

Utilization of smart pump syringe delivery and wireless drug library updates to mitigate the impact of intravenous solution shortages

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Background

- > In September 2017, Hurricane Maria struck Puerto Rico contributing to the ongoing critical shortage of intravenous (IV) fluids in the United States.¹
- > IV fluid shortages are leading to an increased use of IV push syringe medication delivery which has associated potential risks²
- > Medications delivered by syringe within the limits of a drug library address many risks associated with administration
- Manchester Memorial Hospital is part of the Advent Health System located in Manchester, Kentucky. It is a 49 licensed bed general medicine and surgical facility with approximately 80 general intravenous infusion devices utilizing a wireless smart pump technology infrastructure.

Purpose

To describe the technique and results of Manchester Memorial Hospital's efforts to meet its patients' IV fluid needs by utilizing the secondary ports of their large IV infusion device to administer medications via syringe.

Methods

- To meet the demand for IV antibiotics during the fluid shortage, syringe entries were built into the large volume IV infusion device drug library in place of IV bags.
- > Retrospective review was conducted prior to the shortage, from 09/01/2016 to 09/30/2017, and after the shortage, from 10/1/2017 to 12/31/2017 to compare IV antibiotic syringes to all IV antibiotic doses dispensed.
- > Drug Library entries were compared for IV antibiotic piggyback totals to IV syringe antibiotic totals pre and post drug library modifications.
- > Time savings were calculated based on time required for a nurse to manually push IV antibiotics versus administering a syringe utilizing the large IV infusion device. Manual IV push doses are estimated to require an additional 5 minutes of nursing time.
- > Cost savings analysis were based on IV Piggyback costs compared to pre-filled saline syringes. Labor costs were not factored into this calculation.

