Objective: To determine whether the implementation of a standardized handover protocol could reduce the number of errors occurring during patient transitions from the operating room to the intensive care unit.

Design: Prospective interventional study

Setting: Pediatric cardiac intensive care unit

Subjects: 79 patient handovers in patients transitioning from the operating room to the cardiac intensive care unit following congenital cardiac surgery.

Interventions: A pre-intervention assessment of patient handovers was obtained by direct observation using a standardized checklist. A teamwork-driven handover process and protocol was developed using traditional and novel quality improvement techniques. The post-implementation observational assessment of handovers was performed using the same pre-intervention assessment tool. Pre- and post-intervention data metrics were analyzed and compared.

Measurements and Main Results: 41 and 38 observations were performed in the pre- and post-intervention periods respectively. Protocol implementation improved key areas of the handover process. Technical errors per handover were reduced from 6.24 to 1.52 (p<0.0001) and critical verbal handoff information omissions were reduced from 6.33 to 2.38 (p<0.0001) per handover. There was no change in duration of either the verbal handoff briefing or the overall handover process. Caregivers noted improvement in teamwork and handoff content received following the intervention.

Conclusions: A formal, structured handover process for pediatric patients transitioning to the ICU following cardiac surgery can reduce medical errors that occur during the admission process and improve teamwork among caregivers.

REFERENCES
opportunities in physician-to-physician communication during patient handoffs.

-------END ABSTRACT BODY -------

----------------------------------
A quality improvement (QI) review of the analgesic effects of intraoperative dexmedetomidine in children undergoing strabismus surgery

Frederick H, Dear G
Duke University Medical Center, Durham, NC, US

------BEGIN ABSTRACT BODY------

Background: In pediatric patients undergoing anesthesia with inhaled anesthetics, dexmedetomidine (DEX) consistently decreases emergence agitation (EA)(1,2,3,4) and may be analgesic(1,3). Reported protocols for EA prevention include a bolus at induction(2,3), infusion(4), and bolus prior to emergence(1); doses of 0.3-1 mcg/kg are effective. In children undergoing strabismus surgery, we implemented a DEX protocol that minimizes acute hemodynamic effects, maximizes analgesic effects, and accommodates surgeries of uncertain duration: 0.5 mcg/kg loading dose over 15 minutes after induction, followed by an infusion at 0.2 mcg/kg/hr until end of surgery. We performed a Quality Improvement (QI) review to assess the effect of DEX vs No DEX on post-operative fentanyl (PostopFent) dose. PostopFent is a surrogate measure for both pain and agitation, chosen because it is the first treatment for both at our institution.

Methods: Following IRB approval, we requested the electronic anesthesia records (100 cases with and 100 without DEX) for ASA I-II children age 2-8 years undergoing strabismus surgery. We included patients who received oral midazolam and who had documented placement of LMA or ETT. All patients had inhalational induction and maintenance with sevoflurane and N2O. The primary outcome was PostopFent in mcg/kg, which included doses given after the end of surgery, or, if this was not recorded, within 10 minutes of the start of the post-operative record. The relationship between DEX and PostOpFent was evaluated with linear regression, adjusting for age and intraoperative fentanyl (IntraopFent) (JMP 8.0.2, SAS Institute Inc).

Results: A total of 172 patients were analyzed (Table 1); cases occurred between 11/088/09. DEX was documented in 54% of cases: 66% as bolus+infusion, 31% as bolus only, 2.5% as infusion only. Mean (±SD) dose was 0.6±0.5 (range 0.14.3) mcg/kg. 42% of patients received fentanyl post-operatively in both groups. The linear regression for PostOpFent was significant overall (P=0.003) but explained little of the variation (r²=0.08). PostopFent was lower in DEX, older children, and with higher IntraOpFent; age was the only significant predictor (P=0.0003):

PostOpFent = 0.7 0.06(DEX) 0.08(Age) 0.004(IntraopFent)

Discussion: Although DEX may still have an analgesic effect, this regimen did not significantly decrease post-operative fentanyl use. Actual DEX dose was often lower than 0.5 mcg/kg. The intended protocol does not appear to have a large analgesic effect in this patient population, which could be due to lack of efficacy or to poor implementation. We have switched to a protocol of DEX 0.5 mcg/kg as a bolus prior to the end of surgery in patients suspected to be at high risk of emergence agitation.


