



Reducing Central Line Associated Bloodstream Infections by Optimizing Bundle Compliance

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AIM Statement

The purpose of this project is to improve patient safety by reducing central line associated bloodstream infection (CLABSI) rates in pediatric patients admitted to the medical and surgical units in an urban, tertiary, free-standing children's hospital (Levine Children's Hospital) over a 1 year time period. This work is significant because approximately 1 in 20 hospitalized patients develop healthcare associated infections, and CLABSI's account for 15% of these healthcare associated infections. CLABSI's in the pediatric population are associated with a mean attributable cost of \$55,646 per CLABSI and a mean attributable length of stay of 19 days per CLABSI. Central line bundles have proven to be effective in reducing CLABSI rates in numerous national and international studies. Thus, improving compliance with the central line bundle should decrease CLABSI rates. This project focuses on two particular components of the central line bundle: daily discussion of line necessity and central line education.

Goals

The specific goals of this project are to reduce CLABSI rates by 15% from a baseline of 1.06 per 1000 catheter days, to increase the frequency that central lines are addressed during rounds to 40% from a baseline of 20.6%, to improve provider comfort level with central lines by 50% from a baseline of 2.43 on a 1 to 4 Likert, and to not disturb provider workflow by addressing central lines on a daily basis.

Team Members

Matt Pearce, MD- Team Leader
 Talia Buitrago-Mogollon, MHA, CPHQ- QI Coach
 Rishi Laroia, MD- Faculty Mentor
 Katie DeVillers, NP- Team Member
 Laura Mobley, NP- Team Member

Measures

- CLABSI rates as number of CLABSI's per 1000 catheter days
- Percent of time that central lines are addressed during rounds
- Provider comfort level on a 1-4 Likert
- Percent of providers that feel that discussing central lines regularly interrupts work flow

Methodology

The Model for Improvement was used to develop this project and implement change. First, team members were identified and an aim statement was developed. The specific measures for the project were then established. The LCH CLABSI rate (central line infections per 1000 catheter days) was the outcome measure. Frequency that central lines were addressed during rounds and provider comfort level with central lines on a 1 to 4 Likert were the process measures. Subjective disturbance of provider workflow was the balancing measure. Baseline data was then obtained over a 3 month period of time. Change was implemented via several PDSA cycles. Data collection on all measures was ongoing over a 1 year time period as change was implemented.

Changes Tested and Implemented

Creating a new provider rounding list, adding team members from different disciplines, expanding data collection to the attending hospitalist services, implementing a "safety cross" auditing tool, discussing central lines during morning sign out, and providing education sessions on CLABSIs and central lines were the major PDSA cycles implemented throughout the 1 year duration of this project.

Quantifiable Results

CLABSI rates decreased from 1.06 per 1,000 catheter days to 0.678 per 1,000 catheter days, which is a 36% reduction. The frequency that central lines were addressed during rounds increased from a baseline of 20.6% to 74%. Provider comfort level with central line indications, removal, and complications increased from a baseline of 2.43 to 2.93 on a 1 to 4 Likert. No providers endorsed a disturbance of workflow by having to address central lines daily.

Conclusions

Utilization of tools to improve compliance with the central line bundle increased the daily discussions of central line necessity, improved provider comfort level with central lines, and decreased CLABSI rates. Furthermore, implementation of this project did not cause a disturbance in provider workflow. As evidenced in previous studies, decreased CLABSI rates are associated with decreased morbidity and mortality, decreased length of stay, and decreased healthcare costs. The education provided to clinicians through this project also increased their comfort level and understanding of CLABSIs and central lines.

Future Plans

Two junior pediatric residents will continue this project. One of the residents will spread this work to the pediatric heme/onc population, and the other will continue to work on making the changes from this project sustainable. Future plans include training several "CLABSI champions," as well as standardizing CLABSI education for the house staff and faculty.

