AND SAFETY AT
MONROE CARELL JR. CHILDREN'S HOSPITAL AT VANDERBILT
UTILIZING THE LEAPFROG HOSPITAL SURVEY

BY
Stacey Morgan Schlafly

Background: Recent research found that as many as 400,000 adult and pediatric Americans prematurely die each year as a result of preventable medical errors in hospitals. Efforts to improve inpatient quality and patient safety are critical to address this issue. The Leapfrog Hospital Survey is one such nationally recognized standard that encourages hospitals to evaluate and report their progress towards implementing evidence-based safety practices shown to save patient lives.
Purpose: The purpose of this study was to determine compliance with national performance measures of quality and safety, including prevention of medication errors, appropriate ICU physician staffing, evidence-based steps to avoid harm, managing serious errors and safety-focused scheduling. This assessment would allow for the identification of gaps to initiate targeted remediation, as well the identification of strengths in order to reinforce successes.
Methods: A mix-method approach was used to assess processes, policies, and outcomes. Standardized interviews were conducted with identified hospital personnel. Information was compiled into a uniform tracking tool and analyzed against Leapfrog survey questions. Infection data was collected from the organization's reporting system and analyzed in accordance with Leapfrog's methodology. Utilizing Leapfrog's scoring algorithm, the anticipated publicly reported outcome for each key measure was computed. Results were submitted to Leapfrog and benchmarked against 2012 Leapfrog Top Hospitals.
Results: Children's Hospital fully meets Leapfrog's standards for the computerized physician order entry (CPOE), ICU physician staffing (IPS), National Quality Forum (NQF) Safe Practices, Managing Serious Errors – Never Events Policy, and Safety Focused-Scheduling sections. The hospital achieved substantial progress for the Managing Serious Errors – Central Line Associated Blood Stream Infection (CLABSI) section and some progress for the Managing Serious Errors – Catheter Associated Urinary Tract Infection (CAUTI) section. The national comparison showed that Children's Hospital is comparable to 2012 Leapfrog Top Hospitals.
Conclusions: Children's Hospital has successfully implemented the majority of Leapfrog's best practices. Implementation of these standards demonstrates that the organization has adopted clinical care processes to reduce pediatric inpatient preventable harm. Improvement in CLABSI and CAUTI rates will further improve patient outcomes. Finally, the national comparison shows that Children's Hospital has a high likelihood of making the 2013 Top Hospital list.

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TABLE OF CONTENTS

List of Tables

List of Figures

CHAPTER 1: INTRODUCTION

Background

In its 1999 *To Err is Human: Building a Safer Health System* report, the Institute of Medicine (IOM) noted that up to 98,000 Americans die each year from preventable medical errors in the hospital setting (Kohn, Corrigan, & Donaldson, 1999). Preventable medical errors, or adverse events, refer to injuries caused by medical management as opposed to an underlying disease or condition (Bielaszka-DuVernay, 2011). More recent research conducted by John T. James (2013) found that, in fact, between 210,000 and 400,000 adult and pediatric Americans prematurely die each year as a result of preventable medical errors in hospitals. Among the Medicare population, approximately one in seven beneficiaries is harmed during care, which equates to a cost of $4.4 billion annually (Bielaszka-DuVernay, 2011). Furthermore, only 54.9% of adults in the United States receive appropriate, or recommended, care (McGlynn, Asch, Adams, Keesey, Hicks, DeCristofao, & Kerr, 2003). While fewer related studies have been completed among pediatric patients, one such study found that approximately 1.86-2.96 errors occur per 100 pediatric discharges (Lacey, Smith, & Cox, 2008; Sharek & Classen, 2006). Such adverse events and inappropriate care can stem from staffing issues, handoffs between care levels, balancing the use of technology and production pressures, among other things (James, 2013). Among pediatric patients, development, dependency, different epidemiology, and demographics are key drivers for inpatient medical errors. Efforts to improve inpatient quality and patient safety are critical to address this issue and decrease injury, morbidity and mortality rates. There are multiple approaches to achieving improved outcomes but ultimately, a multi-tiered approach is needed.

One such approach for improving patient outcomes is implementation of the best practices outlined in The Leapfrog Group's Hospital Survey. The Leapfrog Group is a national non-profit organization that strives to address the ongoing issue of preventable medical errors in hospital settings. It was officially founded in November 2000 by a group of large employers and benefit purchasers with the intention to drive healthcare quality, safety and affordability using purchasing power (The Leapfrog Group, 2013a). Currently, the group consists of public and private purchasers that provide healthcare benefits to more than 37 million Americans in all 50 states (The Leapfrog Group, 2013e). Building on the idea that transparency of hospital performance is essential to improved inpatient healthcare outcomes, the national non-profit organization launched the Leapfrog Hospital Survey in 2001 (The Leapfrog Group, 2013b; The Leapfrog Group, 2013e). This survey encourages individual hospitals to report their progress towards implementing evidence-based safety practices shown to have the potential to save patient lives. These reported results are made publicly available on The Leapfrog Group's website and shown in comparison to other hospitals participating in the survey. The pediatric applicable portions of the survey focus on computerized physician order entry (CPOE), intensive care unit (ICU) physician staffing (IPS), the National Quality Forum (NQF) Safe Practices, Never Events, central-line associated blood stream infections (CLABSIs), catheter-associated urinary tract infections (CAUTIs) and effective operating room scheduling (The Leapfrog Group, 2013e).

Across the country, there are approximately 220 children's hospitals and more than 40 of those completed the 2012 Leapfrog Hospital Survey (Gaul, 2011; Leapfrog, 2013c). One such hospital is the Monroe Carell Jr. Children's Hospital at Vanderbilt (Children's Hospital). While the Children's Hospital has been focused on improving quality and patient safety since it was

established in 1968, the work was only formalized with the establishment of the Performance Management & Improvement (PM&I) program in 2003 (Monroe Carell Jr. Children's Hospital at Vanderbilt, 2012b). The mission of this program is to support Children's Hospital "in becoming a premier institution through the advancement of a culture built on quality, patient safety, and clinical efficiency and effectiveness" by "engaging multiple stakeholders and using data to evaluate issues and initiatives at the system level to facilitate improvement in processes and outcomes" (Performance Management & Improvement, 2013). The key functions of PM&I include ensuring that best practices are implemented within the Children's Hospital as well as establishing benchmarks against other children's hospitals in order to drive improvement. The Leapfrog Hospital Survey is an assessment tool that can be used to accomplish both of these functions and as such, this thesis project was conducted through the PM&I department.

Problem Statement

Despite the fact that the United States (U.S.) spends more on healthcare per capita than any other country, there continues to be a gap in the quality and safety of care provided (Bielaszka-DuVernay, 2011; The Henry J. Kaiser Family Foundation, 2011). There are several organizations leading the charge to close this gap, including the Agency for Healthcare Research and Quality (AHRQ), Institute of Medicine (IOM), National Association for Healthcare Quality (NAHQ), Centers for Disease Control and Prevention (CDC), and National Quality Forum (NQF). More specific to the pediatric population are the Children's Hospital Association (CHA) and National Surgical Quality Improvement Program (NSQIP) Pediatric. Each of these organizations encourage benchmarking in some way in order to drive improvement. The public reporting of healthcare performance and thus, the availability of benchmarks, has grown significantly in the past few years. The overall purpose of public reporting and benchmarking is

to inform the public and benefit purchasers about choices in hospital care, as well as accelerate improvements in care (Lindenauer, Remus, Roman, Rothberg, Benjamin, Ma, & Bratzler, 2007).

This growing practice of publicly reporting benchmark data has highlighted the fact that inpatient quality and safety performance varies across hospitals throughout the country. Information available through public reporting venues like U.S. News & World Report, Consumer Reports' Hospital Safety Ratings and Healthgrades' America's Best Hospitals demonstrate these variations. Furthermore, overall progress made as a nation has been frustratingly slow (James, 2013). Yet there are clearly defined best practices, including the implementation of the NQF Safe Practices and a CPOE system, which significantly reduce medication errors (Sharek & Classen, 2006). As a nation, the U.S. must ensure that these best practices are implemented in all hospitals in order to reduce disparity of care and ensure that all patients receive appropriate care.

At a pediatric level, these same variations in inpatient quality and patient safety performance hold true. At Children's Hospital, the Leapfrog Hospital Survey is a primary way that the organization determines if it has implemented nationally recommended processes to ensure safe care and drive improved patient outcomes, including reductions in preventable morbidities and mortalities. As such, Children's Hospital undertook the 2013 Leapfrog Hospital Survey in order to identify strengths and opportunities for improvement in regards to the latest evidence-based best practices. Identification of opportunities for improvement drives recommendations for process changes. Without understanding its compliance with these best practices, Children's Hospital would be at risk for not providing the safest care possible. Additionally, Children's Hospital would be unable to understand how it compares to other pediatric hospitals and risk losing a competitive edge with patients and purchasers. While this

survey is typically conducted at Children's Hospital in some capacity, the assessment process outlined in this thesis provides a more robust level of information and organizational understanding than previously collected. Additional detail on the assessment methodology is described in Chapter 3.

Purpose Statement

This in-depth assessment, including the completion and analysis of the Leapfrog Hospital Survey, was conducted in order to determine Children's Hospital compliance with national performance measures of quality and safety, including prevention of medication errors, appropriate ICU physician staffing, evidence-based steps to avoid harm, management of serious errors and safety-focused scheduling. The completion of this assessment provided information to conduct targeted improvement projects. Data and qualitative information were obtained in part through email and otherwise through standardized interviews with identified nursing and medical leaders for each NQF safe practice, infection control nurse practitioners, and perioperative services leadership and analytic teams. This information was compiled into a uniform tracking tool and analyzed in comparison with the Leapfrog survey questions. Utilizing Leapfrog's scoring algorithm, the anticipated publicly reported outcome, with compliance displayed in a four bar format and made available on The Leapfrog Group's website for each key measure, was then computed. This information was then assessed to determine Children's Hospitals strengths and weaknesses. Finally, results were submitted through the Leapfrog Hospital Survey's reporting tool and made available publicly on their website. The publicly reported results were graphically displayed alongside the highest scoring children's hospitals in 2012 (Leapfrog Top Hospitals) in order to assess how Children's Hospital compares to some of the best children's hospitals in the country. In sum, the purpose of this study was to assess

Children's Hospital's current performance with evidence-based measures endorsed by Leapfrog, benchmark performance against other children's hospitals, and use the sum of this information to identify opportunities for improvement in order to make recommendations for process changes.

Research Questions

Question 1: What is Children's Hospital's compliance with the CPOE quality and safety practice?

Question 2: What is Children's Hospital's compliance with the IPS quality and safety practice?

Question 3: What is Children's Hospital's compliance with the NQF Safe Practices, specifically Leadership Structures and Systems, Culture Measurement for Performance, Teamwork Training and Skill Building, Identification and Mitigation of Risks and Hazards, Nursing Workforce, Medication Reconciliation, Hand Hygiene, and Prevention of Ventilator Associated Complications?

Question 4: What is Children's Hospital's compliance with managing serious errors, specifically related to a Never Events policy, central-line associated blood stream infections, and catheter-associated urinary tract infections?

Question 5: What is Children's Hospital's compliance with safety-focused operating room scheduling best practices?

Question 6: What are the primary strengths and opportunities for improvement for Children's Hospital in each of these areas?

Question 7: How do Children's Hospital results compare to top performing children's hospitals?

Significance Statement

While Children's Hospital takes multiple approaches to ensure that all patients receive safe, high quality care, utilizing the Leapfrog Hospital Survey allows for a unique assessment of the organization's compliance with well-established clinical care and process best practices. This assessment will allow for the identification of opportunities for improvement in order to initiate targeted work, as well the identification of areas of strength in order to celebrate the strides that have already been taken by hospital employees. The results of this assessment will be shared with all hospital employees, from the frontline to senior leadership, in a summary format. Furthermore, determining compliance through this assessment will allow for benchmarking against all other children's hospitals that complete the survey, which varies somewhat from year to year but is typically around 40. Comparing these results will facilitate Children's Hospital's ability to reach out to organizations that perform above them in any survey section for improvement recommendations. Finally, participation in the Leapfrog Hospital Survey results in public reporting of key quality and safety metrics. This information can be viewed on The Leapfrog Group's website, and availability of the information can build patient, provider referrers', and healthcare benefit purchasers' trust in the organization. In this time of high competitiveness in the Nashville, TN pediatric healthcare market, such trust is critical in maintaining current patient populations.

Definition of Survey Components

The following definitions are terms that coincide with individual survey sections applicable to pediatrics. The non-applicable survey sections and terms are: Evidence-Based Hospital Referral (EBHR) Standards, Maternity Care, Managing Serious Errors – Pressure Ulcers and Injuries, and Resource Use for Common Acute Conditions. The applicable terms are

defined here and the specific questions and results for each section are detailed in Appendix 1 and Chapter 4.

Basic Hospital Information refers to the general geographic, financial and organizational characteristics that Leapfrog requires of each hospital. This is the first section of the survey applicable to pediatrics, and the specific questions are outlined in Appendix 1.

Computerized Physician Order Entry (CPOE) refers to electronic prescribing systems that are integrated with patient information and intercept potential medication errors or problems (The Leapfrog Group, 2012a). This is the second section of the survey applicable to pediatrics.

ICU Physician Staffing (IPS) refers to the level of ICU patient management by physicians certified in critical care medicine who are on-site for an acceptable amount of time (The Leapfrog Group, 2012b). This is the third section of the survey applicable to pediatrics.

NQF Safe Practices refers to the 34 NQF-endorsed practices that have been shown to have a significant positive impact on patient safety in healthcare settings (National Quality Forum, 2010; The Leapfrog Group, 2013e). The 2013 Leapfrog Hospital Survey addresses eight of these safe practices. This is the fourth section of the survey applicable to pediatrics.

Managing Serious Errors - Never Events refers to the list of 29 "serious reportable events" outlined by NQF in 2011. The list, while not all-inclusive, is intended to capture those preventable adverse events that should never happen to a patient (The Leapfrog Group, 2012c). This is part of the fifth section of the survey applicable to pediatrics.

Managing Serious Errors - Central Line Associated Blood Stream Infections (CLABSIs) refers to a laboratory-confirmed bloodstream infection (LCBI) of a central line (CL) or umbilical catheter (UC) as defined by the Centers for Disease Control and Prevention/National Healthcare

Safety Network (CDC/NHSN) (Centers for Disease Control and Prevention 2013; The Leapfrog Group, 2013f). This is part of the fifth section of the survey applicable to pediatrics.

Managing Serious Errors - Catheter Associated Urinary Tract Infections (CAUTIs) refers to a urinary tract infection (UTI) of an indwelling catheter that meets the CDC/NHSN criterion for symptomatic urinary tract infections or asymptomatic bacteremic urinary tract infections (Centers for Disease Control and Prevention 2013; The Leapfrog Group, 2013f). This is part of the fifth section of the survey applicable to pediatrics.

Safety-Focused Scheduling refers to management methods used to smooth patient flow, specifically in operating rooms, in order to eliminate unnatural scheduling fluctuations and potentially, the need to build additional capacities (The Leapfrog Group, 2013f). This is part of the fifth section of the survey applicable to pediatrics.

Definition of Terms

Quality refers to "the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge" (Corrigan, 2001). Furthermore, high quality care is defined as safe, effective, patient-centered, timely, efficient, and equitable (Bielaszka-DuVernay, 2011).

Patient safety broadly refers to the prevention of errors and adverse events impacting patients within the healthcare field (World Health Organization, 2013) and is "a discipline in the healthcare sector that applies safety science methods toward the goal of achieving a trustworthy system of healthcare delivery" (Emanual, Berwick, Conway, Combes, Hatlie, Leape, Reason, Schyve, Vincent, & Walton, 2008).

Summary

There is a need for improved quality and patient safety in all U.S. inpatient settings, including pediatric hospitals, in order to address the issue of preventable adverse events and their associated rates of injury, morbidity, and mortality. The Leapfrog Hospital Survey outlines evidence-based best practices and if completed, facilitates the understanding of a hospital's measure of progress in meeting these recommendations, which can in turn drive quality and patient safety improvements. This assessment was conducted to determine Children's Hospital's compliance with these evidence-based measures, establish benchmarks in performance against other children's hospitals, and make recommendations for process changes based on an analysis of this information.

CHAPTER 2: REVIEW OF LITERATURE

Introduction

This chapter outlines a comprehensive literature review that was conducted in order to elicit insight into the issue of inpatient quality and patient safety in the U.S. Published journal articles referencing the magnitude of the overall topic were reviewed for methodologies, major findings, and limitations. Additionally, pediatric specific journal articles were assessed to determine specific applicability of quality and patient safety concepts and measurement approaches in the pediatric inpatient population. Finally, published literature about the impact of public reporting on healthcare quality, including the Leapfrog Hospital Survey, was reviewed for conclusions on the meaningfulness of these approaches.

