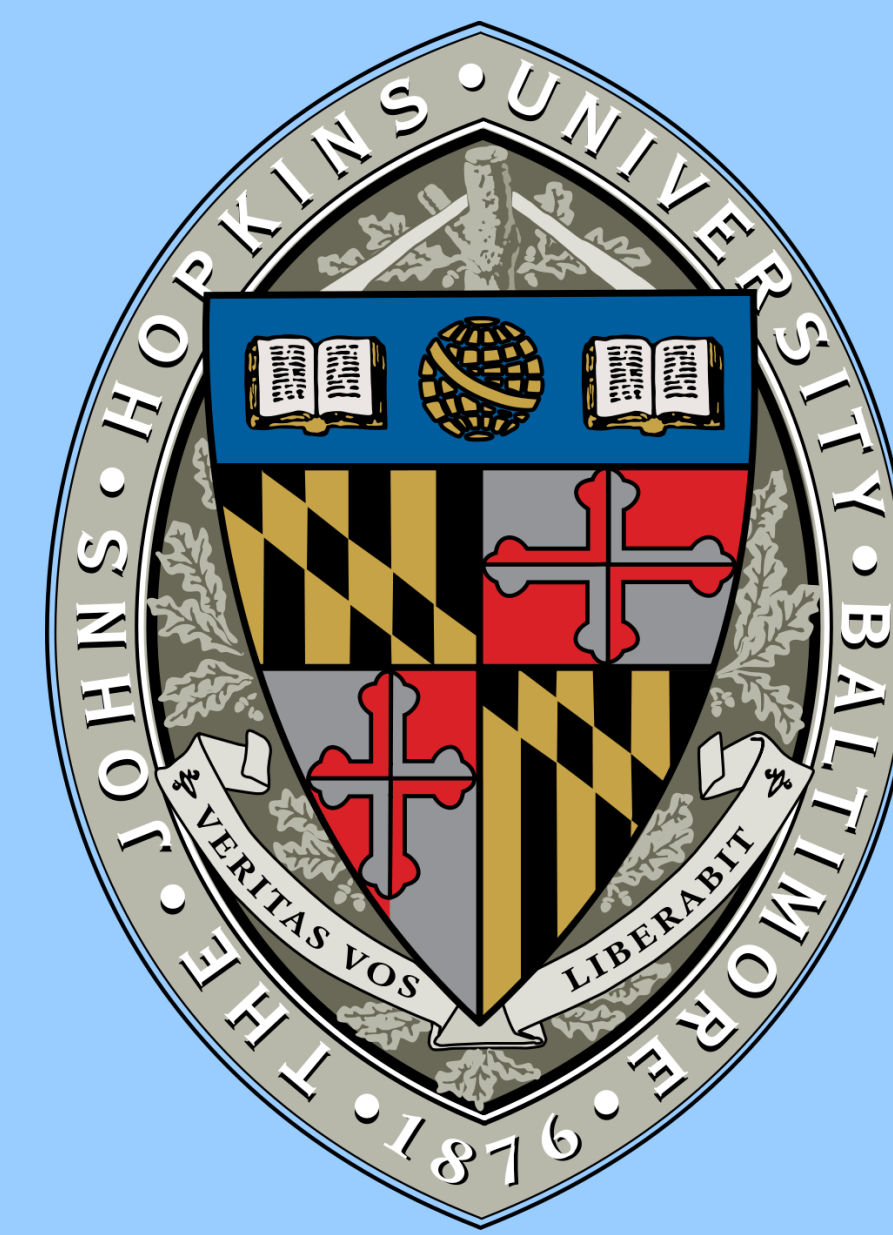


# CLABSIs in the PICU: Use of Alteplase in the PICU and Adherence to the Maintenance Bundle.

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## 1 Background

Central Line Associated Blood Stream Infection, (CLABSI), is one of the most common nosocomial infections in the world. One of the highest incidence rates of CLABSI occurs in pediatric patients admitted to the intensive care unit. CLABSI-related morbidity makes it a major health problem, therefore it is pertinent to develop preventive strategies against it.