This abstract has 1 Additional Files -- Converted Files are included below:

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Table 1

<table>
<thead>
<tr>
<th></th>
<th>DEX</th>
<th>No DEX</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>84</td>
<td>88</td>
</tr>
<tr>
<td>Age (yrs)</td>
<td>4.6±1.8</td>
<td>4.6±1.9</td>
</tr>
<tr>
<td>IntraopFent (mcg/kg)</td>
<td>1.4±0.6</td>
<td>1.6±0.9</td>
</tr>
<tr>
<td>PostopFent (mcg/kg)</td>
<td>0.3±0.6</td>
<td>0.4±0.6</td>
</tr>
</tbody>
</table>
BACKGROUND
The Toyota manufacturing model has been adopted by Seattle Childrens Hospital (SCH) as a method of Continuous Performance Improvement (CPI). A previous CPI project at SCH altered the method of administration of medications used for induction of anesthesia in the operating room to help reduce bloodstream infections (BSI). Because the airway is a potential source of bloodstream contamination, anesthesia providers must unglove and perform hand hygiene after contacting the patients airway and before handing the IV or giving medications. This can be challenging during anesthetic induction as a solo provider, therefore OR nurses may be asked to assist with medication administration with a verbal order. This may potentially lead to medication administration errors. Utilizing the A3 tool, two fellows within the Department of Anesthesiology conducted a thorough evaluation of the problem and will propose a new process for medication administration at anesthetic induction for a solo provider with the aim of improving patient safety.

METHODS and RESULTS
The authors attended a workshop that covered the fundamental concepts of CPI and the A3 method of problem solving. The A3 is a structured method of approaching a problem that is limited in scope. It ensures that multiple viewpoints are solicited and that the proposed solution is carefully conceived and dependent upon stakeholder involvement. To accurately describe the current condition, we surveyed the anesthesiology staff and OR nurses. We then met to analyze the problem and work toward implementation of countermeasures. In the survey responses, many anesthesiologists expressed that the current method is challenging. In particular, it is difficult to do the recommended hand hygiene after airway management and before giving the IV medications. Additionally, we noted a wide variation in practice among providers. The OR nurses reported that when they were asked to administer medications the dose was usually stated as a volume dose. Some also received the order as a milligram dose. If the volume was not stated, all RNs said that they would request a volume dose. There was high compliance with closed-loop communication of the verbal order. Interestingly, there were a few RNs who stated that although the verbal order was clear, they were not comfortable pushing medications for the anesthesiologists.

Now that the left side of the A3 is complete and we have a deeper understanding of the issues, we will develop an ideal target condition and the countermeasures necessary to achieve that. As with the left side of the A3 we will vet our proposal with the providers who do this work before implementation of any changes.

DISCUSSION
We were able to identify a problem within our practice that posed potential harm to patient safety. Using the tools of CPI, we have been able to thoroughly evaluate this issue and work toward implementation of a safer system that reduces the opportunity for inadvertent errors in medication administration.

REFERENCE
Introduction: Children are often the target patient population of volunteer medical services abroad (VMSA), and pediatric anesthesiologists comprise an integral part of U.S.-based healthcare teams deployed to areas of need (1). The evaluation of outcomes for anesthetics performed at home is commonplace; however, in foreign environments data collection among these same providers is not routine. It has been shown that quality assurance (QA) tracking for anesthesia for VMSA is possible and may be potentially useful in guiding providers in minimizing adverse outcomes (2). We designed and implemented a QA Data Collection Form during a mission to Colombia with Healing the Children to provide free reconstructive cleft lip/palate and nose surgeries.

Methods: We designed a data sheet based on that of Fisher et al (2) and collected information about demographics (age, weight, procedure and ASA Physical Status), anesthetic management details (type of airway, use of premedication, induction and maintenance type/agents, monitoring modalities), and adverse events (laryngospasm, bronchospasm, upper airway obstruction, croup, arrhythmias). The data form also had an Other category that allowed write-in data. Each team member was given oral instructions on how to complete the data form prior to completion of their first case.

Results: During a single trip consisting of 6 operative days, our team of U.S.-trained anesthesiology providers administered 58 of 79 anesthetics delivered; the remaining 21 anesthetics were provided by Colombian anesthesiologists and were not included in our study. Of the 58 anesthetics provided, we successfully obtained data for 48 cases. There were a total of 9 anesthesia-related events reported. There were 3 episodes of upper airway obstruction either during the case or in the postoperative anesthesia care unit. One of these episodes involved a kink of the endotracheal tube during the case. There was 1 episode of stridor reported postextubation. There were 2 episodes of ventilator leaks with vaporizer malfunctions during the case. There were 3 incomplete data forms collected and 7 data forms missing.

