

Abstract

Background: Intraluminal occlusions is a common problem with Peripherally Inserted Central line Catheters (PICCS). These occlusions can lead to interruption in therapy, delay in discharge, need for additional procedures including Alteplase therapy or PICC replacement and decreased patient satisfaction. The longer a PICC line is occluded the higher the risk of Central line associated blood stream infection (CLABSI). The cost related to nursing time to clear the line and the dose of Alteplase costs approx. \$225. The vascular access nurses were interested in a cost saving measure. Our Alteplase (TPA) usage for clearing occlusions in PICC's averaged 12.74% from May 1, 2017 thru January 31, 2018. In the past, Education had been provided to bedside nurses on proper flushing and locking technique. These figures showed some improvement but did not resolve the high Alteplase usage in the long term.

Objective: The goal was to decreased PICC line occlusions to 10% or less. The aim was to find a needless connector that would guard PICC lines from reflux and resulting occlusions.

Method: Vascular access nurses used Lean performance improvement methods to check and adjust processes in order to decrease occlusions. A literature review showed success using the anti-reflux needless connector. Clinical nurses designed a trial of the anti-reflux needless connector to determine if they could decrease intraluminal occlusions. The anti-reflux needless connectors, "Neutron" by ICU medical, Inc. was selected. In order to measure intraluminal occlusions, Alteplase use was tracked and reported by our inpatient pharmacy and compared to the number of PICC lines to determine occlusion rates.

What Causes Reflux into a PICC Catheter?

Internal Causes
Patient Vascular Pressure Changes caused by:

- Coughing
- Sneezing
- Movement
- Crying

- External Causes**
- Connection and Disconnection of a Luer
 - IV Bag Running Dry or an Infusion Pump Stopping
 - Syringe Plunger Rebound

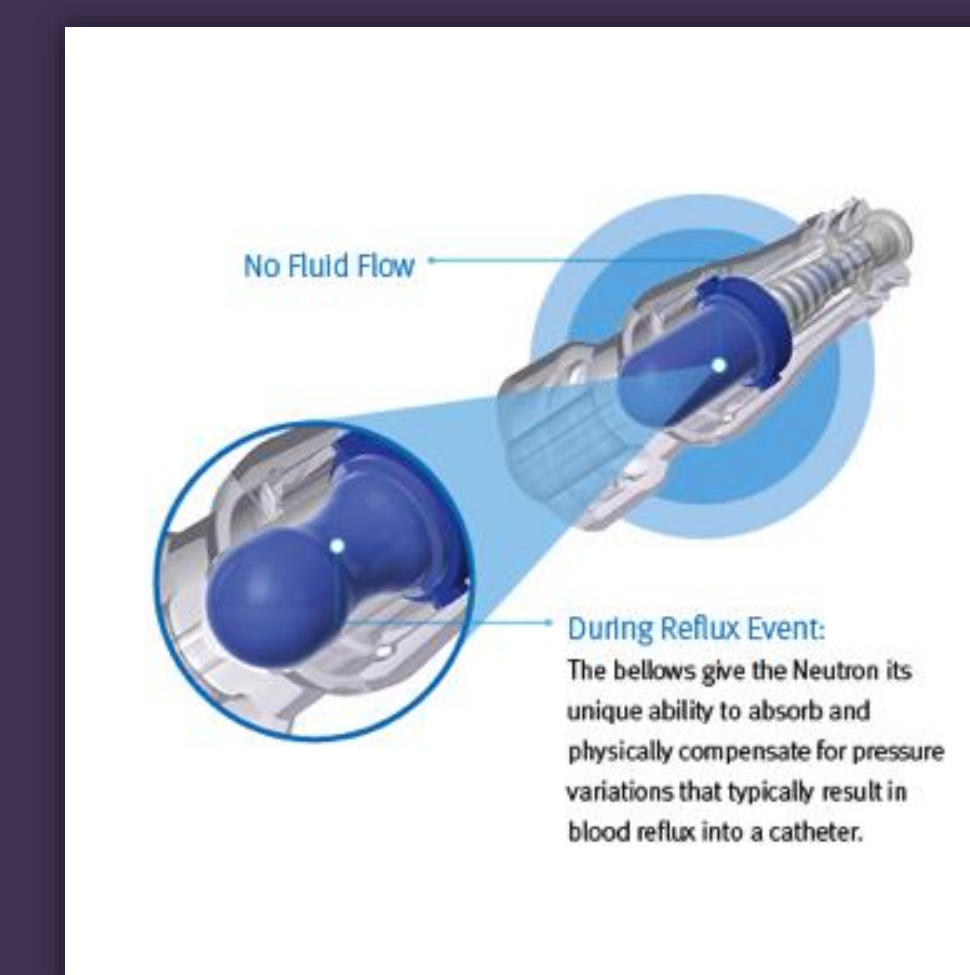
Clinical Benefits of Neutron

> Neutron enhances patient care and safety by reducing the risk of catheter occlusions, which may help you to:

