

## Introduction

- Per capita healthcare expenditures in the U.S. are the highest in the world.
- Operating room (OR) costs are estimated to comprise 40% of all hospital expenditures, and are a prime target for improved efficiency. <sup>1</sup>
- Nearly 30% of anesthetic drugs are wasted, due primarily to the disposal of full and partially-full syringes. <sup>2</sup>
- Drug waste is particularly relevant in pediatrics, where often only small fractions of vials are needed for each patient.
- The Joint Commission has adopted a “one vial for one patient” policy, discouraging the practice of dose-splitting.
- At CHLA, IV acetaminophen has been identified as one of the major causes of rising drug-related costs.
- In collaboration with Pharmacy, we instituted a practice of robotic dose-splitting for 100 mL acetaminophen vials into 20 mL (200 mg) syringes.



Figure 1: IV acetaminophen 1000 mg vial



Figure 2: Omnicell ivStation



Figure 3: Dose-split syringes

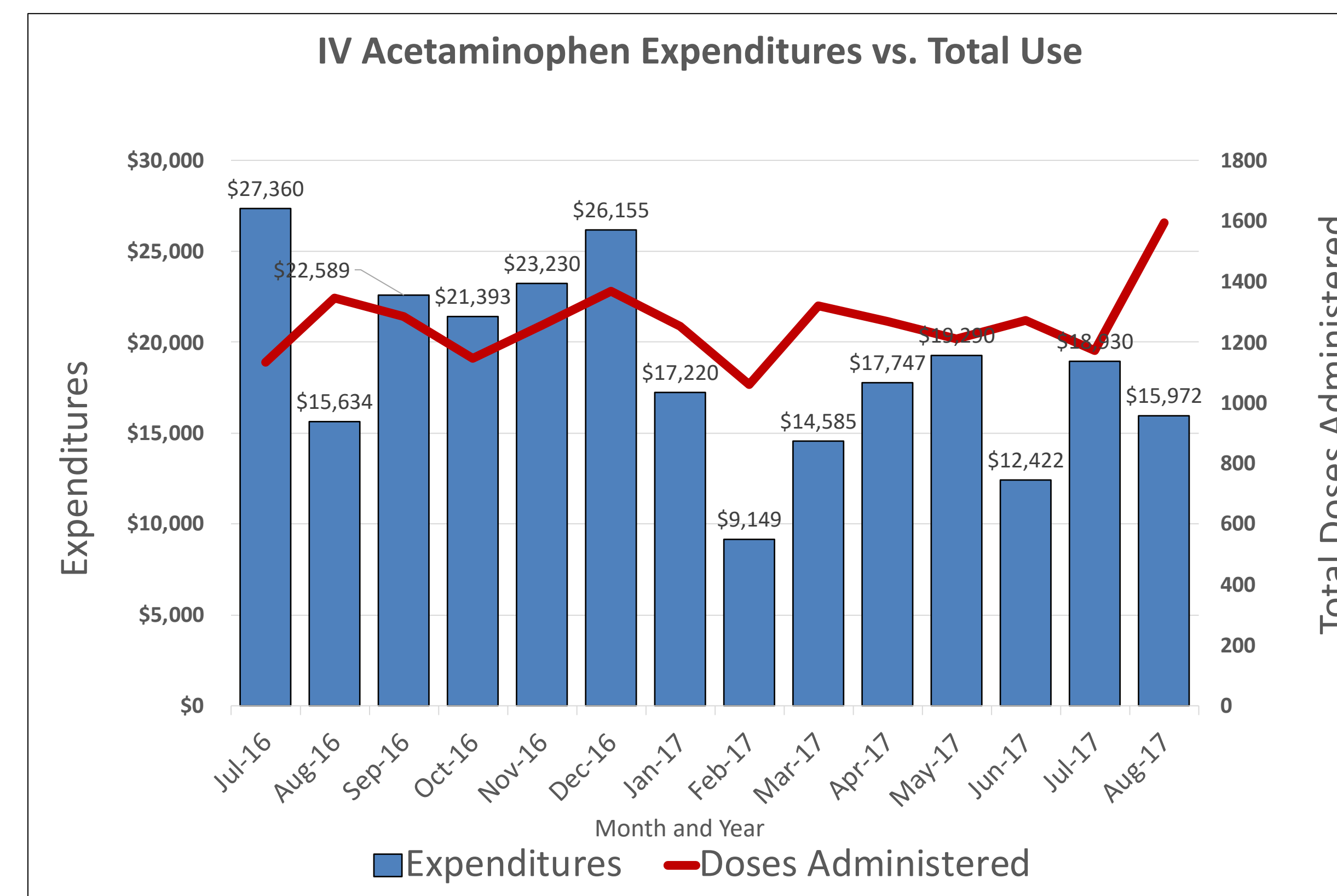
## Study Design

**AIM:** To investigate the impact of robotic dose-splitting on IV acetaminophen use and wastage in the OR

**METHODS:** Retrospective analysis of IV acetaminophen usage at Children’s Hospital Los Angeles. Data was obtained from pharmacy billing records and hospital drug purchase invoices for the period between January 2016 and October 2017.