Discussion: The aim for this observational study was to assess the practicality and issues involved with collecting data on anesthetics performed for VMSA. There were numerous pitfalls encountered. The presence of providers from different institutions contributed to variability in reporting and lost data. The efforts spent acclimating to the site may have detracted from participation in responses.

Using experiences learned on this trip, we propose modifications to both the data sheet and to the procedures involving its implementation. These include formatting changes to make it more easily understandable to a first-time reader, incorporation of a case-tracking component, and organized group briefing and debriefing sessions among all providers involved to promote proper data collection and complete follow-up.

References:
Introduction: Poor communication between health care providers is a major contributing factor in many adverse safety events and a common cause of patient and family dissatisfaction. As part of a Quality Improvement (QI) Science course, an improvement team at CCHMC was initiated to improve the operating room to postanesthesia care unit "handoff" process.

Methods: The initial step in this improvement effort was the development of a Key Driver Diagram (Figure 1). This diagram incorporates the "global" and "smart" aim of the project, the "key drivers" inherent to the process we are trying to improve, and specific interventions which might effect each of the "key drivers". In addition, key elements felt to be essential to every handoff were determined so that it would be possible to "measure" the success of individual handoffs. Nursing staff in the PACU randomly observed handoffs between anesthesia and nursing teams and evaluated them based on whether all key elements were addressed. The improvement model used was based on the concept of building knowledge through the use of "Plan-Do-Study-Act (PDSA) cycles" or small "tests of change". An intervention is planned, initiated for a short period of time, and its effect on the process we are trying to improve is measured. The results are then studied, feedback obtained from the improvement team, and the next intervention planned. The primary intervention used for this project was the development of a standardized handoff checklist. (Figure 2) PDSA cycles initiated during the improvement process included a discussion og the postoperative plan, giving all parties the opportunity to ask questions before the handoff is complete, and placing the checklist on laminated cards and distributing them to all staff.

Results: Prior to the initiation of the project the percentage of successful handoffs in the PACU was 55%. During the last 2 months of the 5 month study period the median percentage of successful handoffs increased to 90%. (Figure 3)

Conclusions: The use of a standardized checklist for handoffs in the postanesthesia care unit increased the percentage of successful handoffs, thereby reducing the chance that key patient information will not be conveyed. By using the principles of QI science, improvement teams can focus on specific problems and measure whether interventions lead to system improvement.
**Project Name:** Improving the OR to PACU Handoff Process

**Project Leader:** James P. Spaeth

**Revision Date:** 02-28-10

**GLOBAL AIM**

By developing a standardized PACU handoff process, we will improve patient safety by eliminating serious events where poor communication is a causal factor.

**SMART AIM**

We will increase the reliability of an appropriate handoff between Anesthesia and PACU Nursing from 56% to 95% by June 30, 2010.

**Appropriate Handoff:**

All parties ready, 10 data elements, all questions answered.

**KEY DRIVERS**

- Determining the key elements included in an appropriate handoff
- Anesthesia is knowledgeable about the patient, procedure, and intraoperative course
- All vital information about the patient and surgical course is presented
- All staff participating in the Handoff are ready and attentive

**INTERVENTIONS (Reliability level)**

- Ask process owners (anesthesia, PACU nursing) what key elements should be part of the handoff
- Develop a standardized checklist for Handoff
- Make the final step of Handoff the opportunity to ask clarifying questions
- Provide individual feedback when failures occur
- Monitor compliance with these measures
- Provide individual feedback when failures occur

**Key**

Dotted box = Placeholder for future additions
Green shaded = what we’re working on right now
PACU Handoff Checklist

1. Stable airway/vital signs
2. Ask PACU nurse “Are you ready for report?”
3. Name, age, weight, allergies
4. Procedure
5. Relevant medical history
6. Type of airway management (ETT/LMA/mask, awake/deep extubation?)
7. Access/Fluids
8. Medications given
9. Intraoperative complications/issues?
10. Postoperative concerns (pain plan, labs, foreign bodies in airway)
11. Any questions?
OR to PACU Handoff Process between Anesthesia and Nursing

Weekly % Reliability

- **Education**
  - Test of standardized checklist
- **Checklist Revised**
  - Checklist on laminated card distributed to anesthesia staff
- **Checklist on laminated card placed on PACU nurse computer in three pods**

Weekly:
- 01/06/10 (n=34)
- 01/22/10 (n=22)
- 01/28/10 (n=43)
- 01/29/10 (n=19)
- 02/08-02/12 (n=56)
- 02/15-02/19 (n=4)
- 02/22-02/26 (n=7)
- 03/01-03/05 (n=10)
- 03/08-03/12 (n=17)
- 03/15-03/19 (n=20)
- 03/22-03/26 (n=31)
- 03/29-04/02 (n=29)
- 04/05-04/09 (n=31)
- 04/12-04/16 (n=42)
- 04/19-04/23 (n=6)
- 04/26-04/30 (n=20)
- 05/03-05/07 (n=24)
- 05/10-05/14 (n=22)
- 05/17-05/21 (n=50)
- 05/24-05/28 (n=25)
Current results of an anonymous near-miss reporting system at a large, academic, pediatric anesthesia department.