This project is one of multi factorial bundles initiated in 2006 in an effort to reduce the incidence of CLABSI in the PICU. On December 16, 2013, the Children's Center of Johns Hopkins Hospital, switched brands of the needleless connectors used as caps on their central lines. The change was primarily driven because of incompatibility issues between IV tubing and the connector cap in use known as MicroClave Clear connector cap. Besides, a central venous catheter, (CVC), clot can require the need for extended anticoagulation therapy even if the CVC is removed. CVC blood clot is also associated with bacterial colonization which increases the risk of CLABSI. InVision-Plus connector cap was reported in white papers to reduce the amount of CVC blood clots.. This new adopted cap is a neutral fluid displacement needleless IV connector cap. It's effective blood clearing minimizes biofilm adhesion and colonization, thereby reducing the risk of CLABSI. (Rymed Technologies LLC, 2014)

### Purpose

The objective of this project is to monitor the use of Alteplase in the PICU after the introduction of the new needleless connector cap while the goal is to reduce PICU CLABSI rate.

## 2 Methods

- Weekly use of the CLOT bundle data collection tool to retrieve information from the electronic medical records of patients.
- The total doses of Alteplase used to dissolve clots and total number of days that patients had central lines (CL) IV access was compared for 6 months periods before and after the introduction of the new needleless connector cap.