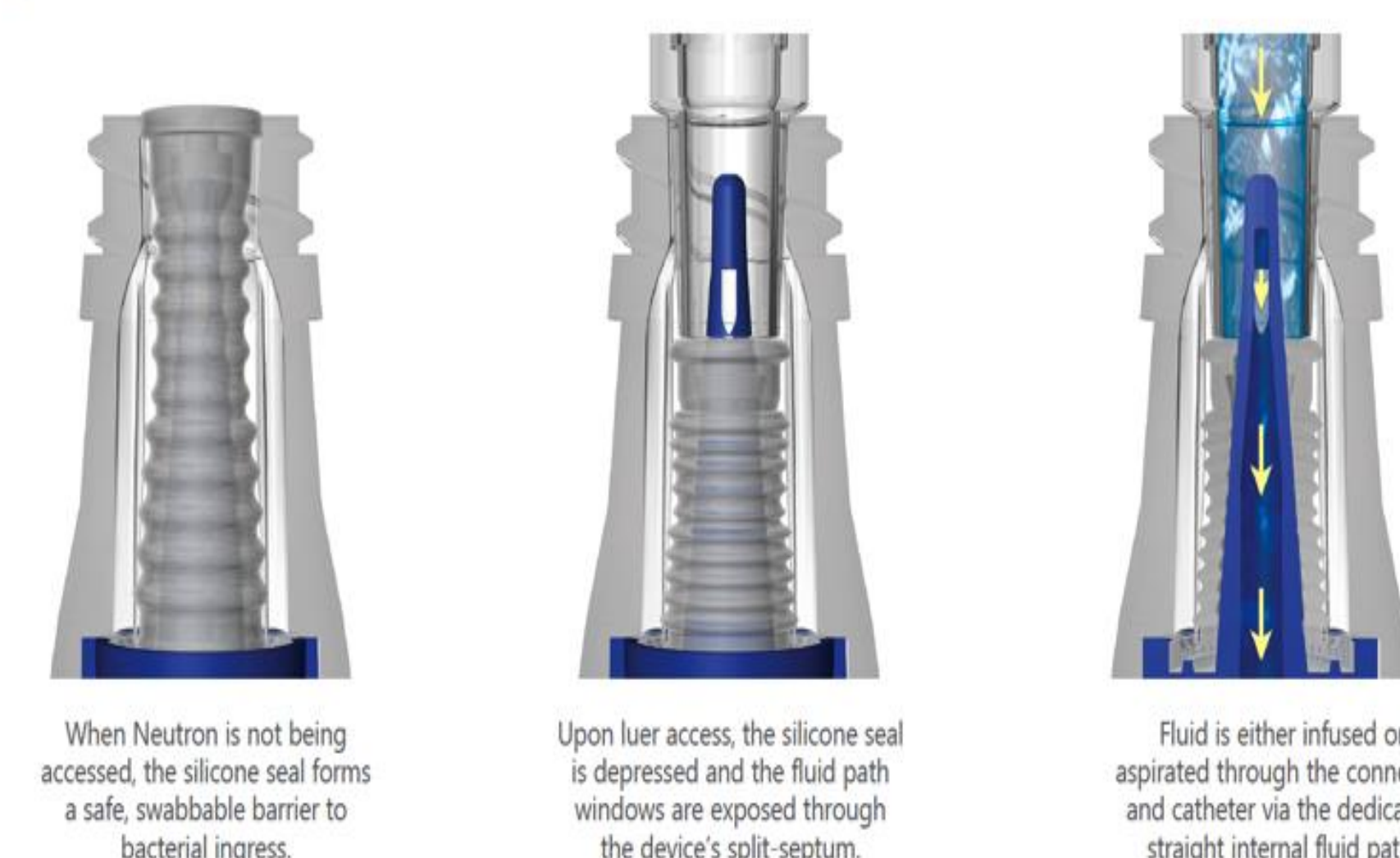
- Minimize delay in therapy and procedures
- Minimize unnecessary patient discomfort
- Avoid an unnecessary increase in length of stay
- Decrease the need for and risks of declotting agents (t-PA)
- Minimize the risk of releasing a blood clot into the bloodstream