1 Guffey P, 1 Szolnoki J, 1 Polaner D, 2 Caldwell J
1 The Children’s Hospital , Aurora , CO, USA; 2 University of California, San Francisco , San Francisco , CA, USA

-------BEGIN ABSTRACT BODY------

Background and Purpose: A near miss is an unplanned event that did not result in injury, illness, or damage but had the potential to do so. Detection of near misses may provide a mechanism to proactively reduce morbidity and mortality in the perioperative environment. Current reporting systems have very low physician participation and this has been shown to be a result of system complexity, legal implications, and fear of implicating others. We designed a readily accessible, searchable, non-punitive on-line system to report near misses, and report here the results from the first 7 months of its use. These data will be used to identify problem areas, which can be targeted for improvement.

Methods: An existing near miss reporting system at UCSF (University of California, San Francisco) was adapted for a freestanding pediatric hospital. The principal criteria governing system design were ease of use and anonymity. An electronic, web based, secure, anonymous reporting system was instituted at The Childrens Hospital, Denver. Anesthesiologists and anesthetists selected a category (derived from the Joint Commission Patient Safety Event Taxonomy) for each near miss and entered a brief description of the event. A summary report was generated and used to drive process improvements in the department and hospital.

Results: From April 1 to November 1 2010, 262 reports have been collected. This is an increase of 1541% from the hospitals system in use in the previous year (17 reports).

196 events occurred during scheduled work hours and 66 occurred during call. 194 originated in the OR vs. 68 in remote locations. 93 events occurred pre-operatively, 123 intraoperatively, and 46 postoperatively. Table 1 summarizes all events using the Joint Commission Patient Safety Taxonomy. Multiple quality improvement projects have been performed which correlated with a subsequent drop in near misses reported for the problem addressed.

Conclusion: We have created a secure and safe environment for reporting of anesthesia near misses. The analysis of near misses and improvement in performance may represent a profound opportunity to prevent sentinel events. Further, the opportunity exists to link reporting of near misses with the occurrence of harmful events and determine which series of near misses are predictive of subsequent morbidity outcomes.

References:

This abstract has 1 Additional Files -- Converted Files are included below:

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### Table 1 – Near Miss Categorization

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<th>Cause</th>
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<tr>
<td>External (Organizational) – Failures beyond institutional control</td>
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</tr>
<tr>
<td>External (Technical) – Failures beyond institutional control</td>
<td>3</td>
</tr>
<tr>
<td>External (Patient) - Failures beyond institutional control</td>
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</tr>
<tr>
<td>Facilities / Equipment - Availability</td>
<td>28</td>
</tr>
<tr>
<td>Facilities / Equipment - Design</td>
<td>21</td>
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<tr>
<td>Facilities / Equipment - Malfunction</td>
<td>25</td>
</tr>
<tr>
<td>Facilities / Equipment - Obsolescence</td>
<td>2</td>
</tr>
<tr>
<td>Management - Resources</td>
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</tr>
<tr>
<td>Practitioner – Knowledge Based: Incomplete</td>
<td>4</td>
</tr>
<tr>
<td>Practitioner – Knowledge Based: Incorrect</td>
<td>2</td>
</tr>
<tr>
<td>Practitioner – Knowledge Based: Insufficient Time</td>
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</tr>
<tr>
<td>Practitioner – Rule Based: Failure to execute at a normal level</td>
<td>10</td>
</tr>
<tr>
<td>Practitioner – Skill Based: Failure to execute at a normal level</td>
<td>9</td>
</tr>
<tr>
<td>Procedures – Documentation</td>
<td>9</td>
</tr>
<tr>
<td>Processes – Time Pressure</td>
<td>12</td>
</tr>
<tr>
<td>Transfer of Knowledge - Supervision</td>
<td>1</td>
</tr>
<tr>
<td>Transfer of Knowledge - Training</td>
<td>2</td>
</tr>
<tr>
<td>Organizational Culture – Communication</td>
<td>43</td>
</tr>
<tr>
<td>Organizational Culture – Poor culture of safety</td>
<td>20</td>
</tr>
</tbody>
</table>
Background: Perioperative antibiotics are routinely given for appropriate procedures prior to incision at Seattle Children’s Hospital (SCH). Current recommendations suggest antibiotics to be dosed within one hour of incision for maximal effectiveness. Antibiotics are most often ordered by a verbal order during the time out which is usually done immediately prior to onset of surgery. Occasionally, the patient will have an allergy to the typical cephalosporin and will require a different antibiotic. This can result in surgical delays or antibiotic administration after surgical incision. In addition, antibiotics may be continued postoperatively and administered by the surgical floor nursing staff. This requires that the nurse knows the time of the last dose given so that the timing of the subsequent dose is appropriate. The antibiotic dosing handoff typically occurs at the discretion of the anesthesiologist or PACU nurse.