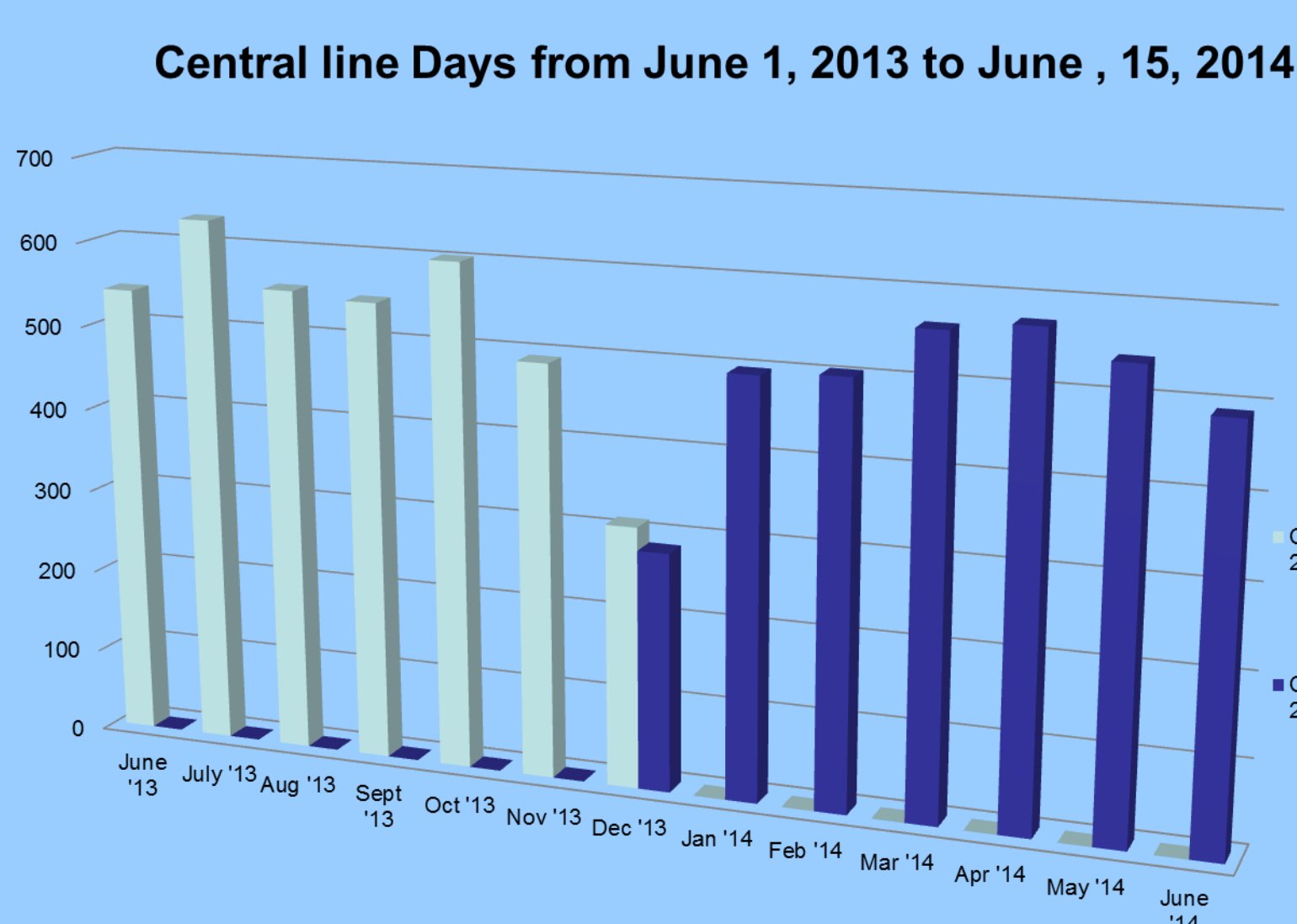


Fig 1. compares CL days for 6 months before and 6 months after the adoption of the new cap. Data reflects a 6% decrease in CL days..

## 3 Results

### Specific Aim #1

To ascertain the effectiveness of the InVision Plus IV connector cap in the reduction of blood clot and invariably, a reduction in the use of Alteplase.