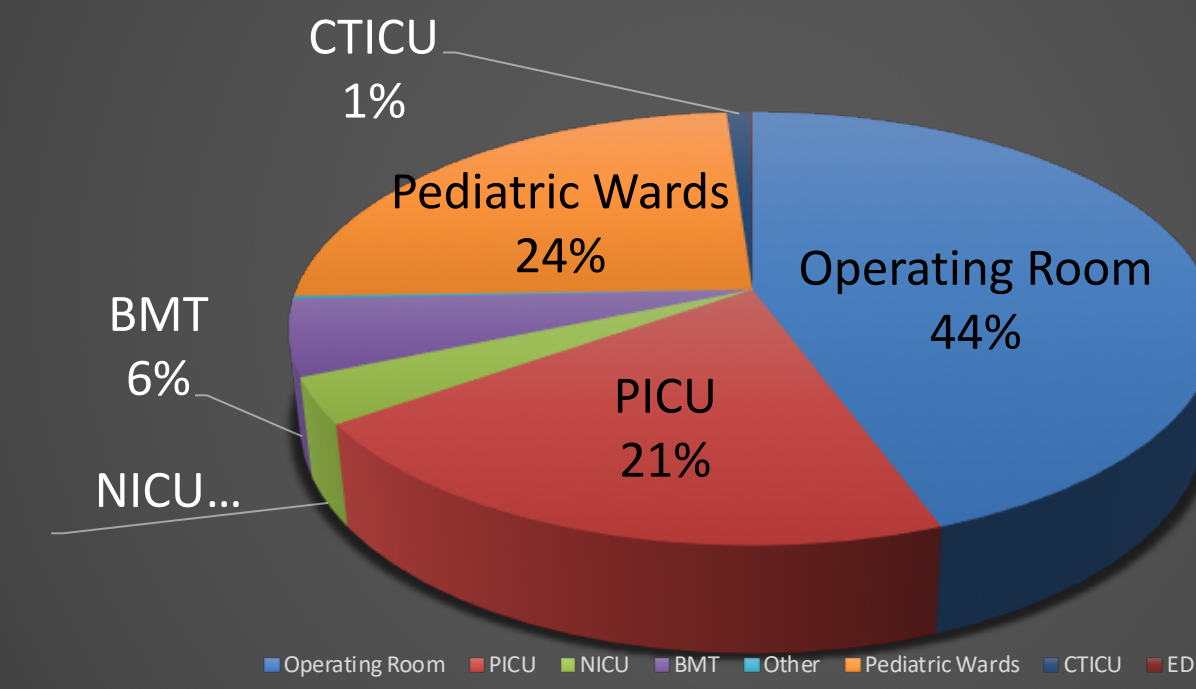
## Results

- Between July 2016 and July 2017, IV acetaminophen doses administered in the OR represented 44% of total hospital use.
- Total hospital spending on IV acetaminophen for that time period was \$245,704, yielding an estimated \$108,109 spent on IV acetaminophen in the OR alone.



- In the 6 month period prior to the intervention, average monthly expenditures for IV acetaminophen were \$22,727, compared to \$15,354 in the 6 months post-intervention.
- Hospital IV acetaminophen expenditures fell by 32.4% in the 6 months following the intervention.
- In that same time period, total hospital IV acetaminophen use increased by 1.1%.
- The net savings on IV acetaminophen for the 6 month period after dose-splitting began totaled \$44,238.

## IV Acetaminophen Doses by Unit July 2016-July 2017



## Discussion

- Robotic dose-splitting satisfies Joint Commission requirements for safety and sterility and provides an alternative to wasting unused portions of multi-dose vials.
- Since we observed no significant change in the overall use of IV acetaminophen during the study period, we believe the reduction in IV acetaminophen expenditures is driven primarily by a reduction in waste of the drug.
- Since all hospital locations outside the OR utilize unit-dosing for IV acetaminophen, the reduction in waste must have occurred in the OR.
- Exact amounts of IV acetaminophen waste could not be directly measured retrospectively due to documentation limitations.
- Savings from reduced waste must be balanced against the cost of purchase and maintenance of the robot.
- The principle of dose-splitting to reduce waste is applicable to many other drugs used in the OR environment.

## Conclusion

- Robotic dose-splitting may reduce OR drug waste, save money, and improve compliance with Joint Commission guidelines.

## References

- Macario A, et al. Where are the costs in perioperative care? Analysis of hospital costs and charges for inpatient surgical care. *Anesthesiology*. 1995;83:1138–44.
- Gillerman RG, Browning RA. Drug use inefficiency: A hidden source of wasted health care dollars. *Anesth Analg*. 2000;91:921–4