Results



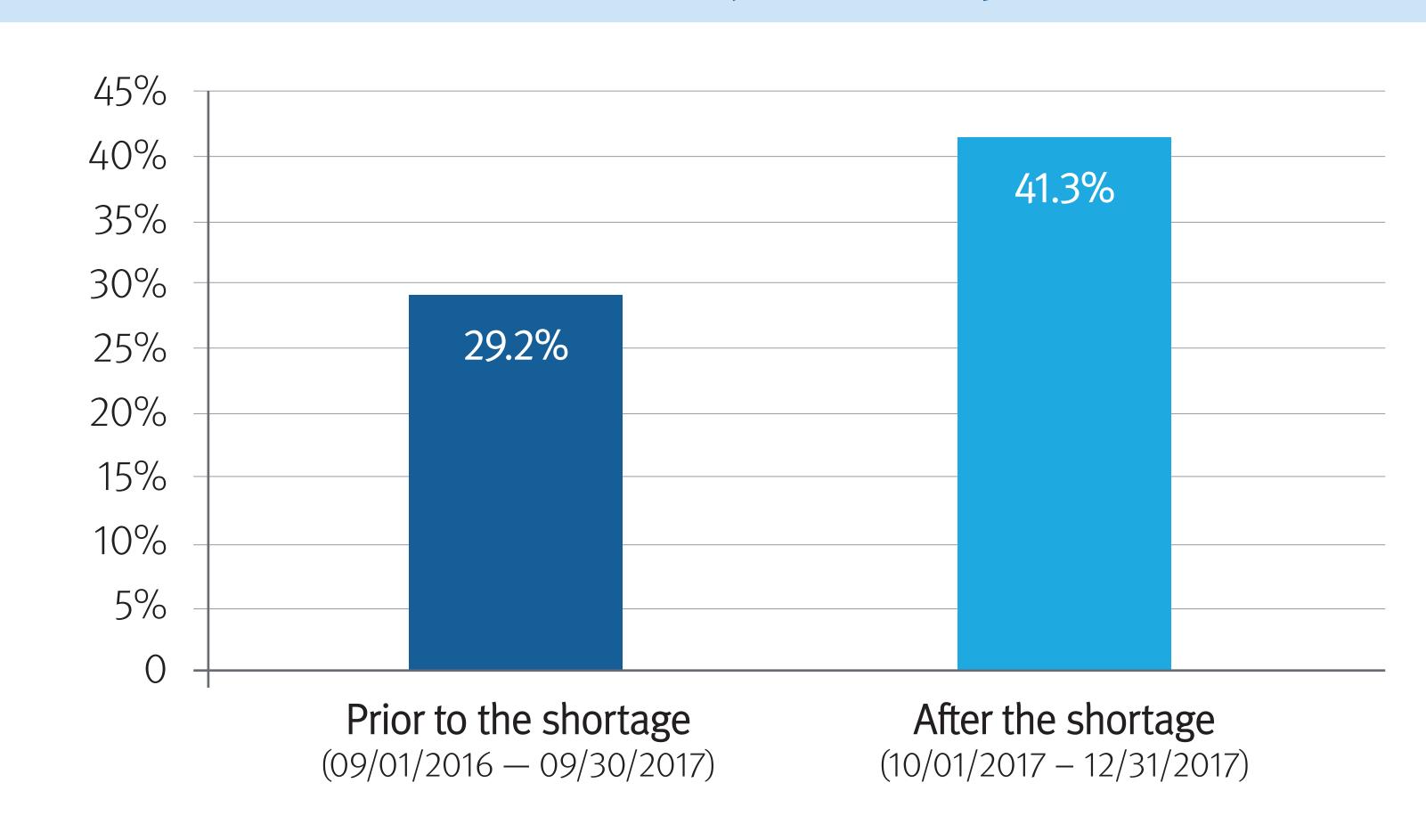


Fig. 3 – IV antibiotic syringe entries – drug library post modifications