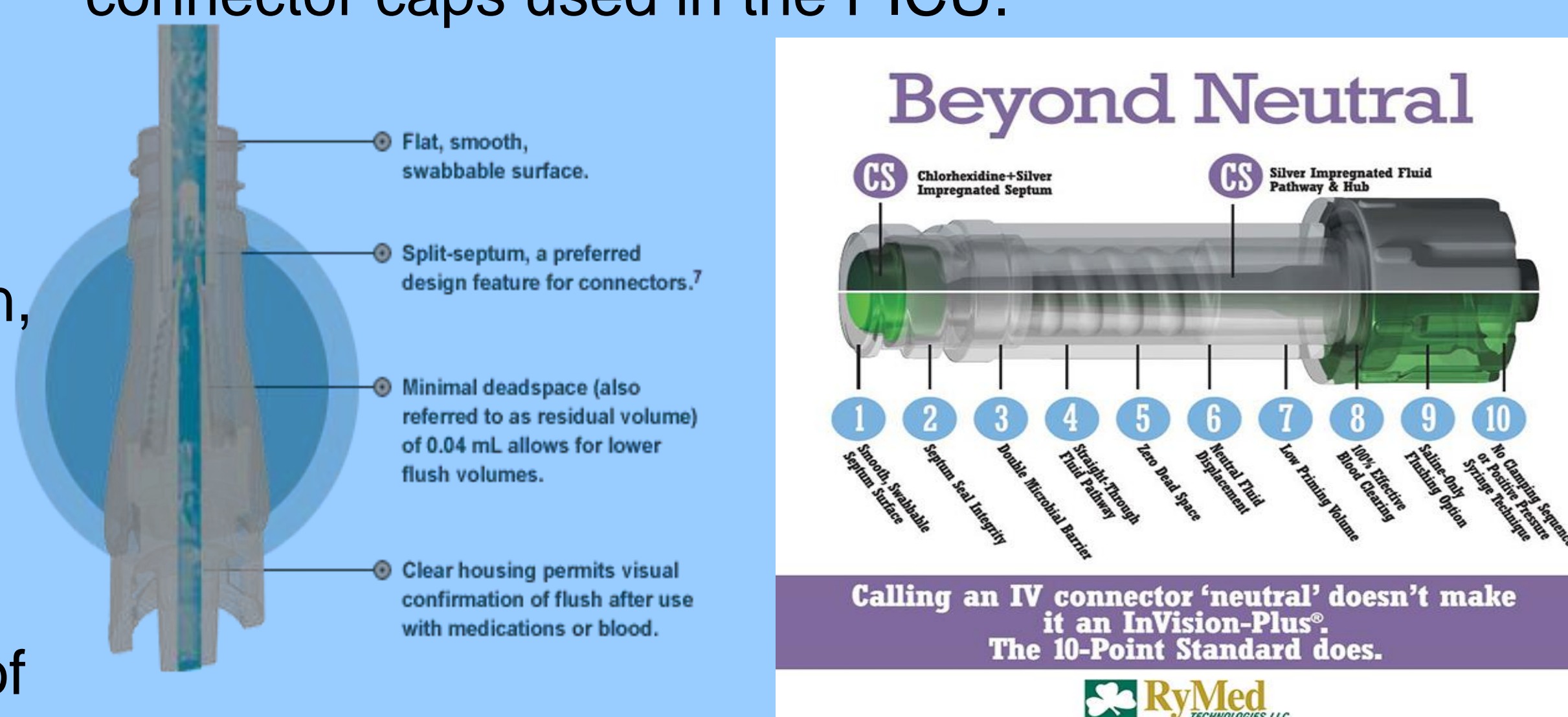
### Specific Aim #2

This retrospective surveillance project also aimed to establish adherence to the CLOT bundle for the maintenance of central lines.

### Demographic:

Specific aim #1 and aim #2 were jointly addressed. Data was collected and compared for the period of June 1<sup>st</sup>, 2013 to December 15<sup>th</sup> 2013 and another period from December 16<sup>th</sup>, 2013 to June 15<sup>th</sup> 2014. These periods represent six month prior and after the adoption of the new cap. Comparative Data analysis revealed that there was a little decrease in CL days during these periods. But there was significant reduction in the use of Alteplase in the months after the adoption. Therefore CL days reflects a constant variable in this project, it was not the reason for the reduction in the use of Alteplase in the PICU.

Below are the images and features of the old and new connector caps used in the PICU.