SCH has adopted Continuous Performance Improvement (CPI) system based on the Toyota production system. They use a problem solving method termed an A3 which uses a simple, semistructured one page document. This document is a flexible tool that can be adapted to fit many problems in the healthcare setting by creating a storyline for communication and a very visual illustration of the problem and proposed solutions.

Methods and Results: Using CPI fundamentals, our quality improvement team is developing an A3 to answer the question how best to order antibiotics. The improvement process involves documenting the background, current condition, problem analysis, target condition, countermeasures, implementation plan and follow up. The current condition and problem analysis are critical components of the A3 project. Although the project is done by a small group, it is essential that feedback from other practitioners who are currently part of the process are considered, so that there is deep understanding of how the process works now, before changes are proposed. In the current condition, the author draws a visual representation that depicts the critical elements of the problem and then in the problem analysis root cause(s) can be identified. To appropriately draw the current condition and background for our project, we surveyed anesthesiologists and surgeons as to how and when perioperative antibiotics were ordered. We also audited how often antibiotics were continued postoperatively and how this information was provided to the nursing staff on the surgical floor. The next phase will involve defining the ideal target condition and then we will create countermeasures and test them in a pilot trial. Data from the trial is then used for revisions (if needed) and included in the final implementation. After the plan as been implemented for a set amount of time, we plan to reassess the changes and determine if expected improvements were achieved. An essential component of CPI work is the plan-do-check-act (PDCA) cycle. In this case we will audit compliance with the new process and modify it as necessary.

References
Introduction

Patients who have unplanned hypothermia may experience a delay in healing and are predisposed to surgical site infections which result in prolonged hospitalizations. Research has shown typical hospital stays for patients with such infections to be as much as 5-20 days longer than those without this complication [1,2]. Core hypothermia of 2°C below normal core body temperature may increase a patient’s susceptibility to surgical site infections by causing vasoconstriction and impaired immunity [3]. In fact, a drop of core temperature 1.5-2°C increases SSI risk by 3-fold, and SSI rate can change from 2% at 36.2°C to 11.5% at 35.4°C [3,4]. Maintaining normothermia may reduce SSIs and associated costs. Infants might be at increased risk for SSIs due to a reduced ability to self-regulate their temperature. As a part of our hospital’s plan to reduce SSIs, this performance improvement initiative is designed to determine aspects of a patient’s care which present the greatest risk for hypothermia to NICU patients undergoing surgery, and opportunities for intervention.

Methods

This is a performance improvement initiative performed at a free-standing tertiary childrens hospital. Phase I of this initiative will monitor the temperature of NICU patients at various intervals during the perioperative period. We will collect temperature just before leaving the NICU, upon arrival to the pre-operative holding area, upon entering the operating room, every 15 minutes during the intraoperative period, and upon return to the NICU after transport. Phase II will assess the data and design interventions (e.g., increased ambient operating room temperature) aimed at maintaining normothermia in these patients throughout the entire perioperative period (i.e., pickup, operation, return).

Results

Core and axillary temperature measurements will all be converted to equivalent temperatures. Data will be analyzed to determine the mean temperature at each interval, the change in temperature between intervals, and to identify any interval in which the temperature of NICU patients may be falling below the recommended thresholds. This will allow us to identify areas for improvement for maintaining normothermia in this vulnerable population undergoing surgical procedures.

Discussion

NICU patients may be at increased risk of hypothermia due to their inability to properly regulate their own body temperature and their high surface area to body mass ratio. Moreover, research has shown that while there are safe and inexpensive methods to maintain normothermia in these children throughout the entire perioperative period, there are barriers in achieving this goal [3]. This quality initiative will help us assess our process and look for areas for improvement for achieving normothermia during the perioperative period.