Inpatient Quality and Patient Safety

The IOM's 1999 *To Err is Human: Building a Safer Health System* reported that between 44,000 to 98,000 Americans die in hospitals each year from preventable medical errors, which initiated significant conversation about care quality and patient safety in inpatient settings. In this report, the IOM noted that deaths from preventable medical errors exceeded the number of deaths attributed to motor vehicle accidents, breast cancer and AIDs, and resulted in costs between $17 billion and $29 billion per year. The IOM noted that the specific types of errors included diagnostic, treatment, and preventive, and that contributing factors were related to the decentralized and fragmented U.S. healthcare system, faulty systems and processes, and the lack of financial incentives for high quality care. When the IOM called for a 50% reduction in medical errors over the span of five years utilizing specific strategies for improvement, such as developing a nationwide public mandatory reporting system, encouraging participation in voluntary reporting systems, and implementing safety systems in healthcare facilities to ensure

safety practices at the delivery level, the country responded almost immediately (Kohn, Corrigan, & Donaldson, 1999). Specifically, the federal government designated $50 million for annual patient safety research, and non-governmental organizations issued statements highlighting patient safety as a priority (Stelfox, Palmisani, Scurlock, Orav, & Bates, 2006). The IOM followed up its 1999 report with the 2001 *Crossing the Quality Chasm: A New Health System for the 21st Century* report, which outlined further strategies for improving healthcare systems and called for healthcare to be safe, effective, patient-centered, timely, efficient, and equitable (Corrigan, 2001).

Following these IOM reports, the AHRQ commissioned the University of California, San Francisco-Stanford University Evidence-Based Practice Center to develop a resource that summarized evidenced-based practices to improve patient safety. That group produced the *Making Health Care Safer: A Critical Analysis of Patient Safety Practices* report which outlined more than 80 safety practices (Shojania, Duncan, McDonald, & Wachter, 2001). In an analysis of these practices, the authors concluded that there is an inherent tension in applying evidence-based medicine principles to patient safety practices. Specifically, they found that while there is a need for evidence-based practices because non-evidenced based practice implementation could be costly and potentially cause harm, there is also a need to ensure that insistence on evidence does not prevent implementation of practical, low risk and understudied interventions that seemed to be effective (Shojania et al., 2002).

A 2003 study by Bates and Gawande found that information technology is a specific evidence-based approach that could improve patient safety in clinical settings by facilitating structured actions, building in safe-guards to catch errors, and establishing patient-specific decision support at the point of care. One example of this technology that the authors referenced

was implementation of CPOE systems (Bates & Gawande, 2003). Later research by Culter, Feldman and Horwitz (2005) attempted to understand the variations in CPOE adoption across the U.S. and found that there was a positive correlation with government and teaching hospitals implementing CPOE, but no correlation with hospital profitability. The authors collected this data from Leapfrog Hospital Survey reported results in 2003 and concluded that there was a need for greater diffusion of CPOE to drive quality and safety (Culter et al., 2005).

Despite these specific studies regarding practices to improve quality and safety of inpatient care, McGlynn, Asch, Adams, Keesey, Hicks, DeCristofaro, and Kerr (2003) acknowledged there continued to be a gap in systematic understanding of the quality of standard healthcare processes delivered in the U.S. This was in large part due to the fact that previous studies on the topic focused on specific populations such as Medicare or managed-care plan patients. As such, they undertook a study to establish a comprehensive review of how often Americans receive recommended care processes. By collaborating with the Center for Studying Health System Change (CTHSC), the authors recruited patients that completed the Community Quality Index (CQI) and conducted standardized phone interviews and medical record reviews. Results of the study indicated that Americans were receiving only half of recommended medical care processes. The authors acknowledged that this methodology did lead to a nonresponse bias, and the potential for inferring conclusions about quality that were actually documentation problems (McGlynn et al., 2003).

In a related study, Jha, Li, Orav, and Epstein (2005) analyzed Hospital Quality Alliance (HQA) data, which was established to provide the first view of analogous data on hospital quality of care. Utilizing multivariable linear regression on ten quality indicators for three clinical conditions collected by the Centers for Medicare and Medicaid Services (CMS), the

authors found that quality of care across the country varied in regards to the specific quality indicators. Specifically, while the indicators associated with acute myocardial infarction had compliance scores above 90% for half the hospitals, other indicators associated with congestive heart failure and pneumonia were much lower. Additionally, they found that small but significant increases in performance with all indicators were associated with being an academic hospital, a hospital in the Northwest or Midwest, and a non-for-profit hospital. Limitations of this study stemmed from the fact that the focus on certain CMS indicators was not all encompassing and the focus on process measures did not account for patient outcomes (Jha et al., 2005).

In 2006, Stelfox, Palmisani, Scurlock, Orav, and Bates set out to conduct an objective assessment of the impact of the 1999 *To Err is Human: Building a Safer Health System* report. Utilizing a Poisson distribution of a MEDLINE search of quality and patient safety articles published between November 1, 1994 and November 1, 2004, the authors confirmed that the report was associated with increased number of safety publications and research awards (Stelfox et al., 2006). Yet, the most recent inpatient quality and patient studies portray a bleak outlook on the progress that has been made in healthcare processes and outcomes. A 2011 Health Affairs Health Policy Brief (Bielaszka-DuVernay, 2011) outlined the multiple initiatives that have been implemented to improve care, but noted that overall improvement remained slow, with only a 2.3% annual rate of change in AHRQ quality measures. This brief highlighted the need for additional research to determine the most effective process changes, and ways to eliminate disparities in the quality of care provided across the country. Specifically, the brief called for improved patient engagement and implementation of process improvement tools such as “Lean” or “Six Sigma” (Bielaszka-DuVernay, 2011).

The most recent inpatient quality and patient safety research conducted by John T. James (2013) found that inpatient harm is an epidemic that requires not only the patient engagement supported by the 2011 Health Affairs Health Policy brief (Bielaszka-DuVernay, 2011), but systematic correction of the root causes of harm and transparent accountability. Utilizing a weighted average of four key studies that utilized the Institute for Healthcare Improvement (IHI) Global Trigger Tool to identify medical errors in patient records, James (2013) estimated that more than 400,000 premature deaths associated with preventable harm occurred annually in the U.S. James (2013) noted that this drastic increase from the IOM reported numbers was most likely due to the fact that the IOM studies had set a much higher bar for identifying preventable adverse events, and that the data was collected through a general review by physicians, as opposed to the Global Trigger Tool, which was better able to identify such events. Alternatively, it was acknowledged to be possible that the overall frequency of these events had in fact increased due to multiple factors, including increased complexity of medical practice and use of technology, production pressures, and an aging population. Overall, these new estimates emphasized the need for increased awareness of the prevalence of preventable adverse events, rigorous follow up investigations into their root causes and increased patient involvement in health care decisions (James, 2013).

Pediatric Inpatient Quality and Patient Safety

While extensive research has been carried out on the topic of overall quality and safety in inpatient facilities, the majority of pediatric specific research has focused on medication errors or unit specific settings (Miller, Elixhauser, & Zhan, 2003). Recent research on pediatric medication errors conducted by Miller, Robinson, Lubomski, Rinke, and Pronovost (2007) synthesized all peer reviewed literature on the topic between January 1, 2000 and April 30, 2005.

The authors found that errors occurred across the entire medication spectrum, from prescribing (3-37%), dispensing (5-58%), and administering (72-75%), with wide-ranging distributional epidemiological estimates. Furthermore, the authors noted that the majority of error-reduction strategies were non-evidenced based, and therefore, further research on these strategies was required (Miller et al., 2007).

Initial research undertaken to understand the magnitude of overall patient safety events among hospitalized children was conducted by Slonim, LaFleur, Ahmed, and Joseph (2003) through an analysis of Healthcare Cost and Utilization Project data for the years 1988, 1991, 1994, and 1997. The authors conducted regression analyses on this nonconcurrent cohort of hospitalized pediatric patients, and found that the hospital-reported medical errors in hospitalized children ranged from 1.81 to 2.96 per 100 discharges. Medical error rates were found to be statistically lower in 1988, but there were no statistically significant differences found between 1991, 1994, and 1997. Additionally, while there were no consistent differences found between gender, race, or payor status, there was a statistically significant relationship between higher median household income and increased error rates (Slonim et al., 2003).

Miller, Elixhauser, and Zhan (2003) conducted similar research utilizing patient safety indicator (PSI) administrative data algorithms established by the AHRQ, applying them to the 3.8 million pediatric discharge records included in the 1997 Healthcare Cost and Utilization Project. In doing so, they found that patient safety events for hospitalized children had a high prevalence comparable to hospitalized adults. Specifically, the highest event rate was associated with birth trauma at 1.5 cases per every 100 births. The authors also utilized bivariate and multivariate analyses to conclude that these patient safety events were associated with increased lengths of stay, in-hospital mortality and total patient charges (Miller et al., 2003). A follow up

study by Miller and Zhan (2004) analyzed the 5.7 million pediatric discharge records included in the 2000 Healthcare Cost and Utilization Project. Using regression analysis, the authors found that PSIs (which include rare but significant errors such as retained foreign bodies during procedures, transfusion reactions, and shock attributed to anesthesia) occurred more frequently among the very young and Medicaid population and that almost all PSIs were associated with substantial increases in length of stay, total charges, and in-hospital mortality (Miller & Zhan, 2004). The key limitations of each of these studies, as pointed out by Sedman, Harris, Schulz, Schwalenstocker, Remus, Scanlon, and Bahl (2005), was the use of administrative data, which contain limited clinical information and are subject to coding variations. Sedman et al. also found that quantifying PSIs through administrative data could be useful as a screening tool, but this did not reliably represent preventable medical error events in pediatrics. These authors concluded that additional investigation into the applicability of these indicators was necessary (Sedman et al, 2005).

Woods, Thomas, Holl, Altman, and Brennan (2005) attempted to determine the incidence and types of pediatric adverse events not through administrative data, but through a retrospective, two-level, medical record review of 3,719 pediatric patients discharged from all hospitals in Colorado and Utah. This review found that approximately 1% of pediatric hospitalizations in Colorado and Utah resulted in an adverse event, of which 0.6% were preventable. The authors weighted this sample to find that approximately 70,000 hospitalized children in the U.S. experienced an adverse event each year, and that nearly 60% of those events were preventable. Furthermore, the authors confirmed that the epidemiology of adverse events in pediatrics is different than adults and thus, additional research is required to determine pediatric-specific approaches for improving care (Woods et al., 2005).

Inpatient Quality and Patient Safety Public Reporting

Marshall, Shekelle, Davies, and Smith (2003) were the first authors to point out that public reporting of healthcare comparative data had become an accepted way to improve hospital quality. In a review of historical U.S. public reporting, they found that the practice first began in 1988 when CMS initiated publication of Medicare report cards. Since then, the authors noted that there had been an ongoing debate about the true impact of public reporting on improving healthcare quality. They found that there were few published studies on the subject and no randomized controlled trials to assess the correlation. Further, they found that while there were some observational studies of the impact of public reporting of care processes, there were no data demonstrating its effect on overall health outcomes. The authors concluded that despite these facts, public reporting would inevitably continue and therefore, there was a need to tailor and broaden the scope of the reported data, ensure adequate risk adjustment, and increase the public's interest (Marshall et al., 2003).

In 2005, Werner and Asch provided further insight into the nature of public reporting and healthcare report cards. They noted that such reporting was intended to drive quality improvement by encouraging patients, referring physicians, and healthcare purchasers to choose high-quality providers, and to encourage providers to compete on quality. Similar to Marshall et al. (2003), the authors pointed out that there was a lack of evidence regarding the value of public reporting. Furthermore, they noted that public reporting could have unintended negative consequences, such as physicians avoiding sick patients to improve their quality scores, implementation of interventions inappropriate for specific patient populations, and providers disregarding patient preferences or their own clinical judgment. The authors summarized by

stating that there was a need for continued assessment about the role of public reporting in quality improvement (Werner & Asch, 2005).

In another 2005 report, Galvin, Delbanco, Milstein, and Belden specifically noted that The Leapfrog Group's encouragement of public reporting through the Hospital Survey had grown rapidly and achieved national recognition. The authors found that an increasing number of hospitals were implementing the evidence-based best practices endorsed by the group, and while there was a lack of definitive data, many experts believed that public reporting improved care quality. Still, the main limitation with the public reporting through the Leapfrog Hospital Survey was noted to be the lack of clear data demonstrating associated clinical improvements (Galvin et al., 2005).

Lindenauer et al. (2007) published the first data tying clinical improvements to healthcare public reporting in a study comparing the practice to pay-for-performance models. The authors compared 207 hospitals that participated in both voluntary public reporting and CMS pay-for-performance programs against 406 hospitals that participated only in voluntary public reporting on a total of ten individual and four composite measure of quality over a two year timeframe. Using multivariable modeling, the authors found that hospitals that participated in both voluntary public reporting and pay-for-performance programs experienced modestly greater improvements in quality than hospitals that participated solely in public reporting. Limitations inherent in the study were a lack of comparison to hospitals with no reporting mechanisms, a focus on only ten indicators, and potential underestimates due to a review of pay-for-performance programs with only modest financial incentives. Therefore, the authors concluded that there was a need for additional research into whether larger financial incentives would stimulate additional

improvements and whether the overall benefits of such programs outweigh the costs (Lindenauer et al., 2007).

The costs of these programs were directly addressed by Kahn, Matthews, Angus, Barnato, and Rubenfeld (2007) and Pronovost, Thompson, Holzmueller, Dorman, and Morlock (2007) in relation to the Leapfrog Hospital Survey's IPS practice. Specifically, these authors surveyed random samples of physician ICU directors and found that barriers to implementation of the practice included concerns for loss of autonomy by the physician director, loss of income, and increased costs for hospital administration. The authors concluded that additional strategies for implementation were needed to facilitate widespread adoption of the IPS practice (Kahn et al.; Pronovost et al., 2007).

In the most recent study of the association between public reporting and inpatient quality of care, Kernisan, Lee, Boscardin, Landefeld, and Dudley (2009) conducted an observational analysis of discharge data on all urban U.S. hospitals that completed the 2006 Leapfrog Hospital Survey. Using a hierarchical logistic regression model, the authors concluded that better performance on survey scores was not significantly associated with risk-adjusted inpatient mortality. Acknowledging the limitation that Leapfrog Hospital Survey data is self-reported, the authors concluded that future work is needed to establish valid methods for assessing compliance with Leapfrog standards and correlate survey performance with patient outcomes (Kernisan et al., 2009).

Summary of Current Problems and Study Relevance

The breadth of literature confirmed that there is a need for improved quality and patient safety among all U.S. hospitals, including pediatric facilities. The reported severity of the problem varies among studies, with the latest research indicating that as many as 400,000

Americans prematurely die annually as a result of preventable medical errors. While this number is inclusive of pediatric patients, additional research specifically quantifying the magnitude of the problem in pediatric hospitals would be beneficial. Additionally, research regarding the impact of public reporting on quality improvement and patient outcomes is inconclusive, and points to the need for further studies to assess potential correlations. Despite this, public reporting through the use of tools like the Leapfrog Hospital Survey was noted to be a growing practice and as such, lends to the relevance of this study, which aims to discover an individual pediatric hospital's compliance with Leapfrog metrics in order to develop improvement plans.

CHAPTER 3: METHODOLOGY

Introduction

This chapter describes the methodology utilized for assessing Children's Hospital's compliance with the Leapfrog Hospital Survey practices. The assessment formalized the survey completion process by outlining a clear research design based on complexity theory. This resulted in a study that included both the completion of the Leapfrog Hospital Survey, as well as the development of a theory based research design that can be replicated in future years. Utilizing a mixed-method approach, both qualitative and quantitative data was collected through interview and data mining procedures to determine compliance with individual survey sections. The information was compiled in Microsoft Word, Excel and PowerPoint tools and analyzed in accordance with Leapfrog scoring algorithms. The methodology outlined below can be utilized when completing future surveys.

Population and Sample

Children's Hospital is a 229-licensed bed pediatric hospital located in Nashville, TN. While it is a part of the larger Vanderbilt University Medical Center (VUMC), it is a freestanding entity that discharged 14,756 patients, conducted surgeries on 16,567 patients and treated 54,092 patients in the emergency department between July 1, 2012 and July 31, 2013 (Monroe Carell Jr. Children's Hospital at Vanderbilt, 2013). The hospital is a level 1-trauma center, Joint Commission and Magnet certified, and has been ranked by U.S News and World Report (USNWR) to have nine top performing pediatric subspecialties. Medical and surgical subspecialties include: adolescent and young adult health; allergy, immunology and pulmonary medicine; anesthesiology; cardiology; congenital heart defect neurodevelopment follow up program; critical care medicine; dermatology; developmental medicine; diagnostic imaging;

emergency medicine; endocrinology and diabetes; gastroenterology; general pediatrics; genetics; hematology and oncology; hospital medicine; infectious diseases; neonatology; nephrology; nutrition; ophthalmology; orthopaedics; otolaryngology; psychiatry; rehab services; rheumatology; sickle cell center; urology; burn; complex coordination of care; fetal; general and thoracic surgery; hand surgery; heart surgery; neurosurgery; plastic surgery; trauma (Monroe Carell Jr. Children's Hospital at Vanderbilt, 2012a).