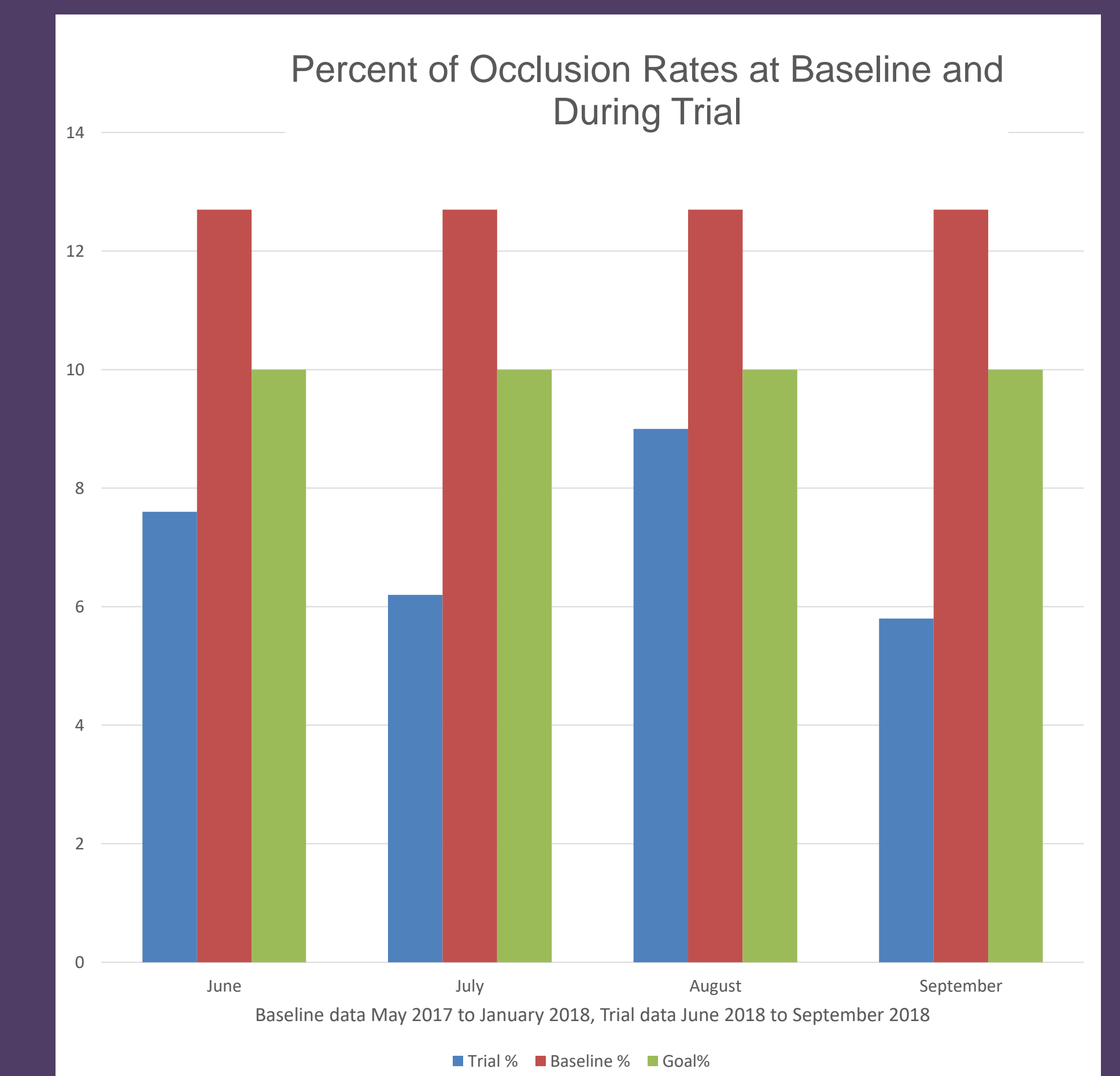
How a Neutron (Anti-Reflux) Valve works:



The Neutron incorporates ICU Medical's patented split-septum silicone seal and straight internal fluid path technology, clinically shown to provide a "significantly reduced bacterial transfer rate."¹



Results:



Results:

Occlusion rates varied by month, however all fell below the baseline of 12.74%. With the final measurement at 5.88%.

Conclusion:

Anti-reflux valves are useful in reducing occlusion rates. In addition the valves allow vascular access nurses to perform routine duties, influencing nursing satisfaction and assisted with keeping patient treatments on time.

References:

- Cloonan, W. (2019, March 19). Neutron Valve [E-mail to the author]. Neutron PowerPoint
- Hull, G. J., Moureau, N. L., & Sangupta, S., Ph.D. (2017, December 04). Quantitative Assessment of reflux in commercially available needle-free IV connectors. *JVA*. doi:10.5301/jva.5000781
- Hadaway, L., M.Ed., RN, BC, CRNI. (2017, December 19). IV-Therapy.net.
- Hadaway, L. –Direct email communication: Lynn Hadaway writes, "There are only 2 needless connectors on the market that work by pressure changes. The difference between the anti-reflux and the others is that all others remain an open conduit allowing blood reflux until the administration set is disconnected. The Anti-reflux type closes automatically when there is a column of fluid left in the administration set of between 8-10 inches. Decreasing gravity infusion pressure causes the closure."