### Introduction

The Pediatric Progressive unit at Levine Children’s Hospital (LCH 8) had six central line-associated bloodstream infections (CLABSIs) in 2016, five of which were due to unnecessary lines remaining in. LCH 8 had the highest rate of CLABSIs per 1000 central line days of any unit within LCH (LCH 8 rate of 2.3, as compared to overall LCH rate of 1.06).

#### Background:
- Central line (CVL) increases a patient’s risk of infection
  - CLABSIs account for an estimated 30,000-62,000 deaths and $600 million-$2.7 billion to the US healthcare system annually.1,2
- Goal is always to place or keep a CVL for a medical necessity, and to escalate properly care for the CVL in those with medical necessity
  - through the use of the CLABSI bundle
- Despite having a CVL management policy at a system level, there was inconsistency of a lack of standardization on LCH8 around the decision to obtain and/or continue access via CVL.
  - The team is committed to improving quality and patient safety in alignment with Atrium Health’s Mission “To improve Health, elevate Hope and advance Healing – for all,” and felt this was a critical quality and patient safety issue to solve.

#### Plan:
- Reduce unnecessary central line days (primary driver of CLABSIs on LCH8)
- Metric: # of unnecessary central line days per week
- Baseline: 10
- Goal: 5 (50% improvement)
- Stretch: 3 per week (70% improvement)
- Expected Impact: Reduction in CLABSIs by 50%

#### Methodology:
Using Lean methodology, rooted in Plan-Do-Study-Act (PDSA), the following findings of root causes were identified:
- Current list of Central Line Necessity Criteria is vague and leaves room for interpretation
- Daily discussion of central line necessity between nurse and provider rarely occurred.
- Nurses were hesitant to initiate conversation due to lack of standard process to initiate and conduct conversation with provider.
- Many nurses expressed concern or fear of initiating this conversation with providers, due to not having a standard process for when and how to initiate this conversation.

#### The following countermeasures were implemented to address the root causes:
- Cardiology providers added “discussion of line necessity” to their standard for daily rounds, which nurses are present at, facilitating multi-disciplinary discussion of line necessity.
- And Created and trained detailed Standard Work for central line necessity documentation
  - Clarity current Necessity Criteria and update in Cerner
  - Scripting provided for nurse to provider notification
  - Documentation standard
  - Decision-making Flowchart
  - Train nurses through 3-step process, including validation of necessity notification

#### The following audits were implemented during the PDSA cycle:
- Daily audits of 100% of central lines conducted during initial implementation to identify and remove barriers to compliance, provide real-time coaching and feedback, problem solve, and escalate.
- After the change was fully adopted, the final step was to implement a system for regular auditing of the standard process to ensure sustainment, which was triggered by Kamishibai cards (K cards).

### Case Report

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### Discussion

- Unnecessary central lines per week decreased from an average of 10 during baseline to 3 at the end of 2017 (70% improvement), therefore meeting the stretch goal. This is a statistically significant improvement (t-test, p=.001)
- Reduction of CLABSIs on LCH8 from 6 in 2016 to 2 in 2017 (50% improvement)
- Using the conservative end of the range for mortality associated with CLABSI, this reduction can be attributed with saving 1 life every 2 years.1
- In addition, this CLABSI reduction represents a cost savings of approximately $129,600 (due to excess variable costs for patients with CLABSI) and 28 patient days in the hospital based on recent cost-savings literature.2

In 2018, LCH is working to spread the great success achieved and Standard Work created on LCH8 throughout other nursing units in the facility.

**K Cards for CLABSI Audits**

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### Resources


### Contact Info

**Jason.Mauney@atriumhealth.org**

### Acknowledgements

Thank you to the entire team on LCH8 for all of their hard work achieving this great accomplishment, the Cardiology providers for their great partnership and commitment to this work, and the LCH leadership team for their support.