The Children's Hospital sample for this assessment was determined based on the fact that the Leapfrog Hospital Survey applies only to the inpatient hospital setting. Since each medical and surgery subspecialty operates in the inpatient setting in some capacity, all Children's Hospital units and subspecialties are included in the survey assessment, except where explicit parameters are defined by Leapfrog. These include:

IPS. This section applies only to the Pediatric Intensive Care Unit (PICU), a medical/surgical ICU, and the Pediatric Cardiac Intensive Care Unit (PCICU). The Neonatal Intensive Care Unit (NICU) is excluded.

NQF Safe Practice – Prevention of Ventilator Associated Complications. This section only applies to the PICU, PCICU, and NICU, where patients on ventilators are cared for.

Managing Serious Errors – CLABSI. This section applies only to the PICU, PCICU, and NICU.

Managing Serious Errors – CAUTI. This section applies only to the PICU and PCICU (Leapfrog, 2013d).

Timeframe

The 2013 Leapfrog Hospital Survey was released on April 1, 2013, and the assessment was conducted between April 1, 2013 and June 24, 2013. Children's Hospital's results were

submitted to Leapfrog on June 24, 2013, ahead of the June 30, 2013 deadline. The survey applies to different time frames, depending on the section of the survey (see Table 1).

Table 1. Survey Timeframes

Survey Section	Timeframe
Basic Hospital Information	Calendar year 2012 (January-December 2012)
CPOE	March-May 2013, the three complete months of available data prior to the survey submission
IPS	Most up to date information available prior to the survey submission (through May 2013)
NQF Safe Practices	June 2012-May 2013 or May 2011-May 2013, depending on the question
Managing Serious Errors – Never Events	Most up to date information available prior to the survey submission (through May 2013)
Managing Serious Errors – CLABSI	Calendar year 2012 (January-December 2012)
Managing Serious Errors – CAUTI	Calendar year 2012 (January-December 2012)
Safety-Focused Scheduling	June 2012-May 2013, the most recent 12 consecutive months of data available prior to survey submission

Research Design

When developing the methodology and research design for this assessment, it was recognized that organizational assessments employing a combination of qualitative and quantitative data can often provide the most complete analysis. Mixed-methods research, incorporating both quantitative and qualitative information, is beneficial because it provides more evidence when studying a research question that one approach alone (Creswell, & Plano Clark, 2010; Creswell, Klassen, Plano Clark, & Smith for the Office of Behavioral and Social Sciences Research, 2011). Additionally, the nature of the Leapfrog Hospital Survey requires both open- and closed-ended information. Therefore, a mixed-methods approach (qualitative and quantitative) was necessary to integrate the multiple components of this study.

This specific mix-methods assessment was grounded in complexity theory, which is a set of concepts and analytic tools that guide the design and implementation of interventions aimed at improving the delivery of healthcare. Complexity theory has often been associated with the engineering sciences since its inception in the years following World War I but it also became a popular method for understanding healthcare organizations in the 1990s and 2000s (Anderson,1999; Paley, 2011). Other assessments and improvement interventions have frequently been based on the continuous quality improvement (CQI) model; but this approach is limited because it uses a manufacturing model that regards variation in healthcare delivery as an undesired function. This limited focus of the CQI model does not address the fact that standardization of healthcare delivery without identification of beneficial variations at the local, or departmental, level, can lead to missed opportunities for enhancing overall healthcare processes. Conversely, complexity theory recognizes healthcare delivery systems are made up of individual, complex systems that may require tailored improvement interventions (Litaker, Tomolo, Liberatore, Stange, & Aron, 2006). In this way, complexity theory lends itself most fittingly to this assessment of the entire Children's Hospital, which required consideration of how each hospital department approached the various components of the survey, and subsequently using that information to guide recommendations for improvement.

In developing the methodology for this assessment, it was clear that this application of complexity theory combined mathematical complexity and aggregate complexity concepts. These concepts were particularly helpful in understanding how the specific Leapfrog Hospital Survey sections applied to Children's Hospital. Mathematical complexity refers to the fact that certain aspects of healthcare delivery have predictable outcomes, while others follow nonlinear and unpredictable trajectories (Litaker et al., 2006). This helped to guide the understanding of

the Safety-Focused Scheduling section of the Leapfrog Hospital Survey, which facilitates measurement of OR utilization rates, and based on those rates, recommendations for implementation of stable OR scheduling techniques for elective procedures to compensate for urgent or emergent procedures. Aggregate complexity refers to the multiple concurrent and dynamic interactions of healthcare processes (Litaker et al., 2006). This was particularly applicable in assessing the NQF Safe Practices section, which required accounting for the implementation of best practices across multiple care processes and departments in the hospital. Furthermore, the totality of the Leapfrog Hospital Survey addressed the entire continuum of care in Children's Hospital, and thus directly incorporated aggregate complexity concepts.

Complexity theory is also useful when determining how to collect assessment data and develop improvement interventions based on that information. The mathematical complexity portion of the theory often lends itself most to quantitative data collection (Litaker et al., 2006). This assessment applied mathematical complexity, and quantitative data collection and analysis, specifically to the Managing Serious Errors – CLABSI, Managing Serious Errors – CAUTI, and Safety-Focused Scheduling sections. On the other hand, aggregate complexity is most often associated with qualitative data collection and analysis (Litaker et al., 2006). As such, this assessment employed qualitative data approaches to specifically address the CPOE, IPS, NQF Safe Practices and Managing Serious Errors – Never Events sections. Specific details about each data collection procedure are described in the section below. Finally, complexity theory guided the development of recommendations (see Chapter 5) based on the results obtained through these data collection processes. Specifically, it was acknowledged that targeted interventions, such as those to improve CLABSI or CAUTI data, may need to be customized to the unique units throughout the hospital.

Procedures

Immediately following the release of the 2013 Leapfrog Hospital Survey on April 1, 2013, the survey was downloaded, thoroughly reviewed and analyzed by the thesis investigator to understand the expectations for each section and determine the applicable pediatric components. This process, while intuitive and expected, was never formalized as a first procedural step of the survey in preceding years. Sections that were not applicable included the Evidence-Based Hospital Referral (EBHR) Standards, the Maternity Care section, the Managing Serious Errors – Pressure Ulcers and Injuries section, and the Resource Use for Common Acute Conditions section. The procedures referenced in these sections are either not conducted in pediatric hospitals or there is not enough scientific evidence to demonstrate that they are relevant. All other survey resources, including the survey deadlines, instructions, reference book, fact sheets and scoring algorithms were also downloaded and organized in the PM&I shared drive. A presentation providing a survey overview and completion timeline was created to share with the Children's Hospital Operations Board and PM&I Executive Team, which includes all appropriate hospital leaders that participated in the survey (see Appendix 2). Additionally, an accountability and survey response tracking tool (see Appendix 3) was created in order to establish the designated leader and auditor for each section of the survey and maintain an ongoing record of questions and issues. The designated leaders and auditors were named collaboratively by the thesis investigator, Jenny Slayton, Administrative Director of PM&I and Dr. Meg Rush, Chief of Staff.

The Basic Hospital Information, CPOE, and IPS section information were obtained by sending the survey questions via email to the identified finance, informatics, and PICU and PCICU medical director leaders, respectively. Multiple discussions were held regarding the definitions of each section. Specifically, communication through multiple emails was conducted

with the Leapfrog Survey Help Desk regarding the defining criteria for Integrated Delivery Network (IDN) and Council of Teaching Hospitals and Health Systems (COTH) in the Basic Hospital Information Section. The language in the IPS section regarding an expanded definition of certified in critical care medicine was not familiar to the PICU and PCICU medical directors and thus required further explanation. Additionally, it was clarified with the Leapfrog Survey Help Desk that a quantified analysis of notification device response time by ICU physicians was not necessary because the attestation to 24/7 coverage met the intention of the section.

Each NQF Safe Practice was first reviewed extensively, along with the associated reference materials, in order to comprehend the survey expectations. Notes were made for each Safe Practice question regarding potential evidence of compliance or gaps in practices. 30 minute meetings with the identified leaders for each of the eight Safe Practices were then scheduled. Both the specific questions and section reference information were sent to the leaders prior to the meeting for review, with the instructions that the meeting time would be spent assessing compliance with the specific Safe Practice, gathering supportive evidence and identifying any issues, concerns or opportunities for improvement. Each question was discussed individually during the meeting and consensus was reached as to whether compliance was met. In order to mitigate potential false reporting of positive results, it was communicated to each leader that a lack of compliance with any question would not result in negative consequences for the individual. In the event that consensus could not be reached, the final decision regarding compliance was made by the Administrative Director of PM&I and the Chief of Staff. Following each meeting, the supporting evidence discussed was logged into the survey evidence matrix and was shared with the leader for a final sign-off.

The Managing Serious Errors section was completed through policy review and analysis

of applicable infection data. The Managing Serious Errors – Never Events section requires affirmation that Children's Hospital maintains a policy that adheres to The Leapfrog Group's defined principles. Therefore, a complete review of VUMC's Disclosure of Unanticipated Outcomes policy (OP 20-10.03) was conducted utilizing the Leapfrog defined principles as a checklist. The Managing Serious Errors – CLABSI and Managing Serious Errors – CAUTI sections were completed by obtaining infection data from Vanderbilt's InSight Performance Management System, disaggregating the Pediatric Critical Care Unit (PCCU) CLABSI data into the PICU and PCICU specific numbers, separating the NICU CLABSI data by individual birth weight categories, and verifying the data with Children's Hospital's Infection Prevention Practitioners. Multiple communications were sent to the Leapfrog Survey Help Desk to confirm that the PICU and PCICU infection data should be separated, and to determine Leapfrog's methodology for calculating the standardized infection ratios (SIRs) for each infection.

The Safety-Focused Scheduling section was completed by first reviewing the specific questions and reference book material to understand the intentions and definitions of the section. The information was then distributed to the identified section leaders and a one-hour meeting was scheduled to discuss Children's Hospital's compliance. Children's Hospital specific definitions for the section were first agreed upon, including the operating rooms that service elective or scheduled surgeries, the operating rooms that service urgent or emergent surgeries, and designated prime time hours. These definitions were then distributed to the leaders for a final sign-off, and the surgical services analytic team used them to obtain the number of elective inpatient surgeries completed and the available and utilized prime time hours for the defined timeframe. Finally, the summary information was disseminated to the Perioperative Executive Leadership Team for approval.

All information was compiled in a complete and organized document and shared with the Administrative Director of PM&I and the Chief of Staff for sign off. A meeting then took place with the Administrative Director, Center for Clinical Improvement, the party responsible for completing the Leapfrog Survey for the Vanderbilt University Hospital (VUH), in order to ensure that questions referring to overlapping systems (e.g., Board reporting processes, lab and medication systems) were reported consistently. The individual scoring algorithms were then utilized for each section to determine the expected publicly reported results. Those areas meeting full compliance were highlighted as organizational strengths. A gap analysis was conducted on all sections that were not deemed to be in full compliance, and these were highlighted as opportunities for improvement. Finally, a summary of expected results, strengths and opportunities for improvement was presented to the CEOs of the Children's Hospital and VUH, as well as the Deputy Vice Chancellor for Health Affairs and CEO of the Vanderbilt Health System (see Appendix 4).

The results of the survey were then submitted electronically through the Leapfrog Hospital Survey online submission portal. Following submission, The Leapfrog Group generated publicly reported results, displayed in bar format with specific details regarding infection rates, and published these on their website on July 30, 2013. All pediatric hospital results were reviewed, with particular focus paid to those that were designated as Pediatric Top Hospitals in 2012. A table display was created to illustrate results comparisons between Children's Hospital and the 2012 Pediatric Top Hospitals. See Chapter 4 and Figure 1 for additional details about this comparison. Finally, this comparison information was shared with Children's Hospital senior leadership in anticipation of the 2013 Pediatric Top Hospital announcement.

Instruments

The 2013 Leapfrog Hospital Survey was first downloaded in Microsoft Word format and was then separated into individual sections for ease in review, sharing, and information tracking. An accountability and response tracking grid was created as a Microsoft Excel spreadsheet (see Appendix 3) in order to record not only the section leaders and auditors, but meeting dates, status, questions identified, person responsible for addressing questions, due dates for question responses and comments. A second Microsoft Excel spreadsheet evidence matrix (see Appendix 5) was created for the NQF Safe Practices to track the specific supporting evidence and evidence location for each question. A third Microsoft Excel spreadsheet (see Appendix 6) was created to track the Managing Serious Errors – CLABSI and Managing Serious Errors – CAUTI data obtained through the Vanderbilt InSight Performance Management System. This included fields to track the monthly number of line or catheter days, number of infections, the infection rate for the designated timeframe and the SIR for the designated timeframe. Additionally, this spreadsheet included calculations of the infection rates and SIRs from the previous year for comparison purposes. The Safety-Focused Scheduling section required a Microsoft Word document to track the key definitions described in the previous section. These definitions are illustrated in Table 2. Finally, a Microsoft Excel spreadsheet was created to compare publicly reported results, including columns for hospital name, city, CPOE results, IPS results, NQF Safe Practice Results, Managing Serious Error – Never Events results, Managing Serious Errors – CLABSI and Managing Serious Errors – CAUTI results, and Safety-Focused Scheduling results.

Table 2. Safety-Focused Scheduling Definitions

	Definition
Operating rooms servicing 'elective/scheduled' surgeries	ORs 1-6, 9-16; excludes dental and IR
Operating rooms servicing 'urgent/emergent' surgeries	Surgeon of the Week (SOW) OR
'Prime time' hours:	Monday, Tuesday, Thursday: 7a-3p; Wednesday, Friday: 8a-3p
Available 'prime time' hours	Block time plus open room time
Utilized 'prime time' hours	In room – out of room time for all cases during block time plus turnaround time (TAT) (notes: TAT up to 60 minutes included; if more than 60 minutes, award 60 minutes; do not include case time/TAT after 3p)

Data Analysis

The CPOE data was calculated by the hospital informatics team by dividing the total number of inpatient medications ordered via CPOE by the total number of inpatient medications ordered in any way during the designated timeframe. The IPS information provided by the PICU and PCICU medical director was analyzed against the section questions to determine if there was appropriate physician staffing (i.e., critical care certification and on-site coverage). Each NQF Safe Practice was analyzed in comparison to the collected supporting evidence to determine if each specific survey question would be answered positivity or negatively. Managing Serious Errors – CLABSI and Managing Serious Errors – CAUTI data was calculated by dividing the total observed number of infections by the expected number of infections for the designated timeframe, utilizing the CDC benchmark to obtain the SIR (see Appendix 6). Safety-focused scheduling data was calculated by dividing the number of utilized prime time hours by the number of available prime time hours for designated inpatient operating rooms. The data for each section was then compared against the specific scoring algorithm set forth by Leapfrog to determine compliance. These scoring algorithms vary in level of complexity. The CPOE, IPS, Managing Serious Errors – Never Events, and Safety-Focused Scheduling sections are range-

based scores. For example, a hospital's CPOE score would vary based on whether it achieved 75% or greater, 50-74%, 25-49%, or less than 25% of inpatient medications orders entered through their CPOE system. The NQF Safe Practices, Managing Serious Errors – CLABSI and Managing Serious Errors – CAUTI scoring algorithms required additional calculations. For example, the NQF Safe Practice section included a weighting system for compliance with individual Safe Practices.

Limitations

There are several limitations of this assessment that must be recognized. To begin, the interview component of the NQF Safe Practices section is subject to three potential limitations. The first limitation stems from the fact that the NQF Safe Practice section leaders were identified by senior leadership. Therefore, there was a potential for reliability issues if the individual leaders selected were not the most knowledgeable about the questions at hand. Additionally, there was the potential that those selected had a vested interest in all survey questions being compliant for fear of retribution if non-compliance was identified, which of course could skew the results. Finally, this sampling for NQF Safe Practice interviews did not account for the viewpoints of all stakeholders, including bedside nurses and ancillary care staff, who may have contributed supporting or contradictory information. In order to mitigate these limitations, the thesis investigator implemented a validation process that consisted of a review of organizational policies, meeting minutes and other tools, including observations of applicable processes. A final limitation is that the quantitative data for the CPOE, Managing Serious Errors – CLABSI, Managing Serious Errors – CAUTI, and Safety-Focused Scheduling sections were obtained through a third party and therefore, the thesis investigator was reliant on those parties to properly

collect the data. This limitation was mitigated by the fact that each of these third parties has specific quality assurance processes, outside the scope of this thesis, that are run on these results.

Summary

Between April 1, 2013 and June 24, 2013, a mixed-method approach was utilized to determine Children's Hospital's compliance with all pediatric-applicable sections of the Leapfrog Hospital Survey. Qualitative data was collected for the CPOE, IPS, NQF Safe Practices and Managing Serious Errors – Never Events sections through standardized interviews and policy review. Quantitative data was collected for the Managing Serious Errors – CLABSI, Managing Serious Errors – CAUTI, and Safety-Focused Scheduling sections using the organizational data repository systems. These data were collectively analyzed using the Leapfrog scoring algorithms.