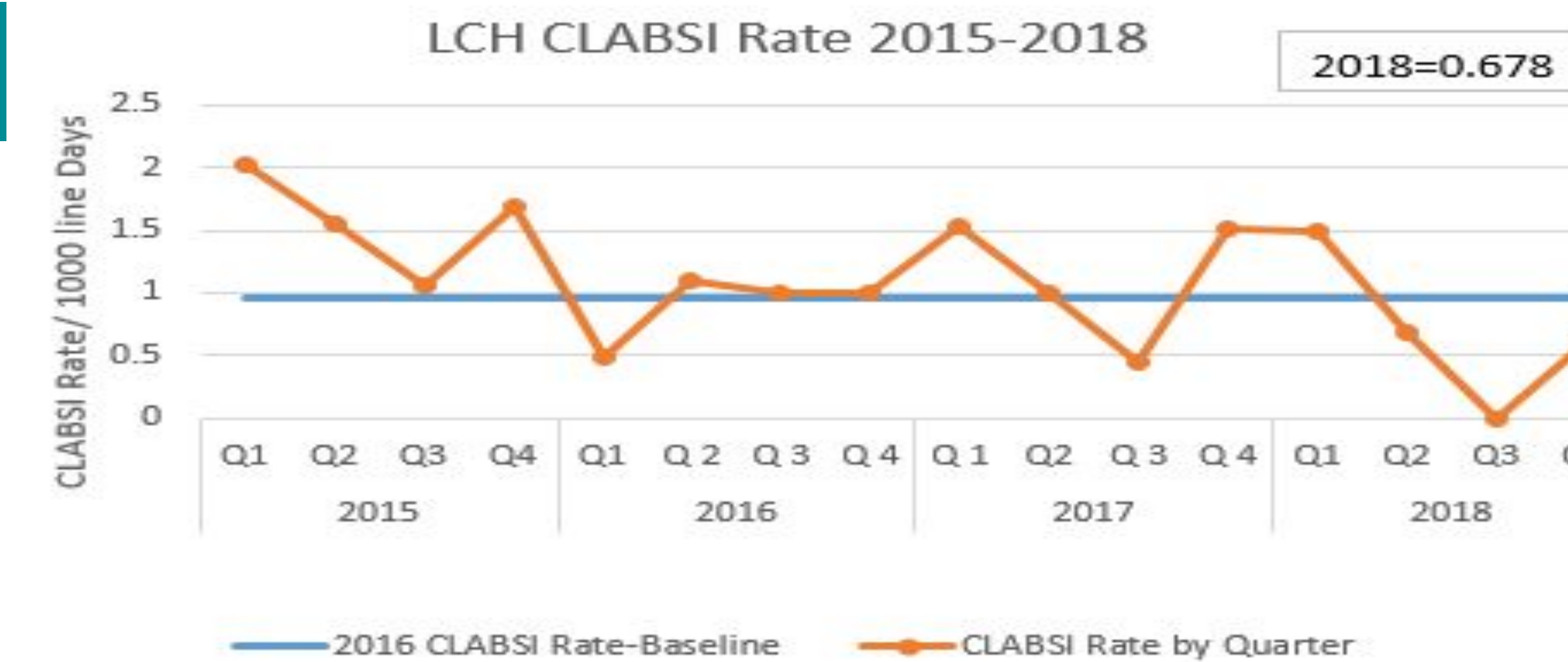


Figure 1. Run chart of LCH quarterly CLABSI rates

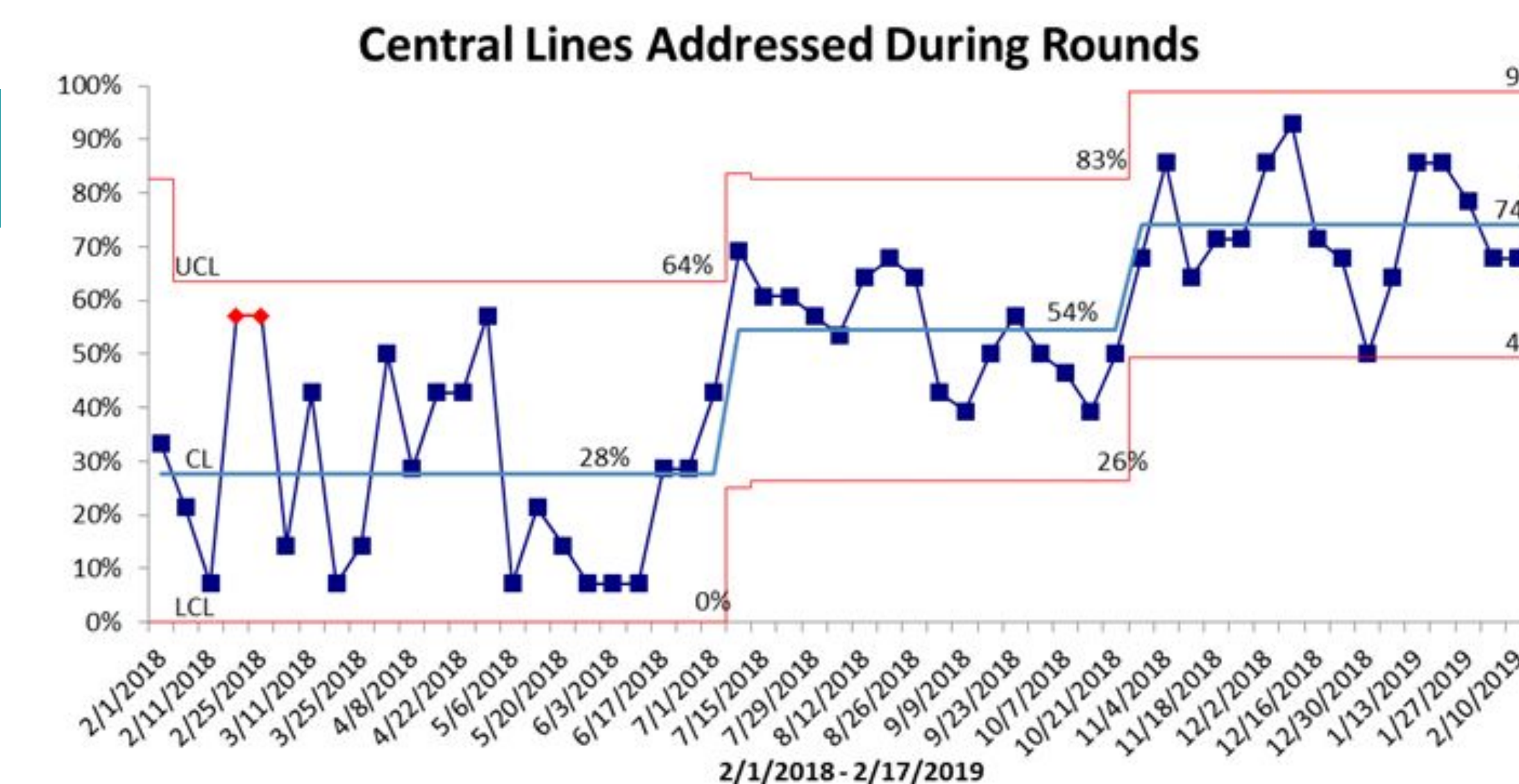