References


------END ABSTRACT BODY ------
Background
The Department of Pain Management (DPM) at Phoenix Children's Hospital (PCH) began a systematic review of patient hospital records in the spring 2010 in an effort to assess the documentation of patient controlled analgesia educational material distribution to both patients and family members. Data from this chart review demonstrated a 58% deficiency in patient controlled analgesia (PCA) patient education forms. The educational program is mandatory for any patient treated with a PCA pump. It is a compulsory part of our computerized PCA order set, and it is mandated in our PCA policy. In 2009 we initiated a quality analysis of our pain service, including the PCA educational program.

Methods
The DPM worked with clinical educators to disseminate the results of the review, and create an educational process to promote Good Clinical Practice (GCP) in patient education. The educational process went through the hospitals Roll Out Committee in summer 2010, and was implemented via electronic learning modules required by all inpatient nurses in October 2010.

Results
A subsequent review of patient hospital records was initiated one month following the nursing educational process implementation. The outcomes of this review revealed a 20% increase in nursing compliance, and are presented in Chart 1. This increase demonstrates a successful evidence based process improvement for patient education. It is the goal of the DPM to promote patient education that adheres to the standards of the hospital and The Joint Commission.

Discussion
The increase in nursing compliance documentation of patient controlled analgesia educational material distribution demonstrates a successful evidence based process improvement for patient education. It is the goal of the DPM to promote patient education that adheres to the standards of the hospital and The Joint Commission. In the Nelson et al study1, 40% of institutions surveyed said they provide PCA educational materials for patients. However, there is no way to know if meaningful education has been achieved unless the educational process has been evaluated critically. If our experience is any indication, it is possible that far fewer patients and families receive meaningful PCA education than is reported in the study. Effective PCA education is not only about providing educational materials or an educational program, its primary purpose is to have educated patients and families.

References
Chart 1: Quality Assurance Outcomes from PCA Patient Education Initiative

- Pre: 58% Delinquent, 42% Present
- Post: 38% Delinquent, 62% Present

n = 50
Introduction
Central line insertions are a common procedure with a potentially high incidence of error, including central line associated bloodstream infections (CLABSIs). There are approximately 250,000 CLABSIs in the United States each year, with an estimated mortality of between 12%-15%, and the costs to care for these hospital-acquired infections is estimated at nearly $30,000 each[1]. CLABSIs insertion practices known to reduce the risk of CLABSIs include: hand hygiene, use of maximal sterile barriers during insertion, proper application of skin antiseptic at site of insertion, avoiding femoral insertion site whenever possible, use of an insertion checklist, and the promotion of a safety culture[2]. Thus, the primary goal of this patient safety initiative is to advance operating room safety in pediatric patients.

Methods
The purpose of this patient safety initiative is to implement a Central Line Insertion Program (CLIP) checklist by pediatric anesthesiologists placing central venous lines (CVLs), assess compliance with its use, and identify any barriers to its use (e.g., need for change in safety culture; poor teamwork). We adapted the evidence based recommendations from the intensive care literature and applied them specifically to anesthesiology to create a checklist [Table 1]. The CLIP will require the anesthesiologist to follow the evidence based guidelines on the checklist when placing all CVLs, and that an observer completes the checklist during the CVL placement.

Results
Analyses will quantify adherence to the CLIP checklist by pediatric anesthesiologists. Based on these factors we will be able to assess compliance with the CLIP checklist, provide baseline data specific to pediatric anesthesia, and be able to intervene in areas where compliance is not reaching the initial goal of 90%, Table 1.

Discussion
The goal of this patient safety initiative is that 90% of pediatric anesthesiologists placing central lines are following the CLIP checklist. In addition to compliance, we will examine the specific areas of the CLIP checklist for compliance (Table 1), and attempt to estimate the direct impact on patients (e.g., length of stay), and the institution in which a CLABSI arises in a patient for whom a central line was placed in the operating room by a pediatric anesthesiologist. We will discuss barriers to implementation of the CLIP, and make recommendations for sustainability of this patient safety initiative.