CHAPTER 4: RESULTS

Introduction

This chapter presents Children's Hospital's Leapfrog Hospital Survey results. Leapfrog publicly reports all results using a four bar scale indicating a hospital's progress toward meeting Leapfrog standards at the time of reporting. One bar indicates 'Willing to Report,' two bars indicate 'Some Progress,' three bars indicate 'Substantial Progress,' and four bars indicate 'Fully Meets Standards' (The Leapfrog Group, 2013c). The numbered questions in each section below represent Leapfrog's proprietary language (The Leapfrog Group, 2013d). The corresponding results are those of Children's Hospital.

Findings

CPOE

Working in collaboration with the hospital informatics team, the following CPOE results were established (answers in bold):

1. Does your hospital have a functioning CPOE system in at least one inpatient unit of the hospital? (**Yes**/No)
2. What percent of your hospital's total inpatient medication orders (including orders made in units which do not have a functioning CPOE) do prescribers enter via a CPOE system that: includes decision support software to reduce prescribing errors; and, is linked to pharmacy, laboratory, and admitting-discharge-transfer (ADT) information? (**97%**)

In previous years, an additional question required the testing of the CPOE system against the Leapfrog CPOE Evaluation Tool, but the pediatric specific evaluation tool was not available for

the 2013 survey. Consistent with the CPOE Scoring Algorithm for Pediatric Hospitals, this resulted in a publicly reported result of 'Fully Meets Standards' or four bars.

IPS

Based on the information collected from the medical director of the PICU and PCICU, the results for the IPS section were as follows (answers in bold):

1. Does your hospital operate any adult or pediatric general medical and/or surgical ICUs or neuro ICUs? (**Yes**/No)
2. Are all patients in these ICUs managed or co-managed by one or more physicians who are certified in critical care medicine? (**Yes, all are certified in critical care**/Yes, based on the expanded definition of certified/No)
3. Is one or more of these physicians ordinarily present in each of these ICUs during daytime hours for at least 8 hours per day, 7 days per week, and do they provide clinical care exclusively in one ICU during these hours? (**Yes**/No)
4. When these physicians are not present in these ICUs on-site or via telemedicine, do they return more than 95% of calls/pages from these units within five minutes, based on quantified analysis of notification device response time? (**Yes**/No)
5. When these physicians are not present on-site in the ICU or not able to reach an ICU patient within 5 minutes, can they rely on a physician, physician assistant, nurse practitioner, or FCCS-certified nurse effector who is in the hospital and able to reach these patients within five minutes in more than 95% of the cases, based on a quantified analysis of notification device response time? (**Yes**/No)

Consistent with the IPS Scoring Algorithm, this resulted in a publicly reported result of 'Fully Meets Standards' or four bars.

NQF Safe Practices

Through standardized interviews with identified leaders, Children's Hospital specific compliance with NQF Safe Practice information, presented in the Leapfrog templates, was obtained. This information is presented in Tables 3 – 10 (compliant questions highlighted and bolded).

Table 3. Safe Practice #1 – Leadership Structures and Systems

Awareness	In regards to raising awareness of key stakeholder to our organization's efforts to improve patient safety, the following actions related to identification and mitigation of risk and hazards have been taken: a ▌ **Board (governance) minutes for the past 12 months reflect regular communication regarding risks, hazards, culture measurement, and progress towards resolution of safety and quality problems.** b ▌ **patients and family of patients are formal participants in safety and quality committees that meet on a regularly scheduled basis.** c ▌ **steps have been taken to report to the community in the last 12 months of ongoing efforts to improve safety and quality in the organization and the results of these efforts.** d ▌ **all staff and independent practitioners were made aware in the past 12 months of ongoing efforts to reduce risks and hazards and to improve patient safety and quality in the organization.**
Accountability	In regard to holding the Board, senior management, mid-level management, physician leadership, and frontline caregivers directly accountable for results related to mitigating unsafe practices, the organization has done the following: a ▌ **an integrated, patient safety program has been in place for at least the past 12 months providing oversight and alignment of safe practice activities.** b ▌ **a patient safety officer (PSO) has been appointed and communicates regularly with the Board (governance) and senior administrative leadership; the PSO is the primary point of contact of the integrated, patient safety program.** c ▌ **performance has been documented in performance reviews and/or compensation incentives for all levels of hospital management and hospital-employed caregivers noted above** d ▌ **the interdisciplinary patient safety team communicated regularly with management regarding root cause analyses, progress in meeting safety goals, and providing team training to caregivers. Actions taken to mitigate system and process failures have been documented in meeting minutes.** e ▌ **the facility reported adverse events to external mandatory or voluntary programs.**

Ability	In regard to implementation of the patient safety program, the Board (governance) and senior administrative leaders have provided resources to cover the implementation during the last 12 months, and: a ▌ **patient safety program budgets were sufficiently resourced to support the program, staffing, and technology investment.** b ▌ **documentation of these budgets is available for review by external organizations.**
Action	Structures and systems for assuring that leadership is taking direct and specific actions have been in place for the past 12 months, as evidenced by: a ▌ **CEO and senior administrative leaders are personally engaged in reinforcing patient safety improvements, e.g., "walk-arounds", holding patient safety meetings, reporting to the Board (governance). Calendars reflect allocated time.** b ▌ **CEO has actively engaged unit, service-line, departmental and mid-level management leaders in patient safety improvement actions.** c ▌ **CEO has established a structure for input into the patient safety program by independent medical practitioners and medical leadership. Input documented in meeting minutes or materials.**

Children's Hospital was found to be fully compliant with Safe Practice #1, with specified stakeholders such as the Board, patients and families, the community, and staff and independent practitioners, aware of the organization's ongoing efforts to improve quality and safety. All levels of staff, from the identified governing Board down to frontline caregivers, were found to be accountable for safety in the recommended capacity. The organization was found to have the ability to implement a patient safety program through a specified budget and finally, the Board, CEO and senior leadership were found to be engaged and taking the recommended actions to encourage safe practices.

Table 4. Safe Practice #2 – Culture, Measurement, Feedback, and Intervention

Awareness	In regard to Culture Measurement, our organization has done the following within the last 24 months: a ▌ **conducted a safety and quality survey using a nationally recognized tool with consideration of validity, consistency and reliability, with a sample that accounts for 50% of the aggregated care delivered to patients within the facility, and covers the high patient safety risk units or departments.** b ▌ **portrayed the results of the culture survey in a report, which reflects both hospital-wide and individual unit level results.**

Accountability	In regard to accountability for improvements in the measurement of the culture of safety, our organization has done the following within the last 24 months: a ▉ **involved senior administrative leadership in the identification and selection of sampled units; and, in the selection of an appropriate tool for measuring the culture of safety.** b ▉ **shared the results of the culture measurement survey with the Board (governance) and senior administrative leadership in a formal report and discussion.**
Ability	In regard to the culture of safety measurement, the organization has done the following (or has had the following in place) within the last 12 months: a ▉ **conducted staff education program(s) on methods to improve the culture of safety, or conducted team training development programs, based on survey results. Training was documented in personnel or other administrative records.** b ▉ **included the costs of annual culture measurement/follow-up activities in the patient safety program budget.**
Action	In regard to culture measurement, feedback, and interventions, our organization has done the following or has had the following in place within the last 12 months: a ▉ **developed or implemented explicit, hospital-wide organizational policies and procedures for regular culture measurement (p.88)** **OR** **implemented strategies for improving culture based on survey results.** b ▉ **disseminated the results of the survey widely across the institution, with follow-up meetings held by senior administrative leadership with the sampled units.** c ▉ **identified performance improvement interventions based on the survey results, which were shared with senior administrative leadership and subsequently measured and monitored.**

Children's Hospital was found to utilize the AHRQ Survey on Patient Safety Culture to ensure awareness and measurement of a culture of safety on a regular basis. Senior leadership was found to be accountable for the implementation of the survey, as well as the review of the results, along with the Board. The survey was found to be a line item in the Children's Hospital budget. Survey results were found to drive specific staff education programs, and the organization was found to have developed procedures for conducting both regular culture measurement every 12-18 months, and implementing strategies for improving results, such a training on their anonymous event reporting system. Finally, specific performance improvement interventions were found to be shared, and continually monitored and measured, with senior leadership at monthly PM&I Council meetings.

Table 5. Safe Practice #3 – Teamwork Training and Skill Building

Awareness	In regard to teamwork training and skill building, our organization has done the following within the last 12 months: a ☐ **conducted a literature review of the teamwork training impact in healthcare or in other settings.** **OR** **conducted a review of available teamwork training programs in progressive organizations.** b ☐ **conducted an assessment of high patient safety risk areas by an Interdisciplinary Patient Safety Team to determine specific processes in need of teamwork improvement. Those processes were identified to senior administrative leadership.** c ☐ **informed senior management, mid-level management and physician leadership about the need for teamwork training, skill building, and identified internal resources and possible resources from progressive organizations.** d ☐ **assessed the organizational need for rapid response systems and any associated training.**
Accountability	In regard to leadership being held accountable for the demonstration of teamwork skills in the organization, our organization has done the following within the last 12 months: a ☐ **determined, through a literature review or an assessment, a set of targeted units or service lines for detailed teamwork training and effective teamwork skill building. These units/lines were identified by the CEO to the Board (governance), senior managers, and medical staff.** b ☐ **provided basic teamwork training to the Board (governance), senior managers, medical staff, mid-level management, and frontline nurses on communication hand-offs and team failures leading to patient harm. Training was documented in personnel records.**
Ability	In regard to effective teamwork training and skill building, our organization has done the following within the last 12 months: a ☐ **resourced patient safety program budgets in a sufficient manner to support the assessment of need and team training activities.** b ☐ **provided clinical staff and licensed independent practitioners in the hospital-targeted units detailed teamwork training and skill building. Participation was documented.**
Action	Effective team-centered interventions were either in place or were initiated in the past 12 months, as evidenced by: a ☐ **notation in board minutes documenting that the performance improvement targets in identified units were being addressed.** b ☐ **evaluation or documentation of unit or service line results for teams that had received the detailed team training intervention during the past 12 months.**

Children's Hospital was found to be aware of the need for teamwork training and skill building through both a literature review of the impact of such training and through a targeted review of training programs in innovative organizations. An interdisciplinary team was found to

have assessed the organization for teamwork needs, communicated those findings to senior leadership, and implemented teamwork training for those areas. All levels of staff, from the identified governing Board down to frontline caregivers, have been provided with basic teamwork training, and the organization was found to have implemented a rapid response team. All of these efforts were found to be detailed line items in the Children's Hospital budget.

Table 6. Safe Practice #4 – Identification and Mitigation of Risks and Hazards

Awareness	Within the last 12 months our organization has done the following: a ▉ **assessed risks and hazards to patients by reviewing retrospective sources, such as:** • **serious and sentinel event reporting;** • **root cause analyses for adverse events;** • **independent comparative mortality and morbidity information with the hospital's performance;** • **patient safety indicators;** • **trigger tools;** • **hospital accreditation surveys;** • **risk management and filed litigation;** • **anonymous internal complaints, including complaints of abusive and disruptive caregiver behavior; and** • **complaints filed with state/federal authorities;** **and based on those findings, documented recommendations for improvement.** b ▉ **assessed risks and hazards to patients using prospective identification tools: Failure Modes and Effects Analysis (FMEA) and/or Probabilistic Risk Assessment, and has documented recommendations for improvement.** c ▉ **defined their risk mitigation efforts based on their own risk profile, and has documented recommendations for improvement**. d ▉ **integrated results from the three assessments, noted in (a), (b) and (c) above. Results have been shared widely across the organization, from the Board (governance) to front-line caregivers.**
Accountability	Leadership is accountable for identification of risks, hazards and mitigation efforts in the past year, as evidenced by: a ▉ **approval of an action plan by the CEO and the Board (governance) for undertaking the assessments of risk, hazards and for the mitigation of risk for patients.** b ▉ **incorporation of the identification and mitigation of risks into performance reviews.** **OR** **outlined financial incentives for leadership and the Patient Safety Officer for identifying and mitigating risks to patients as identified in the approved action plan.**

Ability	In regard to developing the ability to appropriately assess risk and hazards, the organization has done the following or had in place during the last 12 months: a ▌ **resourced patient safety program budgets sufficiently to support ongoing risk and hazard assessments and programs for reduction of risk.** b ▌ **provided managers at all levels with training on the tools for monitoring risk in their areas; senior managers have received training in the integration of risk and hazard information across the organization. Training was documented.**
Action	Structures and systems for assuring that leadership is taking direct and specific actions have been in place for the past 12 months, as evidenced by: a ▌ **provided risk identification training to the high risk patient safety units such as: emergency department, labor and delivery, ICUs, and operating rooms.** b ▌ **established or already had in place a structure, developed by the CEO and senior leadership, for gathering all information related to risks, hazards and mitigation efforts within the organization with input from all levels of staff within the organization and from patients and their families.** c ▌ **evidence of high-performance or actions taken for the following five patient safety risk areas: falls, malnutrition, pneumatic tourniquets, aspiration, and workforce fatigue.**

Children's Hospital was found to be fully compliant with Safe Practice #4, with awareness of risks and hazards accomplished through retrospective and prospective sources, as well as the organization's own anonymous event reporting system. Summary reports of these risks and hazards were widely disseminated across the organization, from the Board to frontline caregivers. The Board and the CEO were accountable for approving action plans based on these results, and both incorporated the identification of risks and hazards into performance reviews and established financial incentives through the organization's annual Risk Rebate Allocation program. This program compensated departments that met specific criteria identified to reduce risk with any excess funds left in the organization's self-insurance pool at the end of the fiscal year. High-risk units such as the emergency department, ICUs, and ORs were provided risk identification training, and specific initiatives were undertaken for the five identified safety risk areas. All of this work was found to be incorporated into the Children's Hospital's budget.

Table 7. Safe Practice #9 – Nursing Workforce

Practice #9 – Nursing Workforce	
Is your hospital currently recognized as an American Nurses Credentialing Center (ANCC) Magnet organization?	■ **Yes** □ No

Children's Hospital was found to be certified as a Magnet organization and as such, was not required by the Leapfrog Hospital Survey to complete specific awareness, accountability, ability, and action survey questions for Safe Practice #9.

Table 8. Safe Practice #17 – Medication Reconciliation

Awareness	In regard to adverse drug events and the medication reconciliation process, our organization has done the following or has had the following in place within the last 12 months: a ■ **completed a review of the literature and identified specific best practices for process redesign.** b ■ **performed a hospital-wide evaluation of the frequency and severity of adverse drug events associated with medication reconciliation in our patient population.** c ■ **submitted a report to the Board (governance) with recommendations for measurable improvement targets.**
Accountability	In regard to adverse drug events and the medication reconciliation process, our organization has done the following or has had the following in place within the last 12 months: a ■ **held senior administrative leadership directly accountable for improvements in performance through performance reviews or compensation.** b ■ **held the person responsible for patient safety directly accountable for improvements in performance through performance reviews or compensation.** c ■ **reported to the Board (governance) the results of the measurable improvement targets.**
Ability	In regard to adverse drug events and the medication reconciliation process, our organization has done the following or has had the following in place within the last 12 months: a ■ **conducted staff education and skill development programs, with attendance documented.** b ■ **conducted an education program for all newly hired clinicians on the importance of medication reconciliation, with attendance documented.** c ■ **allocated compensated caregiver staff time and dedicated line item budget resources for best practices development for the organization's medication reconciliation system.**

Action	In regard to adverse drug events and the medication reconciliation process, our organization has done the following within the last 12 months or has had the following in place during the last 12 months and updates are made regularly: a ☐ **developed explicit, hospital-wide organizational policies and procedures regarding medication reconciliation.** b ☐ **implemented a hospital-wide performance improvement program that measures the impact of this specific Safe Practice.** OR monitored a previously implemented hospital-wide performance improvement program that measures, and demonstrates full achievement of, the impact of this specific Safe Practice. c ☐ **implemented standardized processes to obtain and document a complete list of each patient's current medications at the beginning of each episode of care.** d ☐ **implemented standardized processes to ensure that a complete list of the patient's medications is communicated to the next provider of service, including the documentation of communication between providers.** e ☐ **implemented standardized processes to provide the patient, and family/caregiver as needed, a current list and explanation of the patient's reconciled medications upon the patient leaving the organization's care.** f ☐ **have reconciled medications for patients whose care setting, or level of care has changed, or has had a change in health status.**

Children's Hospital was found to meet all standards for Safe Practice #17, having completed a literature review and hospital-wide evaluation of the frequency and severity of adverse drug events associated with medication reconciliation, and having submitted an improvement plan to the Board. Senior leadership and the organization's patient safety officer were found to be directly accountable for these improvements and for reporting performance improvement to the Board. Education for all staff, including newly hired clinicians, concerning this topic was conducted and listed in the Children's Hospital's budget. The organization had specific policies and procedures in place regarding adverse drug events associated with medication reconciliation, and had implemented a performance improvement program that measured progress towards mitigating these events. The organization was found to conduct medication reconciliation at the beginning of each episode of care and at each transition of care.