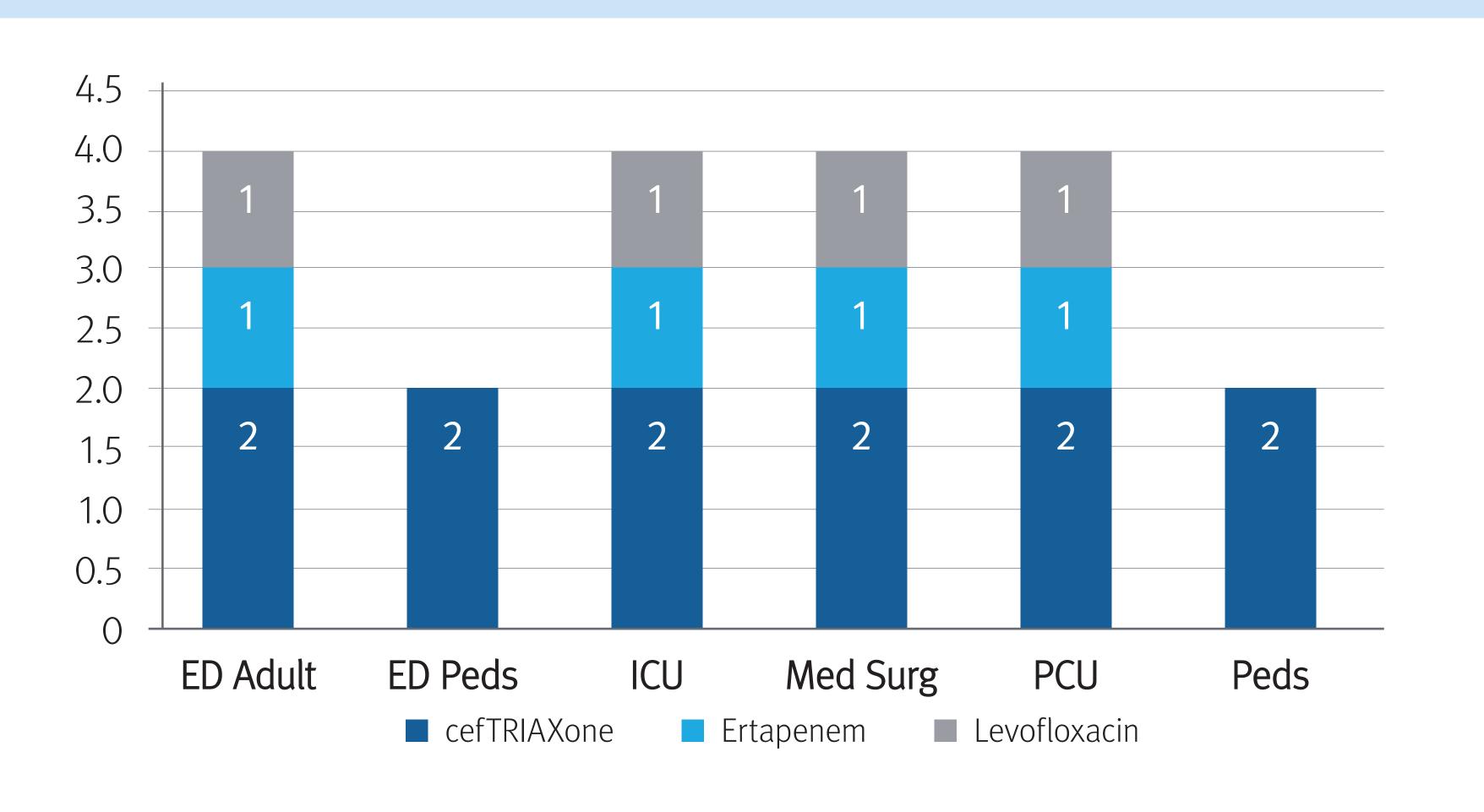


Fig. 2 — IV antibiotic syringe entries — drug library pre modifications

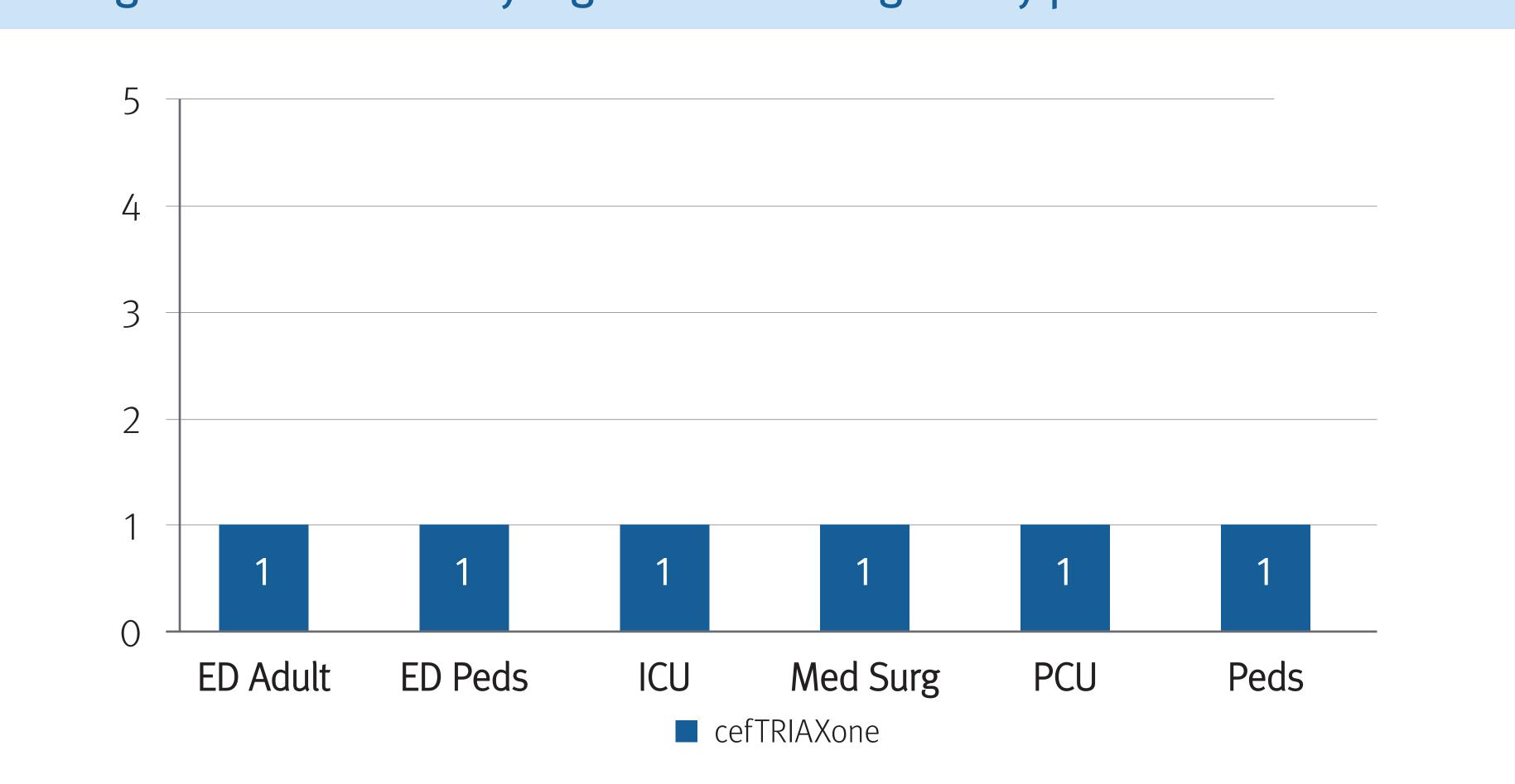