References
<table>
<thead>
<tr>
<th>Critical Step</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Before the Procedure, Did the Inserter:</strong></td>
</tr>
<tr>
<td>Performed a time-out/briefing related to Central Line placement</td>
</tr>
<tr>
<td>Confirmed (asked) – washed hands using antibacterial soap and water or hand</td>
</tr>
<tr>
<td>cleansers (e.g., alcohol gel)</td>
</tr>
<tr>
<td>Inserter: ✑ cap, ✑ mask, ✑ sterile gown, ✑ sterile gloves ✑ protective</td>
</tr>
<tr>
<td>eyewear</td>
</tr>
<tr>
<td>Supervisor: ✑ cap, ✑ mask, ✑ sterile gown, ✑ sterile gloves ✑ protective</td>
</tr>
<tr>
<td>eyewear</td>
</tr>
<tr>
<td>Properly position patient to prevent air embolism</td>
</tr>
<tr>
<td>Prepared site with chlorhexidine (30 seconds; 2 minute for groin)</td>
</tr>
<tr>
<td>Allowed site to dry completely (2 minutes air dry)</td>
</tr>
<tr>
<td>Used sterile technique to drape patient from head to toe?</td>
</tr>
<tr>
<td><strong>During the Procedure, Did the Inserter:</strong></td>
</tr>
<tr>
<td>Maintained a sterile field</td>
</tr>
<tr>
<td>Used ultrasound ** <em>(Discretion of Inserter – Document if Performed)</em></td>
</tr>
<tr>
<td>Clamped ports not used during insertion (to avoid air embolism, clamp all</td>
</tr>
<tr>
<td>but distal port)</td>
</tr>
<tr>
<td>Aspirated blood from each lumen (to avoid air embolism &amp; confirm intravascular</td>
</tr>
<tr>
<td>placement)</td>
</tr>
<tr>
<td>Transduced CVC or estimated CVP by fluid column (confirm venous placement)</td>
</tr>
<tr>
<td><strong>After the Procedure, Did the Inserter:</strong></td>
</tr>
<tr>
<td>Cleaned blood from site using antiseptic agent (CHG) &amp; sterile dressing</td>
</tr>
<tr>
<td>applied</td>
</tr>
<tr>
<td>Dated dressing? DATE: ____________ TIME: ____________</td>
</tr>
<tr>
<td>Verified placement (e.g., X-Ray) of catheter tip? ** *(Discretion of Inserter</td>
</tr>
<tr>
<td>– Document if Performed)*</td>
</tr>
<tr>
<td>Insertion site? ✑ Subclavian ✑ Internal Jugular ✑ Femoral ✑ Umbilical Vein</td>
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<tr>
<td>✑ Other</td>
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[SPS235] Patient Controlled Analgesia in Children with Sickle Cell Crisis: A Quality Initiative

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Introduction
Sickle cell disease (Hgb SS) is frequently associated with vaso-occlusive crisis (VOC). Pain, secondary to VOC, can be very difficult to manage, and is one of the most common reason for hospital admissions in the sickle cell pediatric population [1]. Pain is often managed with patient controlled analgesia (PCA). At our institution, several different services may direct all or part of VOC pain management. Also, there is no comprehensive database for the caregiver to find detailed documentation of previous pain crisis management. Therefore, the purpose of this quality initiative is to review the PCA management of children with sickle cell disease by the acute pain service, and look for areas for improving the quality of care for these children.

Methods
This is a quality improvement initiative performed at a free-standing tertiary childrens hospital. Phase I will: 1) Use process mapping to identify the current process a patient with sickle cell disease goes through from admission until discharge; 2) review records for documentation of patients pain intensity; 3) review records for which service initiated and managed the PCA; 4) review records for quantity of changes made to PCA to control pain; 5) record length of hospitalization; and 6) determine time from discharge until return for the management of a subsequent pain crisis. Phase II will evaluate these data identify areas for process and quality improvement changes.

Results
Between January 2009 and December 2010, the acute pain service at our institution received approximately 435 consults for PCA pain management in children with sickle cell disease. This large volume of patient data will allow us to review our current practices of PCA pain management compared with national guidelines, as well as other services in our hospital.

Discussion
By assessing dosing thresholds (mg/kg per day), duration on the acute service, and time until return for subsequent pain crisis, we will be able to determine the quality of care we are providing and make recommendations for change both to our acute pain service team. In addition, by sharing our information with other services, we hope to establish better teamwork and communication. In patients with sickle cell disease, there is an association with frequency of admissions for VOC and tissue and end organ damage as the child matures [1]. This initiative will allow us to review our current PCA practices, and potentially aid providers in treating VOC more efficiently with better outcomes in the long term.