Finally, Children's Hospital was found to provide a current list of reconciled medications to patients and families upon discharge from the organization.

Table 9. Safe Practice #19 – Hand Hygiene

Awareness	In regard to preventing hospital-acquired infections related to inadequate hand hygiene, our organization has done the following or has had the following in place within the last 12 months: a ▉ **undertaken a hospital-wide educational effort addressing the frequency and severity of hospital-acquired infections within our patient population and the potential impact of performance improvement practices related to improvements in hand hygiene.** b ▉ **submitted a report to the Board (governance) with recommendations for measurable improvement targets.**
Accountability	In regard to preventing hospital-acquired infections related to inadequate hand hygiene, our organization has done the following or has had the following in place within the last 12 months: a ▉ **held clinical leadership directly accountable for this patient safety area through performance reviews or compensation.** b ▉ **held senior administrative leadership directly accountable for this patient safety area through performance reviews or compensation.** c ▉ **held the person responsible for patient safety directly accountable for improvements in performance through performance reviews or compensation.** d ▉ **reported to the Board (governance) the results of the measurable improvement targets.**
Ability	In regard to preventing hospital-acquired infections related to inadequate hand hygiene, our organization has done the following or has had the following in place within the last 12 months: a ▉ **conducted staff education/knowledge transfer and skill development programs, with attendance documented.** b ▉ **documented expenditures on staff education related to this Safe Practice in the previous year.**

Action	In regard to preventing hospital-acquired infections related to inadequate hand hygiene, our organization has done the following within the last 12 months or has had the following in place during the last 12 months and updates are made regularly: a ■ **implemented explicit organizational policies and procedures across the entire organization to prevent hospital-acquired infections due to inadequate hand hygiene including CDC guidelines with category IA, IB, or IC evidence.** b ■ **implemented a formal performance improvement program addressing hospital-acquired infections focused on hand hygiene compliance, with regular performance measurement and tracking improvement.** OR monitored a previously implemented hospital-wide performance improvement program that measures, and demonstrates full achievement of, the impact of this specific Safe Practice.

Children's Hospital was found to be fully compliant with Safe Practice #19. The organization had established a program to understand the frequency and severity of the issue of hospital-acquired infections related to hand hygiene, and submitted a report, including measurable improvement targets, to the Board. Clinical and senior leadership, along with the organization's patient safety officer, were found to be directly accountable for these improvements and for reporting progress to the Board. Staff education about inadequate hand hygiene was conducted, and the resources for this work were included in the Children's Hospital budget. Finally, the organization had established explicit policies and procedures regarding this Safe Practice and had implemented a performance improvement program to measure efforts towards improving hand hygiene compliance.

Table 10. Safe Practice #23 – Prevention of Ventilator Associated Complications

Does your facility care for patients on ventilators?	■ Yes □ No

Awareness	In regard to complications associated with ventilator use, our organization has done the following or has had the following in place within the last 12 months: a ▉ **conducted an evaluation of the frequency and severity of ventilator-associated complications in our patient population and communicated findings to senior administrative and clinical leadership.** b ▉ **submitted a report to the Board (governance) with recommendations for measurable improvement targets.**
Accountability	In regard to complications associated with ventilator use, our organization has done the following or has had the following in place within the last 12 months: a ▉ **held senior administrative leadership and clinical leadership directly accountable for improvements in performance through performance reviews or compensation.** b ▉ **held the person responsible for patient safety directly accountable for improvements in performance through performance reviews or compensation.** c ▉ **reported to the Board (governance) the results of the measurable improvement targets.**
Ability	In regard to complications associated with ventilator use, our organization has done the following or has had the following in place within the last 12 months: a ▉ **conducted a staff education/ knowledge transfer and skill development programs on best practices and strategies to reduce complications with attendance documented.** b ▉ **documented or can document expenses incurred during the past year tied to this Safe Practice.** c ▉ **allocated compensated caregiver staff time to work on this Safe Practice.**
Action	In regard to complications associated with ventilator use, our organization has done the following within the last 12 months or has had the following in place during the last 12 months and updates are made regularly: a ▉ **documented evidence that all ventilated patients are included in an appropriate adult or pediatric specific bundle or prevention plan that is clearly documented in the medical record.** b ▉ **implemented explicit organizational policies for the disinfection, sterilization, and maintenance of respiratory equipment that are aligned with evidenced based guidelines.** c ▉ **documented evidence that all ventilated patients and/or their families have been educated on prevention measures involved in the care of the ventilated patient.** d ▉ **implemented a formal performance improvement program with regular performance measurement and tracking improvement addressing ventilator associated complication prevention and compliance with prevention strategies.** OR monitored a previously implemented hospital-wide performance improvement program that measures, and demonstrates full achievement of the impact of this specific Safe Practice.

Children's Hospital cares for patients on ventilators in its emergency department and ICUs, and was found to be fully compliant with Safe Practice #23. Daily evaluation of the frequency and severity of ventilator-associated complications was conducted and monthly reports were provided to clinical and senior leadership. The same clinical and senior leadership, along with the organization's patient safety officer, was found to be responsible for improvements in this Safe Practice and for providing recommendations and updates on improvement targets to the Board. Staff education on complications associated with ventilator use was conducted by the Children's Hospital Infection Prevention Practitioners, whose time was included in the Children's Hospital's budget. The organization had documented evidence that all ventilated patients were included in a prevention bundle and that patients and families had been educated on prevention strategies. Finally, the organization had established explicit policies and procedures regarding the disinfection, sterilization and maintenance of respiratory equipment, and had implemented a performance improvement program that measured efforts towards preventing ventilator-associated complications.

Specific compliance evidence for each NQF Safe Practice question is illustrated in Appendix 5. Consistent with the Safe Practice Scoring Algorithm, full compliance with all questions resulted in a publicly reported result of 'Fully Meets Standards' or four bars.

Managing Serious Errors – Never Events

VUMC's Disclosure of Unanticipated Outcomes policy (OP 20-10.03) was found to adhere to all of the following Leapfrog principles:

- We will apologize to the patient and/or family affected by the never event;
- We will report the event to at least one of the following external agencies within 10 days of becoming aware that the never event has occurred:

  - Joint Commission, as part of its Sentinel Events policy
  - State reporting program for medical errors
  - Patient Safety Organization (as defined in the Patient Safety and Quality Improvement Act of 2005)

- We will perform a root cause analysis, consistent with instructions from the chosen reporting agency;
- We will waive all costs directly related to a serious reportable adverse event;
- We will make a copy of this policy available to patients, patients' family members, and payers upon request.

Consistent with the Never Events Scoring Algorithm, adherence to all required principles resulted in a publicly reported result of 'Fully Meets Standards' or four bars.

Managing Serious Errors – CLABSI

Following the internal review of infection data and practices, the following information was submitted to the Leapfrog Hospital Survey in relation to CLABSIs (answers in bold):

1. Does your hospital care for patients with central lines in an intensive care unit (ICU)? (**Yes**/No)
2. Has your hospital measured its incidence of Central Line Associated Blood Stream Infections (CLABSI) for the reporting time period and chosen to report this information to the survey? (**Yes**/No)
3. Does your hospital utilize personnel trained in human factors engineering in conducting root-cause analyses of adverse events (e.g., central line associated bloodstream infections? (**Yes**/No)

4. Is your hospital designated as a "major teaching hospital?"[1] (**Yes**/No)

5. For each applicable ICU, indicate the appropriate data (see Table 11):

Table 11. CLABSI Data by ICU

ICU Type	Does your hospital operate this type of ICU?	# of Central Line Days	# of Central Line Associated Bloodstream Infections
Pediatric Medical/Surgical	**Yes** No	2155	0
Pediatric Cardiothoracic	**Yes** No	4784	3
Level III NICU	**Yes** No		
Birthweight Category			
≤ 750 g		1928	4
751 – 1, 000 g		1992	1
1,001 – 1,500 g		1872	0
1,501 – 2,500 g		2810	1
> 2,500 g		4079	5

Utilizing the CLABSI Scoring Algorithm, these data translated to the following SIRs:

- Pediatric Medical/Surgical (PICU): 0.00
- Pediatric Cardiothoracic (PCICU): 0.21
- Level III NICU
    - ≤ 750 g: 0.53
    - 751 – 1, 000 g: 0.15
    - 1,001 – 1,500 g: 0.00
    - 1,501 – 2,500 g: 0.15
    - > 2,500 g: 0.65

[1] A major teaching hospital is defined as having a minimum ratio of one resident per four staffed inpatient beds or has self-designated to the CDC NHSN.

This translated to an overall hospital CLABSI SIR of 0.26 and resulted in a publicly reported result of 'Substantial Progress' or three bars. Chapter 5 will address recommended strategies for improving these results.

Managing Serious Errors – CAUTI

After a process analogous to CLABSI data collection, the following information was submitted to the Leapfrog Hospital Survey in relation to CAUTIs (answers in bold):

1. Does your hospital care for patients with indwelling urinary catheters in an intensive care unit (ICU)? (**Yes**/No)
2. Has your hospital measured its incidence of Catheter-Associated Urinary Tract Infections (CAUTI) for the reporting time period and chosen to report this information to the survey? (**Yes**/No)
3. Is your hospital designated as a "major teaching hospital?" (**Yes**/No)
4. For each applicable ICU, indicate the appropriate data (see Table 12):

Table 12. CAUTI Data by ICU

ICU Type	Does your hospital operate this type of ICU?	# of Urinary Catheter Days	# of Catheter-Associated Urinary Tract Infections
Pediatric Medical/Surgical	**Yes** No	478	1
Pediatric Cardiothoracic	**Yes** No	891	1

Utilizing the CAUTI Scoring Algorithm, these data translated to the following SIRs:

- Pediatric Medical/Surgical (PICU): 0.50
- Pediatric Cardiothoracic (PCICU): 1.07

This translated to an overall hospital CAUTI SIR of 0.87 and resulted in a publicly reported result of 'Some Progress' or two bars. Chapter 5 will address recommended strategies for improving these results.

Safety-Focused Scheduling

The following results were submitted to the Leapfrog Hospital Survey for this section (answers in bold):

1. Does your hospital operate more than one operating room that services inpatients (i.e., exclude any operating rooms that service outpatients)? (**Yes**/No)
2. Did elective inpatient surgeries make up 10% or more of your hospital's total inpatient admissions during the latest 12-month period? (**Yes**/No)
3. For those operating rooms that service inpatients, has your hospital designated specific operating rooms for "elective/scheduled" surgeries and other operating rooms for "urgent/emergent" surgeries? (**Yes**/No)
4. In those operating rooms that service inpatients and that have been designated for scheduled and/or elective surgeries, what were your hospital's total available 'prime time' hours during the reporting period? (**25,420**)
5. In those operating rooms that service inpatients and that have been designated for scheduled and/or elective surgeries, what were your hospital's total utilized 'prime time' hours during the reporting period? (**21,562**)

Upon dividing the total utilized 'prime time' hours by the total available 'prime time' hours, Children's Hospital reported an average utilization rate of 85%, rounded up from 84.8%.

Consistent with the Safety-Focused Scheduling Scoring Algorithm, this resulted in a publicly reported result of 'Fully Meets Standards' or four bars.

Strengths and Opportunities for Improvement

In reviewing the above results, it was concluded that organizational strengths lie in the overall robust survey review procedures, and CPOE, IPS, and NQF Safe Practice compliance. The review process, including validation by the thesis investigator through review of policies, meeting minutes, organizational tools and observations of applicable processes (as opposed to simply obtaining yes or no responses from designated leaders) ensures data integrity. The CPOE, IPS, and NQF Safe Practice sections were each fully compliant and resulted in strong publicly reported results.

The key opportunities for improvement include CLABSI and CAUTI rates, NQF Safe Practice processes for information sharing with the Board, and Safety-Focused Scheduling. The CLABSI rates, particularly in the PCICU and NICU, as well as the CAUTI rates, represent the lowest publicly reported survey score achieved by Children's Hospital. While the NQF Safe Practices were each determined to be compliant, the individual questions related to information sharing with the Board lacked comprehensive evidence. Finally, while the Safety-Focused Scheduling survey item also achieved full compliance, the utilization rate of 85% lay directly on the cut off between 'Fully Meets Standards' or four bars and 'Substantial Progress' or three bars. Specific strategies for improvement for each of the opportunities are discussed in Chapter 5.

National Comparison

After publicly reported results were published on The Leapfrog Group's website, a comparison matrix was created comparing Children's Hospital's 2013 results against the 2013 results for the 2012 Leapfrog Top Pediatric Hospitals (Figure 1). This matrix, while not

inclusive of all children's hospitals, suggests that Children's Hospital has a high likelihood of making the 2013 Leapfrog Top Pediatric Hospital list.

Summary

Children's Hospital's reported results for the CPOE, IPC, NQF Safe Practices, Managing Serious Errors – Never Events, and Safety-Focused Scheduling sections fully met Leapfrog standards. Results for Managing Serious Errors – CLABSI and Managing Serious Error – CAUTI met Leapfrog standards for 'Substantial Progress' and 'Some Progress,' respectively. These results lead to identification of specific strengths, as well as opportunities for improvement, even among results that fully met Leapfrog standards. Recommendations for process changes are presented in the following chapter. Overall, the 2013 Children's Hospital results demonstrate that the organization has implemented evidence-based best practices in a manner comparable to other highly ranked pediatric hospitals.

Figure 1. National Comparison Matrix

2013 Leapfrog Ratings

(Comparison between 2012 Top Hospitals)

Hospital Name	City	CPOE	ICU Staffing	Safe Practices Score	Managing Serious Errors	Reduce ICU Infections		Safety-Focused Scheduling
						CLABSIs - ICU	CAUTIs - ICU	
Monroe J. Carell Jr. Children's Hospital at Vanderbilt	Nashville, TN							
Phoenix Children's Hospital	Phoenix, AZ							
Children's Hospital Los Angeles	Los Angeles, CA							
Children's National Medical Center	Washington, DC							
Nemours/Alfred I. duPont Hospital for Children	Wilmington, DE							Response Not Required
Children's Mercy Hospitals South Campus	Overland Park, KS		Does Not Apply			Does Not Apply		
Boston Children's Hospital	Boston, MA							
Children's Hospitals and Clinics of Minnesota - Saint Paul	Saint Paul, MN							
Cincinnati Children's Hospital Medical Center	Cincinnati, OH							
Nationwide Children's Hospital	Columbus, OH							
Cook Children's Medical Center	Fort Worth, TX							
MultiCare Mary Bridge Children's Hospital & Health Center	Tacoma, WA							Declined to Respond

CHAPTER 5: CONCLUSIONS, RECOMMENDATIONS, AND IMPLICATIONS

Introduction

This chapter summarizes the major findings of the Children's Hospital Leapfrog Hospital Survey assessment and the relevance of these findings to overall efforts to improve pediatric inpatient quality and safety. Specific implications for the Children's Hospital are presented in the form of recommended improvement strategies. Additionally, recommendations for future assessments at the Children's Hospital and for improvements in the use of the data on a national scale are outlined.

Summary of Study

The prevalence of preventable medical errors in the U.S. resulted in several healthcare organizations, including the AHRQ, IOM, CDC, and NQF, taking steps to encourage the practice of publicly reporting inpatient quality indicator data. This reporting led to the increased availability of benchmarks to guide individual hospital improvements and inform the public and healthcare purchasers about choices in health care. Such benchmarks also illustrated the variations in quality and safety performance across the nation, including pediatric inpatient facilities. The literature review presented in Chapter 2 found correlations between publicly reported benchmarks and improved quality of care to be inconclusive, but the overall process of public reporting was identified as a growing best practice and an increasingly accepted component of quality improvement. The Leapfrog Hospital Survey was identified to be one such public reporting venue focused on reporting progress towards implementation of specific evidenced-based practices. The specific assessment presented in this thesis was conducted to determine Children's Hospital's compliance with applicable pediatric survey sections, to understand how the organization compared to other pediatric hospitals across the nation, and to

use this information to identify strengths and opportunities for improvement in order to conduct targeted improvement initiatives.

A mixed-method approach, grounded in complexity theory, was employed to conduct this assessment. Qualitative data was collected for the CPOE, IPS, NQF Safe Practices and Managing Serious Errors – Never Events sections through standardized interviews and policy review. Quantitative data was collected for the Managing Serious Errors – CLABSI, Managing Serious Errors – CAUTI, and Safety-Focused Scheduling sections using organizational data repository systems. All data was compiled into Microsoft Word, Excel, and PowerPoint tools. Analysis was conducted based on Leapfrog scoring algorithms specific to each survey section.