Fig. 4 – Estimated monthly antibiotic IV piggyback and IV syringe costs

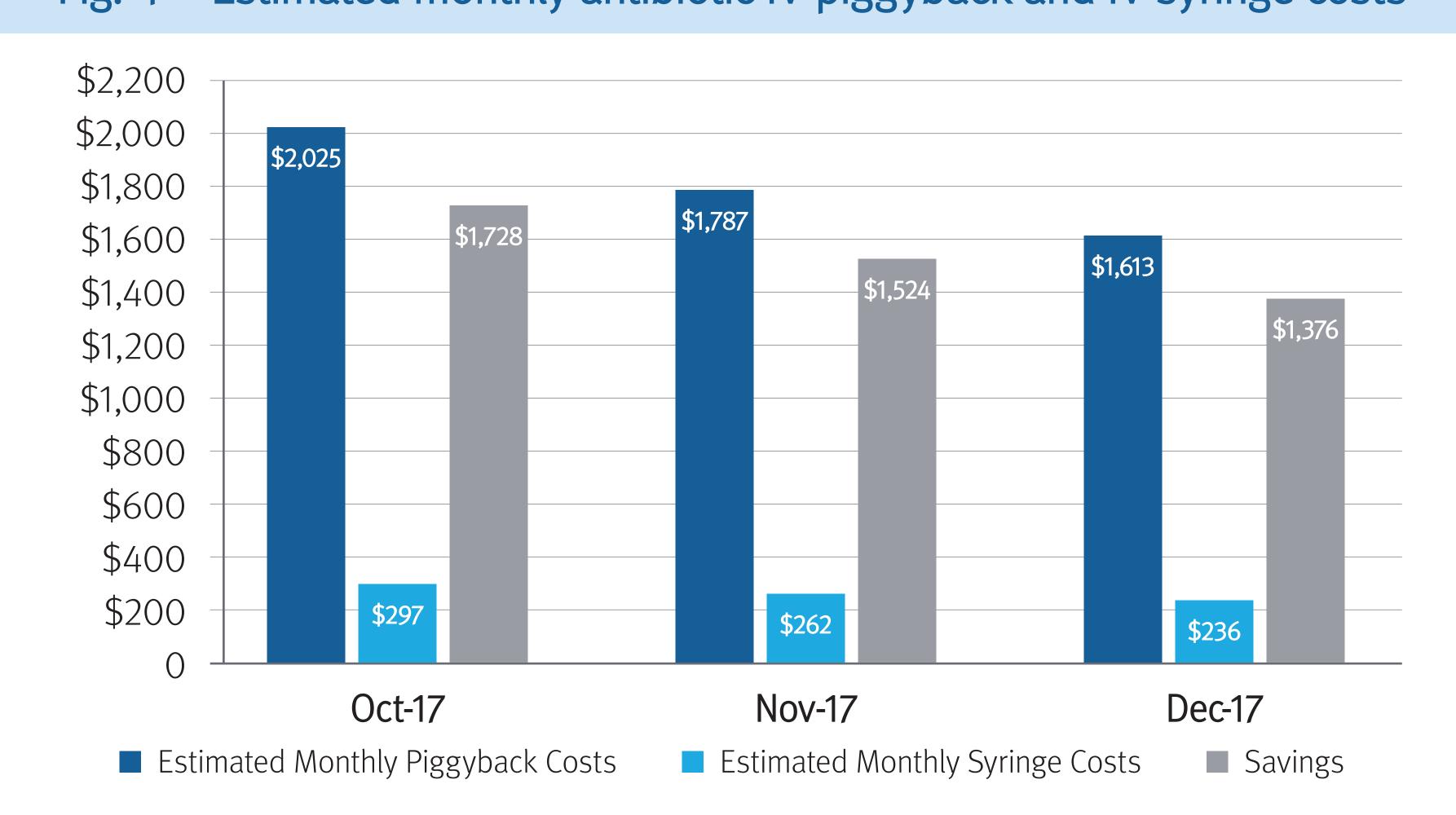
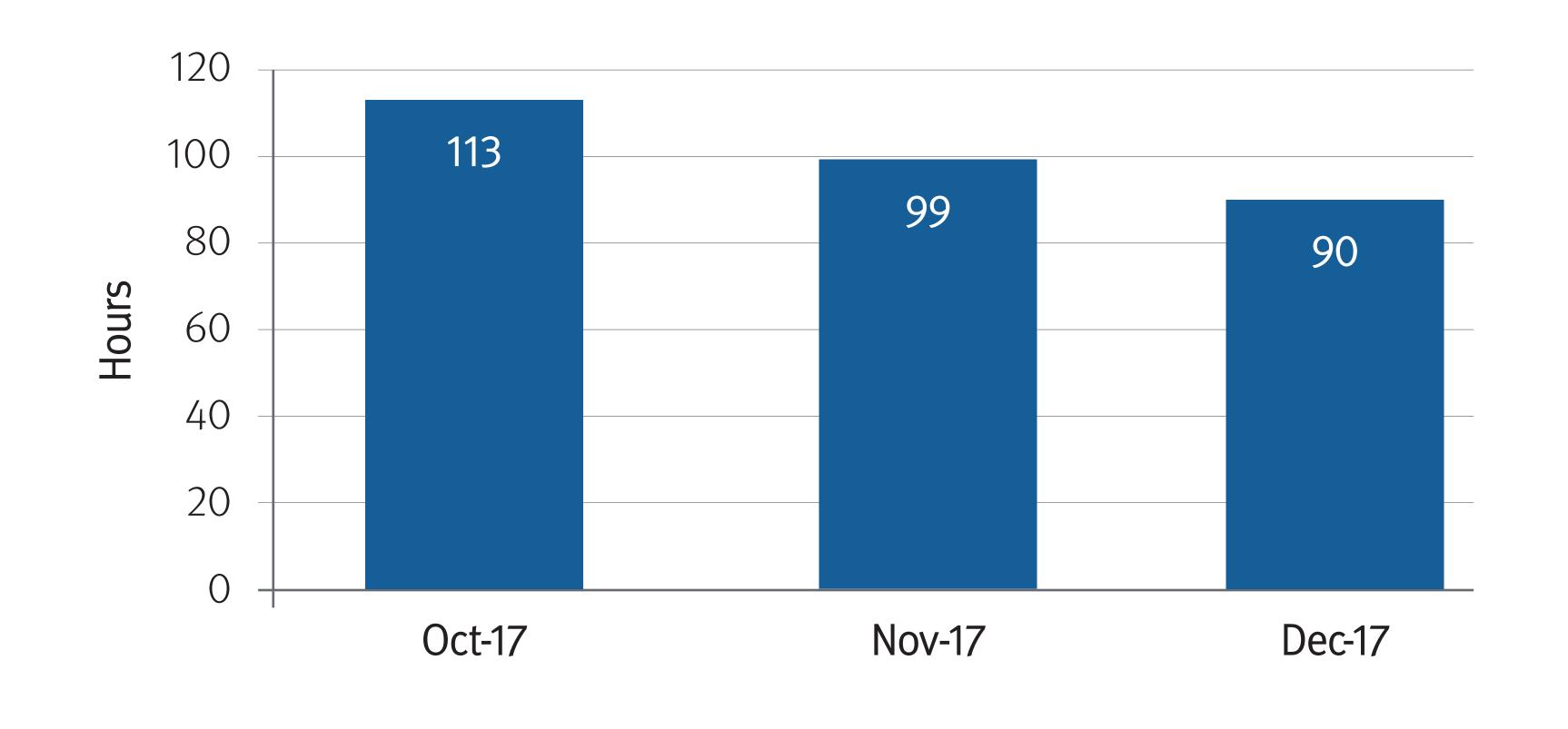