Figure 2. Control chart of frequency central lines were addressed

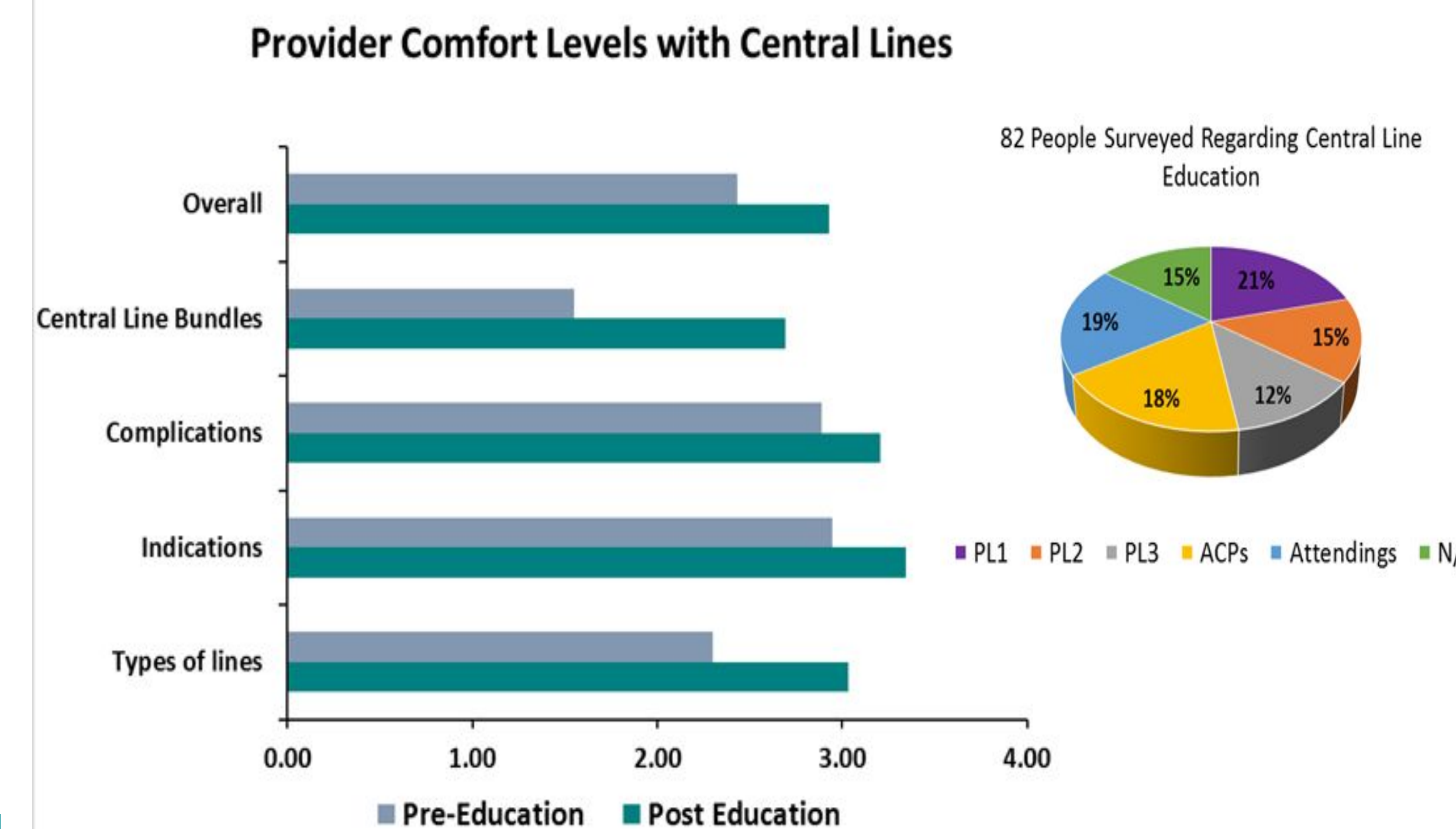


Figure 3. Comfort