Conclusions

This assessment revealed that Children's Hospital fully met Leapfrog standards in regards to the CPOE, IPS, NQF Safe Practices, Managing Serious Errors – Never Events, and Safety-Focused Scheduling Sections. Managing Serious Errors – CLABSI met Leapfrog standards for 'Substantial Progress,' while Managing Serious Errors – CAUTI met Leapfrog standards for 'Some Progress.' Finally, a comparison of Children's Hospital's publicly reported results against 2012 Leapfrog Top Pediatric Hospital revealed that the organization reported results similar to its competitors and that there is a high likelihood of being named to the 2013 Leapfrog Top Pediatric Hospital list.

These results facilitated the identification of key opportunities for quality and patient safety improvement for Children's Hospital. While the hospital achieved full compliance with NQF Safe Practices, 15 questions specifically referencing information sharing with the Board had the least comprehensive supporting evidence (see Appendix 5). This was in part due to the fact that the organization is part of a larger medical system and therefore, has relatively little

control over the information filtered up to the governing board. While the Safety-Focused Scheduling result of 85% utilization lies directly on the cut off between 'Fully Meets Standards' and 'Substantial Progress,' no issues were identified that would contribute to improved utilization scores utilizing Leapfrog's methodology. The failure to fully meet Leapfrog standards for the Managing Serious Errors – CLABSI section was determined to be driven by PCICU and NICU ≤ 750g and > 2500g birth weight SIRs. Since a combined CLABSI SIR of zero was required to achieve full compliance with this section, the remaining NICU birth weights were found to also require targeted improvements. Finally, failure to fully meet Leapfrog standards for the Managing Serious Errors – CLASBI section was found to be driven primarily by the PCICU SIR. Similar to Managing Serious Errors – CLABSI, the need for comprehensive CAUTI improvement efforts spanning both the PICU and PCICU was identified in order to improve the overall CAUTI SIR. Appendix 6 illustrates the specific SIRs for both infection survey sections, including a breakdown of data by hospital unit.

Recommendations and Implications

In order to address the above identified opportunities for improvement, several targeted improvement strategies should be initiated. To address the issue of information sharing with the Board, the VUMC Chief Quality Officer must first determine the appropriate communication frequency and method, as Board agenda time is limited. Based on this information, Children's Hospital leadership must collaborate with leadership of all other VUMC entities, including Vanderbilt University Hospital and Vanderbilt Medical Group, to establish processes for presentation of standardized reports to the Board that include Leapfrog Hospital Survey components. It may be appropriate to create quarterly PowerPoint presentations with rotating Leapfrog Hospital Survey topics to be emailed to the Board. Children's Hospital leadership

must then ensure it is kept apprised of the date and content of these reports for evidence tracking purposes.

To address issues related to CLABSI and CAUTI rates, several approaches are needed. These approaches include real-time huddles after infections occur in order to identify contributing factors, and the trending of this huddle data to identify causal themes, coupled with implementation and measurement of infection prevention bundles. The huddles should be multidisciplinary, including frontline caregivers, and should be led collaboratively by the Infection Prevention Practitioners and the PM&I team. The trending of the huddle data should be the responsibility of the PM&I team, but collaboration should again occur with the Infection Prevention Practitioners when determining potential improvement interventions based on the data. Finally, infection prevention bundles should be created with input from frontline caregivers, who also should conduct observational audits of bundle compliance. The audit data should be entered into an Access database maintained by the PM&I team, who regularly analyze cumulative reports for opportunities for improvement with bundle compliance. These bundles should include fundamental practices, such as hand hygiene, and specific components, such as scrubbing catheter hubs, identified through an in-depth literature review and with input from frontline caregivers. Finally, while the Leapfrog Hospital Survey does not require data reporting of acute care CLABSI or CAUTI data, the current reporting of these data to the CDC indicates that this may be required by the Leapfrog Hospital Survey in the future (Centers for Disease Control and Prevention, 2013). Therefore, the improvement approaches recommended here should also be applied in the acute care setting. When doing so, the approaches may need to be customized consistent with principles of complexity theory, which recognizes individual departments as unique systems that may require tailored improvement approaches (see Chapter 3

for additional details). This should be done through stakeholder interviews and focus groups with all unit staff, from physician and clinical leaders to nursing and ancillary staff. The implementation of these recommendations should further improve the level of quality and safety at Children's Hospital.

To address the reliability of Leapfrog Hospital Survey data, Children's Hospital should maintain direct contact with The Leapfrog Group. As concluded in the literature review presented in Chapter 2, there is a need for methods to verify hospital reported compliance with Leapfrog standards. Accordingly, the Children's Hospital should encourage the Leapfrog Hospital Survey to require submission of supportive evidence for each survey section. If the assessment process outlined in this thesis is followed in subsequent years, the supportive evidence will be collected and therefore, this will require no additional work for the hospital. Furthermore, this will help drive the collection of reliable data across the country, and should facilitate future research endeavors to determine any significant correlations between public reporting and improved care quality and patient outcomes.

Finally, to address the need for ongoing improvement at Children's Hospital, it is recommended that the assessment outlined in this thesis be completed on an annual basis and that the results continue to be reported to Leapfrog. This will enable continued identification of organizational strengths and weaknesses, as well as pediatric inpatient benchmarking of evidenced based quality and safety indicators. This methodology can be replicated and implemented in other pediatric hospitals and thus contribute to improvements in national pediatric inpatient quality and safety.

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APPENDICES

Appendix 1. Basic Hospital Information

Section 1: Basic Hospital Information	

Organization Information

If your hospital is part of a larger healthcare system, you should respond to this survey for your individual hospital only. Your hospital has been identified based on its separate designation as a Medicare-certified hospital. (If your hospital was not included in the roster derived from the Medicare Provider of Service directory, you have been assigned a special identification number for the purposes of completing this survey only.)

Your responses should reflect the status and information pertaining only to this hospital, as identified. If you are responding on behalf of a multi-hospital system, separate survey responses are required for each hospital based on their separate Medicare certification (or the special identifier assigned to your hospital).

1)	Hospital name *(make any necessary corrections online)*	Monroe Carell Jr. Children's Hospital at Vanderbilt
2)	Street address	2200 Children's Way
3)	City	Nashville
4)	State	TN
5)	ZIP code	37232-9625-9900
6)	Main phone number	615-936-4040
7)	Hospital's Medicare Provider Number (MPN)	44-0039
8)	Hospital Web site address (So consumers can learn more about your hospital's efforts in the area of patient safety and quality improvement.) Tips for entering Web addresses	http://www.childrenshospital.vanderbilt.org
9)	Number of licensed medical, surgical, and obstetric beds.	229
10)	Number of staffed medical, surgical, and obstetric beds.	229
11)	Number of total acute-care admissions to your hospital for most recent 12 months available.	9848
12)	Number of licensed ICU beds.	42
13)	Number of staffed ICU beds.	42
14)	Number of admissions to adult and pediatric general medical/surgical ICU(s) for most recent 12 months available.	2253
15)	Is this hospital part of a healthcare system or Integrated Delivery Network (IDN)?	*Yes* *No*
16)	If so, please enter the name of the healthcare system or IDN.	
17)	Is your hospital a member of the Council of Teaching Hospitals and Health Systems (COTH)?	*Yes* *No*
18)	If no, is your hospital considered a teaching hospital?	*Yes* *No*
19)	Hospital's federal tax identification number (TIN)	62-0476822

Contact Information

1) Name of Chief Executive Officer of your hospital	C. Luke Gregory
2) Name of Chairman of Board of your hospital	Mark F. Dalton
3) Name of contact person for this survey	Jenny Slayton
4) Contact's title	Administrative Director, Performance Management and Improvement
5) Contact's phone number	615-936-6192
6) Contact's e-mail address	jennifer.slayton@Vanderbilt.Edu
If this hospital is part of a healthcare system or Integrated Delivery Network (IDN), you may *optionally* indicate a contact person at the system level to be included in communications about your hospital's survey.	
7) Name of system contact for this survey	C. Wright Pinson
8) System contact's e-mail address	Wright.pinson@vanderbilt.edu
Leapfrog may need to contact your hospital's community relations department (e.g., if your hospital is chosen as a Leapfrog Top Hospital).	
9) Name of public relations contact at your hospital	John Howser
10) Public relations contact's phone number	615-322-4747
11) Public relations contact's e-mail address	john.howser@Vanderbilt.Edu

Appendix 2. Survey Overview and Timeline Presentation

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2013 Leapfrog Survey

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2013 Survey Overview

Leaps

- Computerized Physician Order Entry (CPOE) – *no evaluation test*
- ICU Physician Staffing (IPS)
- NQF Safe Practices

Safe Practices

- SP #1: Leadership Structures and Systems
- SP #2: Culture Measurement for Performance
- SP #3: Teamwork Training and Skill Building
- SP #4: Identification and Mitigation of Risks and Hazards
- SP #9: Nursing Workforce
- SP #17: Medication Reconciliation
- SP #19: Hand Hygiene
- SP #23: Prevention of Ventilator Associated Complications

Managing Serious Errors

- Never Events Policy
- Central Line Associated Blood Stream Infections – PCCU and NICU
- Catheter Associated Urinary Tract Infections – PCCU

Safety-Focused Scheduling (OR utilization)

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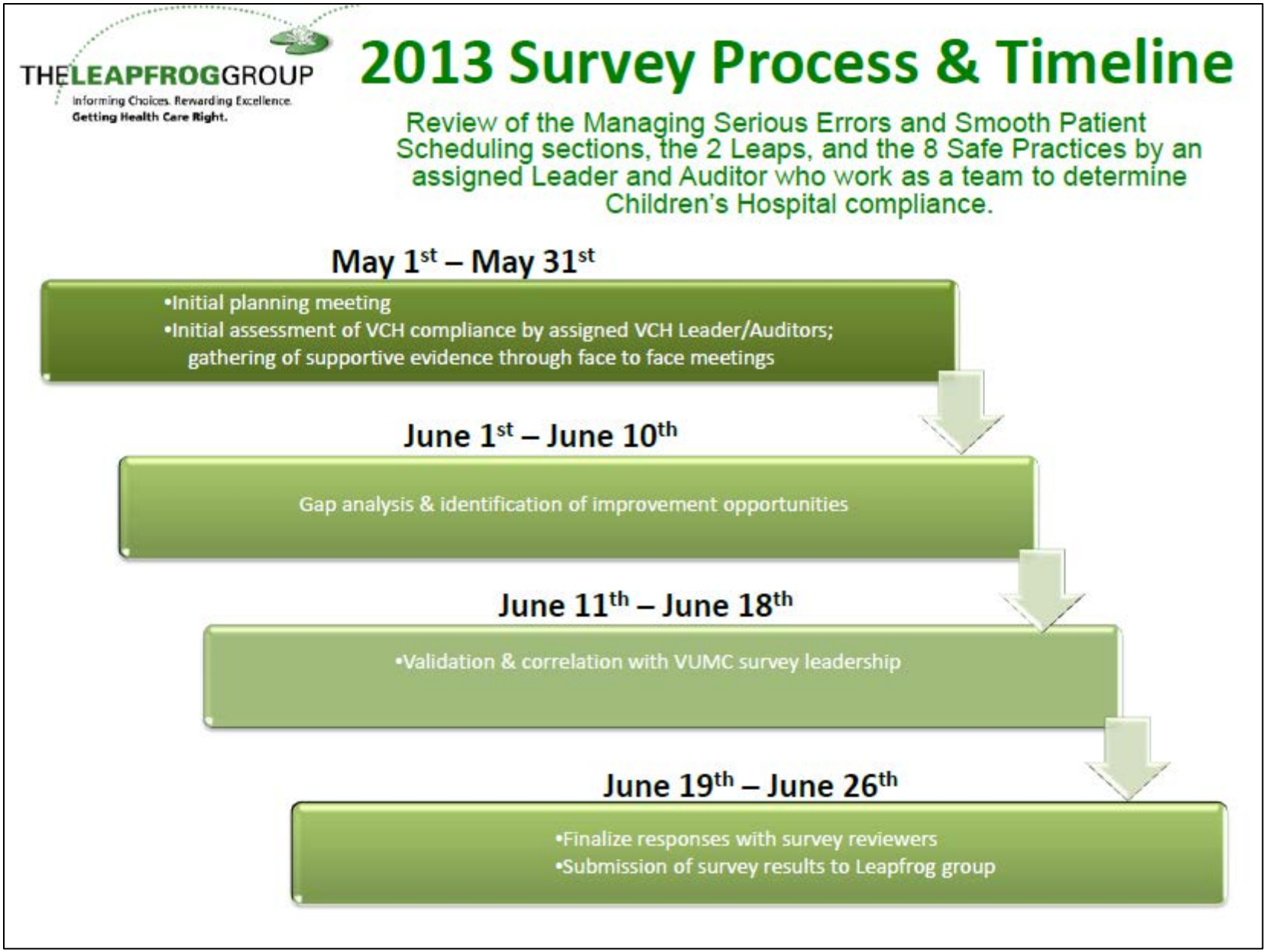
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2013 Survey Process & Timeline
Review of the Managing Serious Errors and Smooth Patient Scheduling sections, the 2 Leaps, and the 8 Safe Practices by an assigned Leader and Auditor who work as a team to determine Children's Hospital compliance.
May 1st – May 31st
•Initial planning meeting
•Initial assessment of VCH compliance by assigned VCH Leader/Auditors; gathering of supportive evidence through face to face meetings
June 1st – June 10th
Gap analysis & identification of improvement opportunities
June 11th – June 18th
•Validation & correlation with VUMC survey leadership
June 19th – June 26th
•Finalize responses with survey reviewers
•Submission of survey results to Leapfrog group

Appendix 3. Survey Accountability and Response Tracking Grid

	Tracking						
							Accountability
Safe Practices	**Meeting Date**	**Status**	**Questions Identified**	**Person (s) Responsible**	**Due Date**	**Comments**	**L=Leader A=Auditor**
Basic Hospital Information							
	Email	Completed	Email J. Kasnick for information.	S.M.Schlafly	ASAP	Returned by Mike McConnell	L=Mike McConnell A=S.M. Schlafly
	5/19/13	Completed	Contact Help Desk x2 to determine definition of #17	S.M.Schlafly	ASAP		
		Completed	Add Julie Morath to #7 & #8	S.M.Schlafly	ASAP		
Common Acute Conditions (CAC) (N/A)							
Smooth Patient Scheduling							
							L=D. Anderson; Barbara Shultz; D. Roke A=S.M. Schlafly
Managing Serious Errors (Hospital Acquired Infections and Serious Reportable Events)							
	5/19/13	Completed	Contact T. Louis for CLABSI information and then J. Grantham to ensure a match w/publically reported data; P. Hain to finalize	S.M.Schlafly	ASAP		L=Travis Harper A=S.M. Schlafly
		Completed	Pull Never Events/Disclosure policy for correlation meeting	S.M.Schlafly	ASAP		

	Tracking						
							Accountability
Safe Practices	**Meeting Date**	**Status**	**Questions Identified**	**Person (s) Responsible**	**Due Date**	**Comments**	**L=Leader A=Auditor**
4 Leaps (ICU, CPOE, EBHR, and Safe Practices)							
SP #11	**Intensive Care Unit**						
	Email	Completed	Email PCCU for information/confirmation	P. Throop	ASAP	Compliant w/Leap	L=Fred Lamb A=S.M. Schlafly
	Email	Completed	Email the Help Desk to clarify #4	S.M.Schlafly	ASAP		
SP #16	**Safe Adoption of Computerized Prescriber Order Entry**						
	5/8/13	Completed	Determine % of in-patient medication orders entered via CPOE for Children's Hospital	Leslie Mackowiak	ASAP		L=N. Patel, N. Proctor, P. Hain, L. Mackowiak A=S.M. Schlafly
	Evidence-Based Hospital Referral (EBHR) (N/A)						
17 Safe Practices: Leapfrog Reporting							
SP #1	**Leadership Structures and Systems**						
	5/6/13	Completed	None				L=J. Slayton A=S.M. Schlafly
SP #2	**Culture Measurement, Feedback, and Intervention**						
		Completed	**2.2b:** F/u w/J. Cotton re: if info has been shared w/Board	J. Slayton	ASAP	Information shared during Oct 30th Patient Quality and Safety Oversight Committee	
		Completed	**2.4c:** Schedule meeting w/J. Slayton re: EOPS survey dates and next steps	S.M.Schlafly	ASAP	Meeting held 05/06/13. Measurable actions stemming from survey results to be shared at PM&I Exec meeting on 05/07/13	