Fig. 5 – Estimated time savings in utilizing large volume syringe pump for IV Push antibiotics



Conclusions

- This change in IV antibiotic administration process demonstrated that the use of a large volume IV infusion device with wireless drug library upload capability can mitigate the impact of the IV solution shortage.
- Antibiotic syringe delivery on the large volume IV infusion device secondary port was used to safely and efficiently ration IV fluids and maintain medication administration to patients.
- > The conversion from IV bags to antibiotic administration via IV syringe has resulted in several benefits:
 - Increased safety and reduced variability in administration process
 - Reduced total volume of fluids required to administer antibiotics
 - Reduced bedside administration time required for clinicians
 - Potentially impact turnaround time and efficiency in key hospital units

Directions for further study

- Considerations of adding more medications that can be administered with the large IV Infusion device to deliver slow IV Push via IV syringe safely to replace larger IV Bags.
- Further investigate the potential impact of the utilization of IV syringe administered medications via the large volume IV Infusion device to improve bed/chair availability for outpatient and/or ED areas.

REFERENCES

1. Saker A, Rudavsky S. Hospitals find other ways to deliver medicine amid IV bag shortage. USA TODAY Network. January 14, 2018.

2. ISMP. NurseAdviseERR. Nov 2018, Vol 16, Issue 11.

DISCLOSURES

Authors of this presentation have the following to disclose concerning possible financial or personal relationships with commercial entities that may have direct or indirect interest in the subject matter of this presentation: LeAnn Graham, Navneet Dhanjal and J.W. Beard – ICU Medical, Inc. Michael Ledford and Janet C. Jones have nothing to disclose.