Reference

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Pediatric patients undergoing surgery often present to the Pediatric Intensive Care Unit (PICU) for postoperative care. At our institution, the anesthesiology team transports the patient from the operating room (OR) to the PICU, and communicates pertinent information about the patient's medical history and intraoperative course to the PICU physician team. Barriers to effective and thorough communication exist which may result in deficient transfer of important information. To identify and overcome these barriers, we recorded the rate of hand-offs over a thirty-day period and surveyed anesthesia and PICU physicians on the perceived benefit of physician-to-physician communication, barriers to communication and methods to improve communication between teams.

Based on this data, we implemented the use of a written, standardized checklist to use during the patient hand-off. We then re-surveyed the anesthesia and PICU physicians to gauge the subjective quality and completeness of the communication after the implementation of the checklist. We hypothesized that use of a checklist would improve the subjective quality and increase the rate of physician-to-physician hand-offs. Prior to the intervention, the majority of anesthesia (78%) and PICU (88%) physicians strongly agreed that physician-to-physician communication improved patient care. The majority of providers also agreed that a more systematic, standardized approach to hand-offs improved patient care. The most-commonly cited barrier to effective hand-offs was time. Many anesthesiologists reported the need to return to the OR to start the subsequent case, whereas PICU physicians reported that other critically-ill patients required their attention when patients arrived from the OR.

In the thirty days immediately preceding the implementation of the checklist, 87% (20/23) of patients presenting to the PICU from the OR had a physician-to-physician hand-off. Most hand-offs (78%) occurred between the anesthesia resident and the PICU fellow; the rate of attending-to-attending hand-offs was low 13% (3/23).

A standardized checklist was then implemented for a period of thirty days. Upon arriving to the PICU, after application of standard monitoring, the anesthesia provider relayed the information to the PICU physician. The PICU physician recorded the information on the standardized checklist which then remained in the patient’s chart for reference. After this thirty-day trial, providers completed a survey to comment on the subjective quality and completeness of hand-offs using this protocol. The thirty-day post-intervention rate of physician-to-physician hand-offs and survey results will be complete by the end of December, 2010. These results will be included in the poster if accepted.
Standardizing Antibiotic Prophylaxis for Reduction of Surgical Site Infections in Pediatric Patients: A Patient Safety Initiative

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Introduction
Surgical site infections (SSIs) account for approximately 15% of hospital-acquired infections (HAIs) resulting in prolonged hospitalization and increased costs[1]. Approximately 40%-60% of SSIs are thought to be preventable with antibiotic prophylaxis. However, compliance with recommendations remains poor[2]. Children who do not receive antibiotics within the recommended 0-60 minutes are 3.5 times more likely to develop SSIs[3]. As part of a program to reduce hospital SSIs by 50% (from 4.8% to 2.4% in 6 months), this study will test and implement a system to ensure proper antibiotic prophylaxis is reliably administered at least 90% of the time.

Methods
This is a patient safety initiative performed at a free-standing tertiary childrens hospital. Phase I will be to implement a systems change: 1) Recommend standardization (i.e., type, dose, redosing, discontinuation) of antibiotic prophylaxis for Class I/II cardiac, orthopedic, and neurosurgical operative procedures for which antibiotic prophylaxis is recommended based on current guidelines, 2) Educate anesthesiologists and surgical service specialties, 3) Implement changes that must be conducted in a teamwork fashion, and 4) Determine barriers to implementation of changes, and education and teamwork between anesthesiology and the surgical service specialties. Phase II will assess compliance. Compliance is defined as the patient receiving the recommended antibiotic at an appropriate dose, completion of infusion of the antibiotic 0-60 minutes before the skin incision, indicated antibiotic re-dosing, and discontinuation of antibiotic prophylaxis within 24 hours of surgery (48 hours for cardiac surgery). SSIs will be identified prospectively by infection preventionists using National Healthcare Safety Network definitions. Quality improvement methods will be used to test the interventions designed to standardize and improve the reliability of antibiotic prophylaxis.

Results
Overall compliance and compliance with each component of appropriate antibiotic prophylaxis will be displayed using statistical process control charts. Charts will be annotated to show the relationship of various interventions with changes in compliance. Changes in antibiotic prophylaxis compliance will be compared to changes in the SSI rate.

Discussion
SSI prevention is multifactorial, but appropriately administered antibiotic prophylaxis is an important component. This study will show that the use of interventions to improve reliability will result in a sustained improvement in patients receiving recommended antibiotic prophylaxis. The anesthesiologist plays a key role in this initiative as he/she is primarily responsible for the administration of intraoperative medications In addition, we will attempt to show the impact this has on the rate of SSIs.

References
3.Gagliardi et al. Factors influencing antibiotic prophylaxis for surgical site infection prevention in general

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