	Tracking						
							Accountability
Safe Practices	**Meeting Date**	**Status**	**Questions Identified**	**Person (s) Responsible**	**Due Date**	**Comments**	**L=Leader A=Auditor**
	4/30/13	Completed	Discuss content of Board presentations over last 12 months w/B. Joers, as well as presentations that need to go ASAP	P. Throop & S.M.Schlafly	ASAP	Full Board and Q&S Committee topics/agendas obtained. Presentations of FMEA, Informed Consent & Advanced Directive audits and ADE collab created for May Board meeting	L=J. Slayton A=S.M. Schlafly
		Open	Create grid of standing Board presentation topics required by Leapfrog	P. Throop	5/19/2013		
	5/1/13	Completed	None				
SP #3	**Teamwork Training and Skill Building**						
	5/4/13	Completed	**3.1b**: Discuss status of safety champs and need to share w/Admin Board and Med. Directors w/L. Allen	S.M.Schlafly	By 5/8/13	Pilot will not end until July	L= J. Slayton A=S.M. Schlafly
		Completed	**3.2a**: F/u w/P. Hain to determine if CRM was discussed in preparation for Board walk-through	P. Throop & S.M.Schlafly	ASAP	CRM discussed at Board meeting when recapping walk-through events	
		Completed	**3.2a & 3.4a**: F/u w/B. Joers re: Board information	P. Throop & S.M.Schlafly	ASAP	Rapid response discussed through RCA during Oct 30th Q&S Committee meeting	
		Completed	**3.3a**: F/u w/J. Slayton to confirm that CRM is part of PM&I budget	S.M.Schlafly	ASAP	CRM efforts are funded by PM&I	
SP #4	**Identification and Mitigation of Risks and Hazards**						

	Tracking						
							Accountability
Safe Practices	**Meeting Date**	**Status**	**Questions Identified**	**Person (s) Responsible**	**Due Date**	**Comments**	**L=Leader A=Auditor**
	5/6/13	Completed	Request Board slides/agendas from J. Cotton	S.M.Schlafly	5/6/2013	Full Board and Q&S Committee slides/agendas obtained	L= J. Slayton; P. Throop A=S.M. Schlafly
		Completed	**4.1b & 4.1d**: Request FMEA information from K. Rogers	S.M.Schlafly	5/6/2013	Information obtained	
		Completed	Send all reports need for Board to B. Joers	P. Throop & S.M.Schlafly	5/6/2013	FMEA, Informed Consent and Advanced Directive audits and ADE Collab slides sent	
SP #9 Nursing Workforce							
	5/1/13	Completed	**9.1c, 9.2d, 9.2e, 9.2f & 9.4f:** Discuss need for information to go to Board w/B. Joers and P. Hain	P. Throop & S.M.Schlafly	ASAP	Nursing Quality Indicators go to Board	L=S. Hernandez A=S.M. Schlafly
SP #17 Medication Reconciliation							
	4/29/13	Completed	**17.3b:** Email D. Arnow re: education information	P. Throop	ASAP	New hires, PNRs	L= N. Patel; J. Slayton A=S.M. Schlafly
		Completed	**17.2b**: F/u w/P. Hain	P. Throop & S.M.Schlafly	5/19/2013	Compliant	
	5/1/13	Completed	None				
SP #19 Hand Hygiene							
	4/28/13	Completed	**19.1b & 19.2d:** Determine dates of Board presentations	P. Throop & S.M.Schlafly	ASAP	Taken to VUMC level Board but not Children's. Will mark as compliant but note as opportunity for improvement	L=A. Allen, T. Talbot
		Completed	**19.2b**: F/u w/BJ & PH	P. Throop & S.M.Schlafly	5/19/2013	Compliant	
		Completed	**19.2c**: F/u w/P. Hain	P. Throop & S.M.Schlafly	5/19/2013	Compliant	

	Tracking						
							Accountability
Safe Practices	**Meeting Date**	**Status**	**Questions Identified**	**Person (s) Responsible**	**Due Date**	**Comments**	**L=Leader A=Auditor**
		Completed	**19.3a**: F/u w/T. Louis re: education	S.M.Schlafly	ASAP	See documentation	A=S.M.Schlafly
		Completed	**19.4b**: F/u w/ B. Nelson or T. Fortenberry re: audit numbers	P. Throop	ASAP	Tentative numbers obtained; system still in progress	
	5/19/13	Completed	**19.1b & 19.2d:** Send graph for Board presentation	P. Throop & S.M.Schlafly	ASAP	VUMC level data presented to Children's Board	
SP #23	**Care of the Ventilated Patient**						
	5/8/13	Completed	**23.2b**: F/u w/P. Hain	P. Throop & S.M.Schlafly	5/19/2013	Compliant	L=T. Hann, G. Wilson A=P. Throop, S.M.Schlafly
		Completed	**23.4a:** Determine if true for NICU	T. Louis	ASAP	Not currently documented but may be able to add to HED	
	5/8/13	Completed	**23.4b:** F/u w/C. Lynn re: polices	T. Louis	ASAP	Policies obtained	
		Completed	**23.4c:** Determine if education is a part of the pathway	P. Throop	ASAP		
	5/19/13	On Hold	**23.4a**: Ask S. Hernandez if NICU bundle documentation can be added to HED	P. Throop	ASAP		L=J. Smith, T. Boswell, G. Wilson A=S.M. Schlafly
		Completed	**23.4a:** Contact Daniel and Neil re: NICU documentation	P. Throop	ASAP		

Appendix 4. Presentation Summary of Expected Survey Results, Strengths and Opportunities for Improvement

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2013 Leapfrog Survey Update

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Leapfrog Top Hospital
The Leapfrog Group
2008
Top Hospital
2008
2009
2012
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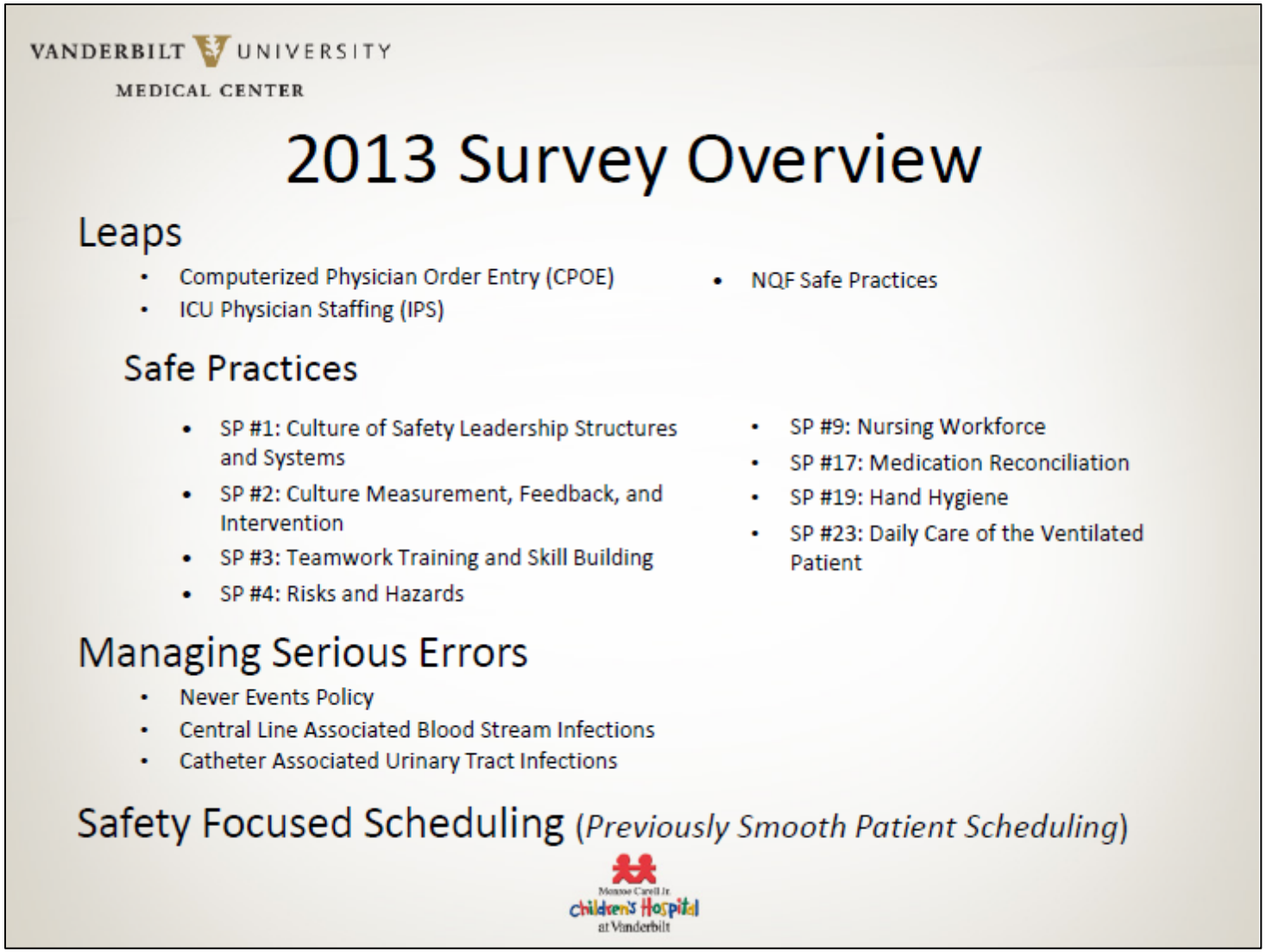
VANDERBILT UNIVERSITY
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2013 Survey Overview
Leaps
Computerized Physician Order Entry (CPOE)
ICU Physician Staffing (IPS)
NQF Safe Practices
Safe Practices
SP #1: Culture of Safety Leadership Structures and Systems
SP #2: Culture Measurement, Feedback, and Intervention
SP #3: Teamwork Training and Skill Building
SP #4: Risks and Hazards
SP #9: Nursing Workforce
SP #17: Medication Reconciliation
SP #19: Hand Hygiene
SP #23: Daily Care of the Ventilated Patient
Managing Serious Errors
Never Events Policy
Central Line Associated Blood Stream Infections
Catheter Associated Urinary Tract Infections
Safety Focused Scheduling (Previously Smooth Patient Scheduling)
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Leaps

- Computerized Physician Order Entry (CPOE): 
- ICU Physician Staffing (IPS): 
- NQF Safe Practices Score: 

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NQF Safe Practices

- Components
  - Awareness
    - Understand and address performance opportunities
  - Accountability
    - Direct accountability of appropriate leaders
  - Ability
    - Investment ranging from education, skill development, allocated human resources, and line item budget allocations
  - Action
    - Improvement programs and projects for sustained performance
- Opportunities for Improvement
  - Standardized and consistent information sharing with the Board
  - VAP patient and family education

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Managing Serious Errors

- "Never Events" Policy Statement: 

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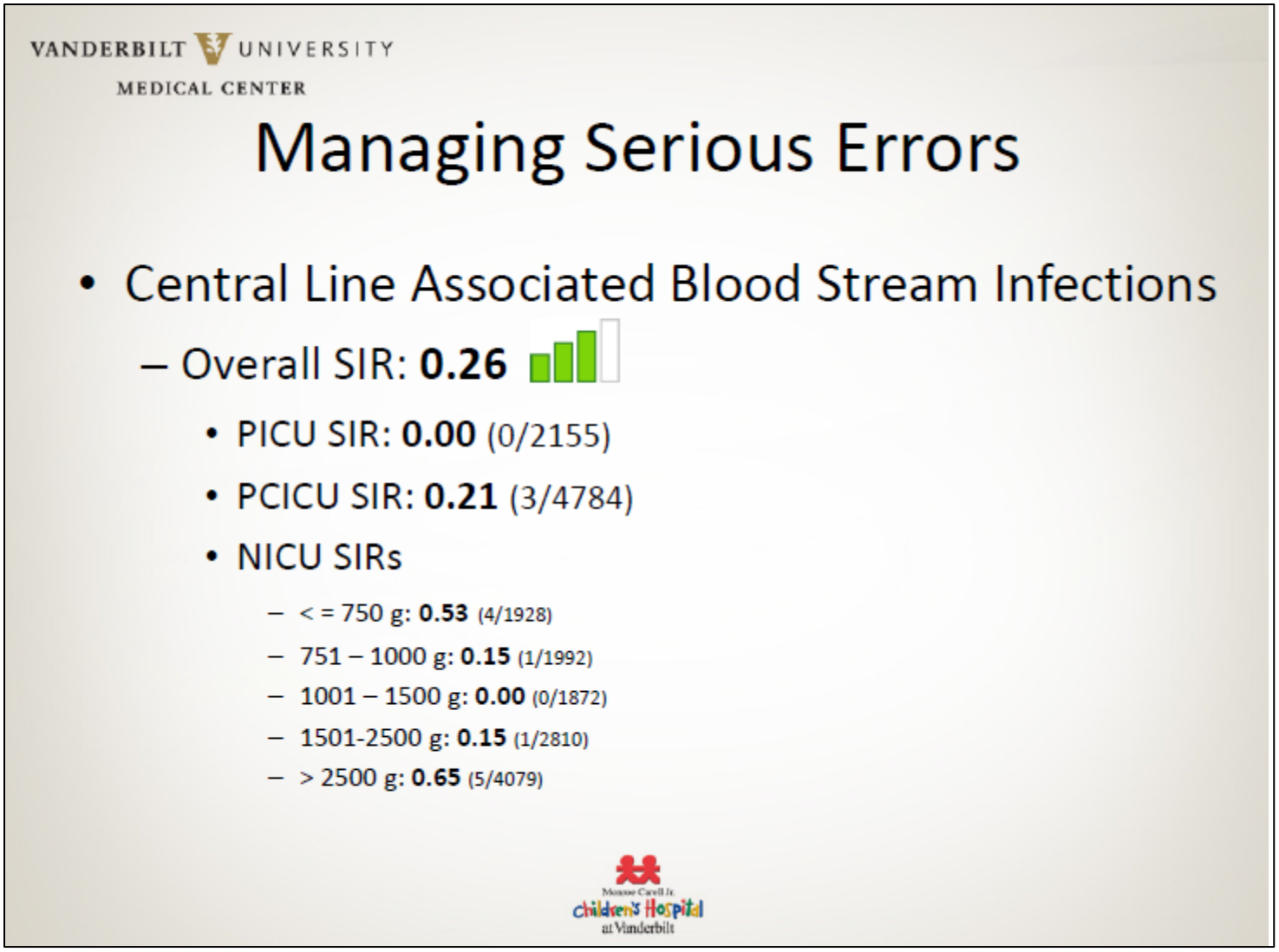
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Managing Serious Errors
• Central Line Associated Blood Stream Infections
– Overall SIR: 0.26
• PICU SIR: 0.00 (0/2155)
• PCICU SIR: 0.21 (3/4784)
• NICU SIRs
– < = 750 g: 0.53 (4/1928)
– 751 – 1000 g: 0.15 (1/1992)
– 1001 – 1500 g: 0.00 (0/1872)
– 1501-2500 g: 0.15 (1/2810)
– > 2500 g: 0.65 (5/4079)
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Managing Serious Errors

- Catheter Associated Urinary Tract Infections
  - Overall SIR: **1.59** 
    - PICU SIR: **0.95** (1/478)
    - PCICU SIR: **1.92** (4/891)

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Safety-Focused Scheduling

- Purpose:
  - Use operations management methods to smooth patient flow across operating rooms
    - Eliminate unnatural fluctuations & achieve optimal scheduling of patient procedures
- Information & Data Collection Process:
  - Proposed responses compiled based on agreed upon definitions/notes
- Goal:
  - 85% average utilization across ORs that service inpatients (elective/scheduled surgeries)
- Key Results: TBD ()

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Lessons Learned

- Strengths
  - Overall survey process
  - Leaps: CPOE, IPS, Safe Practices
- Opportunities for Improvement
  - CLABSI and CAUTI rates
  - Information sharing with the Board
  - VAP patient and family education

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Next Steps

- Next Steps
  - PM&I Exec endorsement
  - Final sign off with Mr. Gregory, Dr. Pinson, Mr. Posch
  - Survey submission

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Appendix 5. NQF Safe Practice Evidence Tracking Matrix

		Evidence	Evidence Location
SP #1	**Leadership Structures and Systems**		
	1.1 Awareness		
a	Board minutes for last 12 months - risk,hazards,culture & progress toward resolution.	All board requirement information will be checked as compliant based on overlap with VUH. Rationale: Board = MCMB; all QPS Steering Committee minutes and QPI reports feed up to MCMB. Also consider Med Center Affairs Committee presentation from Dr. Pinson.	
b	Patients & families formally involved in Q & S committees	Family Advisory Council - regularly discusses quality & safety at monthly meetings; VUMC QPS Council; VUMC Nursing Quality Council; VMG Council	J. Cross; S. Polancich; J. Slayton
c	Community aware of efforts to improve Q&S	Children's website quality page; community pediatricians members of PM&I Council, MM&I ; advocacy work; CHAT; Cumberland Foundation COS presentation; Community Outreach (car seats); N&PA	Children's Hospital Quality Initiatives; J. Cotton; J. Slayton
d	Staff & IP's aware of efforts to improve Q&S	Elevate Posters; staff meetings; Medical Directors forum; Ops Board; MM&I; NLB; rebate program; Days between infections posted on units; PM&I Council; Bi-annual Perioperative Town Meeting; Cumberland Pediatric Foundation communications; TJC Safety Sparks	Unit RN/MD leadership; S. Gad; K. Grimes; P. Throop; S.M. Schlafly; J. Cotton; L. Partridge
	1.2 Accountability		
a	Integrated patient safety program in place & providing oversight for last 12 mos	PM&I Council and Task Force minute; PM&I Management Team; PM&I Executive Committee; VUMC QPS Council/Steering	P. Throop; J. Cotton; S. Polancich
b	Patient Safety Officer appointed & communicated regularly w/Board & senior leadership	See 1.1a; Meg Rush - Children's Hospital; Jim Johns - Department of Peds; PM&I Medical Director at operational level; Meg Rush - rebate program	
c	Performance documented	Elevate; pillar goals; rebate program; chairman goals; incentive goals tied to pillars for senior leadership	2013 Rebate; J. Slayton
d	Interdisciplinary patient safety team communicates regularly w/management	PM&I Council; PM&I Executive Committee; MM&I; PM&I Taskforces; M&Ms	
e	External Reporting Activities	Events reporting; state reportables; CHCA Whole System Measures - Never Events; HAIs; Wake Up Safe; TN Dept of Health; CDC; FDA/ISMP; OCHSPS	J. Cotton; T. Harper; P. Throop; S. Schlafly
	1.3 Ability		
a	Patient safety budgets	Children's 2013 budget	J. Cotton/M. McConnell
b	Budgets available for external review	Children's 2013 budget	J. Cotton/M. McConnell
	1.4 Action		