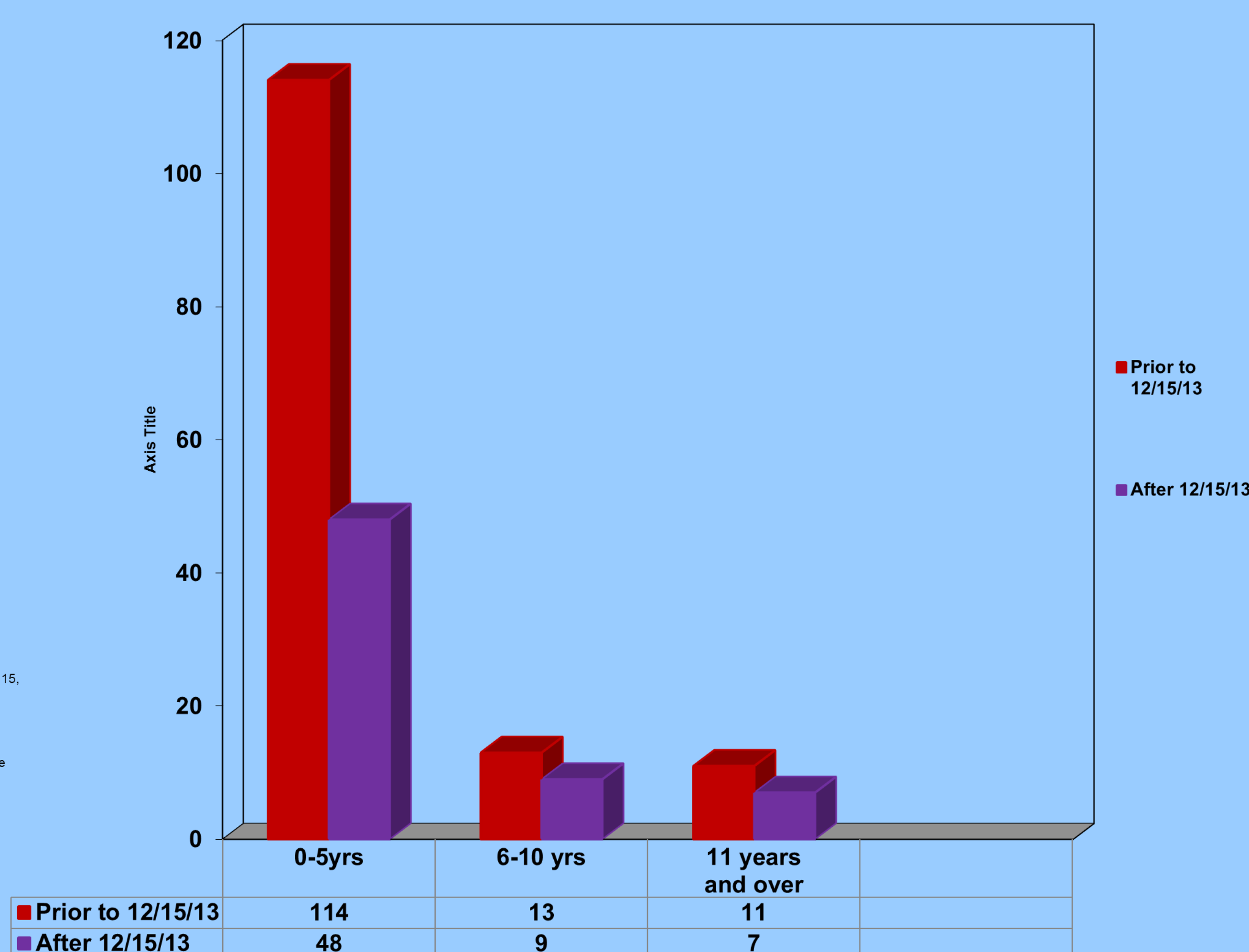


MicroClave Clear

InVision-Plus

The graph below indicates that from June 1, 2013 to December 15<sup>th</sup>, 2013, 138 doses of Alteplase was used to dissolve blood clot in the PICU, while only 64 doses was used from December 16<sup>th</sup>, 2013 to June 15<sup>th</sup>, 2014. This represents 54% decrease in the use of Alteplase after the introduction of the new cap. The use of Alteplase also dropped significantly to about 58% in 0 to 5 years old patients in the PICU for the same period.

Alteplase Usage in The PICU Before and After the adoption of new cap



**Analyzing the evidence:** The data analysis for the first half of 2014 revealed a 54% reduction in the use of Alteplase in the dissolution of blood clot in the PICU. This result indicates that the use of InVision Plus needleless connector cap is effective. During the same period, a total of 333 central lines were analyzed for adherence to the CLOT bundle, there was a single incidence of non adherence to the bundle.

## 4 Conclusions

The efficient use of the new needleless connector cap in conjunction with commendable, effective staff implementation of the CLOT bundle in the maintenance of CVC has continued to reduce the incidence of CVC clot in the PICU patient population. This effort has also contributed to reducing the rate of CLABSI in the PICU.

The consistent utilization of these evidence-based practices will continually yield the best outcomes for both patients and clinicians.

## 5 Future Directions

- Continue to monitor adherence to the CLOT bundle.
- Continue to monitor the use of Hospital protocol in the use of Alteplase.
- Use of root cause analysis in the investigation of new cases of CLABSI. In the PICU

## 6 References

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### Funding Source:

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