level with central lines pre- and post-education

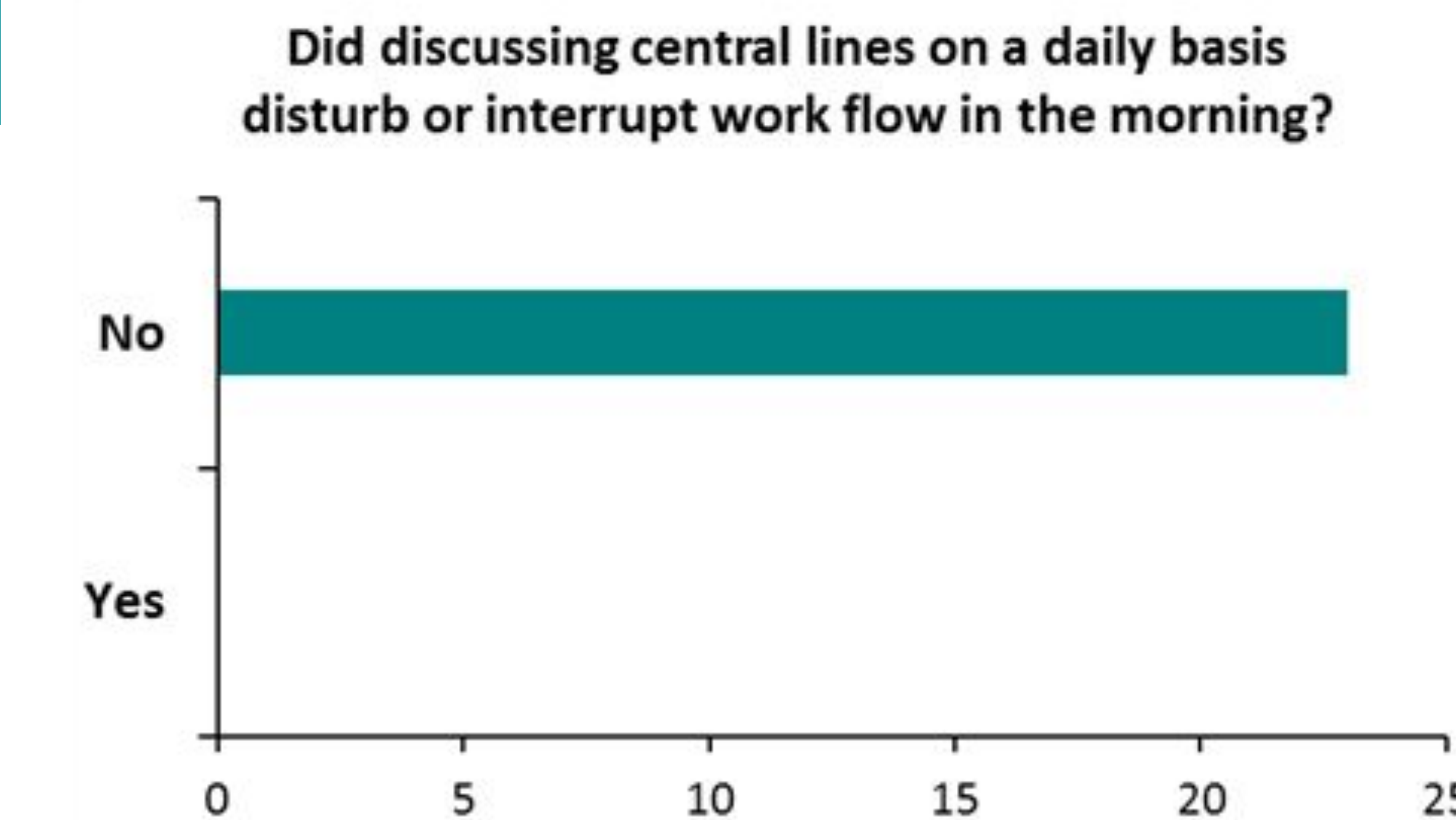


Figure 4. Subjective disturbance of workflow