		Evidence	Evidence Location
a	CEO and senior leadership personnally engaged in reinforcing patient safety improvement (e.g., "walk-arounds")	See 1.1a; PM&I Exec; DSB; senior leadership endorsement of OCHSPS and attendance of meetings	C-Suite AA's; J. Cotton
b	CEO engaged unit, service-line, departmental and midlevel leaders in patient safety improvement actions	Dr. Rush and Luke Gregory involvement w/hand hygiene; rebate program; PM&I Council; MM&I; PHI QPS efforts; PM&I Exec - hold high risk units accountable	L. Sevier; J. Cotton; P. Throop
c	CEO has established structure for input from independent medical practitioners	Medical Dir meeting (monthly); Dr. Rush's role; Admin team meeting; ED, PHI, Neonatology, Hem/Onc service line meetings w/Luke Gregory	M. Rush; C-Suite AAs; S. Gad
SP #2	**Culture Measurement, Feedback, and Intervention**		
	2.1 Awareness		
a	Safety/Quality survey conducted	AHRQ	S.M. Schlafly
b	Reported out results reflecting housewide & unit specific results	PM&I Council; PM&I Executive Committee; unit level sharing; Ops Board; Admin team meeting; VUMC QPS Council	S.M. Schlafly; J. Cotton; S. Polancich
	2.2 Accountability		
a	Senior leadership involved in selection of tool & sampled units	PM&I Core includes COS, Associate Hospital Directors-Operations, Nursing; PM&I Executive Committee	J. Cotton
b	Shared results with Board & senior leadership	See 1.1a	
	2.3 Ability		
a	Staff education to improve culture of safety or team training based on survey results; training doc in personnel records	MM&I; Periop AHRQ Action Plan - Systems Thinking Presentation, VERITAS Training, Shadwoing	P. Throop; S.M. Schlafly
b	Costs for annual culture measurement included in Q&S budget	PM&I budget - AHRQ, Collaboratives	J. Cotton
	2.4 Action		
a	Explicit hospital-wide policy and procedure reflecting regular culture measurement; OR implemented strategies for improving based on survey results	Disclosure/Jousting; VERITAS Training	S.M. Schlafly
b	Disseminated results widely across the institution with follow-up meetings with sampled units	PM&I Council; PM&I Executive Committee; MM&I; Unit meetings in June	S.M. Schlafly; J. Cotton
c	Identified process improvement based on survey results, which were measured, monitored & shared with senior leadership	Senior Leadership Patient Safety WalkRounds (although limited); VERITAS incorporation into PM&I Council and MM&I	S.M. Schlafly

		Evidence	Evidence Location
SP #3	**Teamwork Training and Skill Building**		
	3.1 Awareness		
a	Lit review of teamwork training; or review of available teamwork training programs	PEWS; PHI; Jousting; OCHSPS Culture Domain	S.M. Schlafly; L. Sevier; J. Slayton
b	Conducted assessment of high risk areas & informed senior leadership	PEWS; PHI; Jousting; OCHSPS Culture Domain	J. Slayton
c	Informed management & physicians about need for training	PM&I Exec: Perfusion/ECMO, Housewide EBM	M. Cull; S.M. Schlafly; L. Sevier; J. Slayton
d	Assessed need for RRT and associated training	PEWS	K. Copeland; L. Sevier;
	3.2 Accountability		
a	Targeted units/service lines identified by CEO to Board	See 1.1a	
b	Basic teamwork training to Board	See 1.1a	
	3.3 Ability		
a	Resourced Q&S budgets to support team training	PM&I	J. Cotton
b	Provided teamwork training to LIPs & clinical staff	Rebate	S.M. Schlafly
	3.4 Action		
a	Board minutes document performance targets were addressed	See 1.1a	
b	Evaluation of unit/service line results for teams that received training during past 12 months	Improved PHI outcomes; decreased blood utilization	J. Slayton
SP #4	**Identification and Mitigation of Risks and Hazards**		
	4.1 Awareness		
a	Assessed risks & hazards by retrospective sources	EAs; EA report matrix; MM&I Action Plans; VERITAS; Trust Committee; rebate program; ADE Trigger Tool	P. Throop; A. Bailey; S.M. Schlafly
b	Assessed risks & hazards by prospective sources	Pharmacy compounding review; Colin - ID review in NN	J. Slayton
c	Asessed defined mitigation efforts based on own risk profile & have recommendations for improvement	RM Profile for Children's/rebate program; O/E data review	J. Hickson/S. Bledsoe; S.M. Schlafly/P. Throop/C. Jones/P. Hain
d	Integrated results from all 3 assessments & shared across organization, from Board to front-line	See 1.1a - Veritas; EAs; patient complaints; Events; FMEA; Quality Rounds: themes shared in various forums inclusive of leadership and frontline, including PM&I Executive Committee and Council, Ops Board and the Trust; CCI meetings; VUMC QPS Council and Steering	
	4.2 Accountability		
a	Approval of action plan by CEO & Board	See 1.1a - Compounding	

		Evidence	Evidence Location
b	Incorporation into performance reviews; OR financial incentives for leadership & Patient Safety Officer	Rebate Process; Pillar Goals; chairman goals	J. Slayton
	4.3 Ability		
a	Sufficiently resourced patient safety budgets	Children's 2013 budget	J. Cotton/M. McConnell
b	Provided managers with training & tools for assessing risk in their areas	Rebate training - Disclosure/Jousting; VERITAS Training; unit-based QIAs	S.M. Schlafly; A. Bailey
	4.4 Action		
a	Provided risk identification training to high risk areas	Rebate training - Disclosure/Jousting; pharmacists attend stats; CMS - Patients discharged from the ED; Blood in the ICU	S.M. Schlafly; E. Humphreys; J. Slayton
b	Structure/process for gathering information related to risks	AHRQ Survey; PM&I CORE with COO, COS, Medical Dir, CNO; EA summary; Pt Affairs complaint data base; Trust Committee; VERITAS; VUMC Q&S Council; PRC; NDNQI	S.M. Schlafly; J. Cotton; C-Suite AAs; J. Slayton; S. Polancich; A. Bailey
c	Evidence of high-performance or actions taken for following five patient safety risk areas	Falls programs; track hypoplastics in cardiac, CF and eating disorders; Periop QPS metrics; VAP; swallow study; PT/OT; RT; nursing/resident surveys; Malnutrition - maple syrup urine disease MM&I	A. Bailey; J. Slayton; L.A. Ruffing; C. Burney-Jones
SP #9	**NURSING WORKFORCE**		
Compliant by Magnet status: Is your hospital currently recognized as an American Nurses Credentialing Center (ANCC) Magnet organization? If YES, your hospital will receive full credit for this Safe Practice and no boxes need to be checked.			
SP #17	**MEDICATION RECONCILIATION**		
	17.1 Awareness		
a	Lit review completed and best practices for process redesign identified	MUSIC; High risk double check process; drug shortages: AAEDC; OCHSPS	A. Potts; A. Bailey; S. M. Schlafly
b	Hospital-wide evaluation of frequency	VERITAS review; Sentri7	PM&I; A. Potts
c	Board report with recommendations for measurable improvement targets	See 1.1a	
	17.2 Accountability		
a	Held senior leadership accountable for improvements through performance reviews or compensation	C-Suite; E. Humphreys	J. Slayton; E. Humphreys
b	Held person responsible for patient safety directly responsible through performance review or compensation	M. Rush, J. Johns, J. Morath, J. Slayton role/responsibilities; J. Starmer/N. Patel; E. Humphreys	J. Cotton; S. Polancich

		Evidence	Evidence Location
c	Board report with results of measurable improvement goals	See 1.1a	
	17.3 Ability		
a	Staff education & skill development	Competency days - New hires, CAVE, ICU (pumps, double checks, high alert, ADEs, batch delivery); Faculty (HEO/WIZ)	J. Slayton; CNE; J. Newman
b	Education program for all newly hired clinicians	Residents; new hires; VMG faculty members; unit orientation; pharmacy orientation	J. Slayton
c	Allocated staff time and dedicated line item budget resources	Manager, Nursing Quality; Assistant Manager - Pharmacy	A. Potts; A. Bailey
	17.4 Action		
a	Implemented hospital-wide policy & procedure	Medication Reconciliation	VUMC Clinical Policy Manual
b	Implemented hospital-wide performance improvement program; OR monitored previously implemented performance improvement program	Compliance reports w/PAML w/in 8 hours of admission; One Med list/Sentri7	J. Morrison; A. Potts; A. Bailey
c	Implemented processes to document current medications at beginning of each episode of care	Medication Reconciliation; PAML; OPC	VUMC Clinical Policy Manual
d	Implemented processes to ensure complete list of medications is communicated to next provider, including documentation of communication	Medication Reconciliation	VUMC Clinical Policy Manual
		Faxing capability with receipt in Starpanel; OPC; Handovers	IT
e	Implemented process to provide patient/family current list of reconciled medications upon leaving	Discharge wizard; RX star at d/c	IT
f	Reconciled medication at any change in care or health status	Medication Reconciliation; OPC; HEO New Orders; Handover Tool	VUMC Clinical Policy Manual
SP #19	**HAND HYGIENE**		
	19.1 Awareness		
a	Hospital-wide educational effort	Hand Hygiene Campaign - unit based scorecards; unit based observer training; ongoing staff education education session; posters/stickers/etc; new product	L. Sevier
b	Board report with recommendations for measurable improvement targets	See 1.1a	
	19.2 Accountability		
a	Held clinical leadership accountable for improvements through performance reviews or compensation	Medical Directors job description; chairman goals; Pillar goal	M. Rush

		Evidence	Evidence Location
b	Held senior leadership accountable for improvements through performance reviews or compensation	Infection Control Department leadership - Dr. T. Talbot; Dr. G. Wilson; J. Smith; T. Boswell	IC Department
c	Held person responsible for patient safety directly responsible through performance review or compensation	P. Hain, M. Rush, J. Morath, J. Slayton role/responsibilities	J. Cotton
d	Board report with results of measurable improvement goals	See 1.1a	
	19.3 Ability		
a	Staff education & skill development	HH educational inservices to inpatient and ancillary departments; unit based observer training	L. Sevier
b	Documented expenditures on staff education	PM&I hand hygiene budget; IC role/responsibilities	J. Slayton; IC Department
	19.4 Action		
a	Implemented hospital-wide policy & procedure	Hand Hygiene	VUMC Clinical Policy Manual
b	Implemented hospital-wide performance improvement program; OR monitored previously implemented performance improvement program	Observation data; Committee meeting minutes; Rebate process; Unit based scorecards	L. Sevier
SP #23	**Prevention of Ventilator Associated Complications**		
	23.1 Awareness		
a	Evaluation of the frequency and severity	Ongoing monitoring - VIPER; ICPs	IC
b	Board report with recommendations for measurable improvement targets	See 1.1a	
	23.2 Accountability		
a	Held senior and clinical leadership accountable for improvements through performance reviews or compensation	Medical Directors job description - ICU; ICP job descriptions	M. Rush
b	Held person responsible for patient safety directly responsible through performance review or compensation	M. Rush, J. Morath, J. Slayton role/responsibilities	J. Cotton
c	Board report with results of measurable improvement goals	See 1.1a	
	23.3 Ability		
a	Staff education/knowledge transfer & skill development programs	VAP (risks and prevention) part of critical care orientation and for all new staff; RT orientation; OCHSPS Bundle	IC; C. Burney-Jones; S. M. Schlafly
b	Documented or can document expenses	ICPs; Quality nurses; RT	IC; A. Mayfield; C. Burney-Jones
c	Allocated compensated staff time	Orientation; RT Quality Manager; Quality nurses; Airway Protection Committee	J. Smith; T. Boswell; J. Gardner; A. Bailey

		Evidence	Evidence Location
	23.4 Action		
a	Documented evidence that all ventilated patient are included in a pediatric specific bundle or prevention plan	VAP: Guidelines to Reduce; OCHSPS Bundle; RN HED Documentation (HOB, Mouth Care)	VUMC Clinical Policy Manual; S. M. Schlafly
b	Explicit organizational policies for care of respiratory equipment	Respiratory Therapy policies	C. Burney Jones/C. Lynn/J. Gardner
c	Documented evidence that all ventilated patients and/or families have been educated on prevention measures	VAP: Guidelines to Reduce; HED Pulm Teaching Tab (need to strengthen next year through OCHSPS work)	VUMC Clinical Policy Manual; J. Newman
d	Implemented hospital-wide performance improvement program; OR monitored previously implemented performance improvement program	M&Ms; NICU Committee; PCCU Committee; Airway Protection Committee; Quality nurses; RT VAP QA; OCHSPS VAP work	S.M. Schlafly; T. Boswell; J. Smith; A. Bailey; J. Gardner

Appendix 6. Managing Serious Errors – CLABSI and CAUTI Data

	PICU CLABSI		PCICU CLABSI		PCCU CLABSI		NICU CLABSI										PICU CAUTI		PCICU CAUTI		PCCU CAUTI	
							< = 750 g		751 – 1000 g		1001 – 1500 g		1501-2500 g		> 2500 g							
	# Line Days	# CLABSI	# Line Days	# CLABSI	# Line Days	# CLABSI	# Line Days	# CLABSI	# Line Days	# CLABSI	# Line Days	# CLABSI	# Line Days	# CLABSI	# Line Days	# CLABSI	# Catheter Days	# CAUTI	# Catheter Days	# CAUTI	# Catheter Days	# CAUTI
Jan-12	168	0	261	1	429	1	196	0	147	0	187	0	259	0	276	0	31	1	64	1	95	2
Feb-12	168	0	186	0	354	0	164	0	225	0	149	0	322	0	239	0	45	0	22	0	67	0
Mar-12	236	0	238	1	474	1	138	0	254	0	182	0	252	0	416	2	35	0	32	0	67	0
Apr-12	255	0	334	0	589	0	203	1	307	1	223	0	220	0	394	0	53	0	54	0	107	0
May-12	191	0	483	0	674	0	212	0	244	0	128	0	320	0	298	2	47	0	81	1	128	1
Jun-12	126	0	471	0	597	0	131	0	109	0	138	0	139	0	284	0	33	0	108	0	141	0
Jul-12	148	0	499	0	647	0	197	0	101	0	215	0	167	0	332	0	42	0	109	0	151	0
Aug-12	127	0	494	1	621	1	223	1	95	0	95	0	216	0	314	0	29	0	114	0	143	0
Sep-12	141	0	473	0	614	0	145	0	139	0	96	0	239	0	339	0	32	0	77	1	109	1
Oct-12	160	0	493	0	653	0	93	0	135	0	161	0	193	0	475	0	39	0	94	1	133	1
Nov-12	186	0	452	0	638	0	136	1	109	0	129	0	278	1	433	0	47	0	70	0	117	0
Dec-12	249	0	400	0	649	0	90	1	127	0	169	0	205	0	279	1	45	0	66	0	111	0
2012 Sum	2155	0	4784	3	6939	3	1928	4	1992	1	1872	0	2810	1	4079	5	478	1	891	4	1369	5
2012 Rate	0.00		0.63		0.43		2.07		0.50		0.00		0.36		1.23		2.09		4.49		3.65	
2012 SIR	0.00		0.21		0.15		0.53		0.15		0.00		0.15		0.65		0.50		1.07		0.87	

2012 SIR - Combined	Observed	Expected	SIR
	14.00	53.69	**0.26**

	Observed	Expected	SIR
	5.00	5.77	**0.87**

2011 Sum					6478	4	1700	2	1420	1	1579	0	2326	0	3418	1						
2011 Rate					0.62		1.18		0.70		0.00		0.00		0.29							
2011 SIR					0.21		0.30		0.21		0.00		0.00		0.15							

2011 SIR - Combined	Observed	Expected	SIR
	8.00	46.39	**0.17**