



# Assessment of pharmacist-driven fluid stewardship recommendations that target hidden fluids in critically ill patients

Charles S. Wilson Jr., PharmD Candidate; Susan E. Smith, PharmD, BCCCP, BCPS; Andrea Sikora Newsome, PharmD, BCPS, BCCCP; Michael K. Long Jr., PharmD Candidate; W. Anthony Hawkins, PharmD, BCCCP  
on behalf of the University of Georgia Critical Care Collaborative

## BACKGROUND

- Fluid stewardship focuses on managing fluids based on patient specific needs in an effort to optimize volume status and improve outcomes<sup>1</sup>
- It has been suggested that fluid stewardship be guided by the 4 patient rights of medication safety: Right Patient, Right Drug, Right Dose, Right Route<sup>2</sup>
- One focus of fluid stewardship is the prevention of fluid overload, which is associated with organ dysfunction and death in critically ill patients<sup>1-2</sup>
- Hidden fluids, defined as discrete fluids administered as part of routine care that might be unaccounted for but contribute to overall fluid balance, account for 40-60% of total volume administered in the ICU<sup>3</sup>
- Purpose:** This research aimed to characterize pharmacist-driven fluid stewardship recommendations and their relation to hidden fluids in medically critically ill adults

## STUDY DESIGN

- IRB approved, single center, retrospective review
- Patients who were admitted to the medical ICU (MICU) between June 2016 and June 2019 and had pharmacy documentation in TheraDoc<sup>®</sup> were included
- Patients were excluded if they were less than 18 years of age or were not followed by the academic rounding team
- Documentation was reviewed for all pharmacy recommendations made on each patient day
- Recommendation Assessment:**
  - Each recommendation was assessed for relevance to fluid stewardship
  - Fluid stewardship recommendations were then stratified based on the four patient rights of fluid stewardship. Each recommendation was assessed for relevance to hidden fluids
  - All categorization was based on definitions agreed upon by the investigators a priori

## ENDPOINTS

### Primary

- Percentage of fluid stewardship recommendations related to hidden fluids

### Secondary

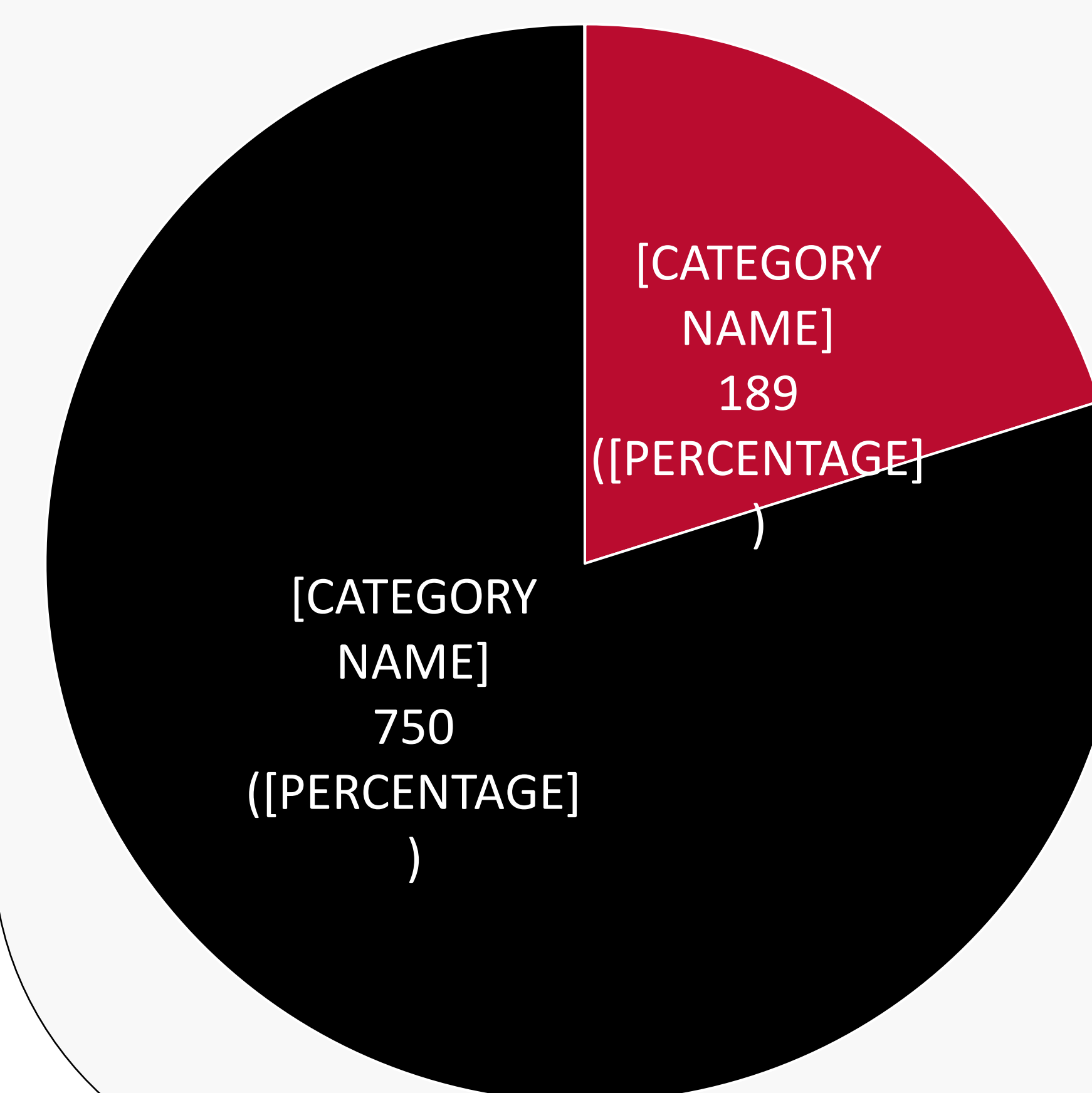
- Percentage of all recommendations that were related to fluid stewardship
- Average number of fluid stewardship recommendations per patient
- Average number of fluid stewardship recommendations per patient day
- Average number of hidden fluid recommendations per patient
- Characterization of hidden fluid recommendations according to the four patient rights

## RESULTS

Figure 1. Screening and Description of Recommendations



a. Total Recommendations



b. Fluid Stewardship Recommendations

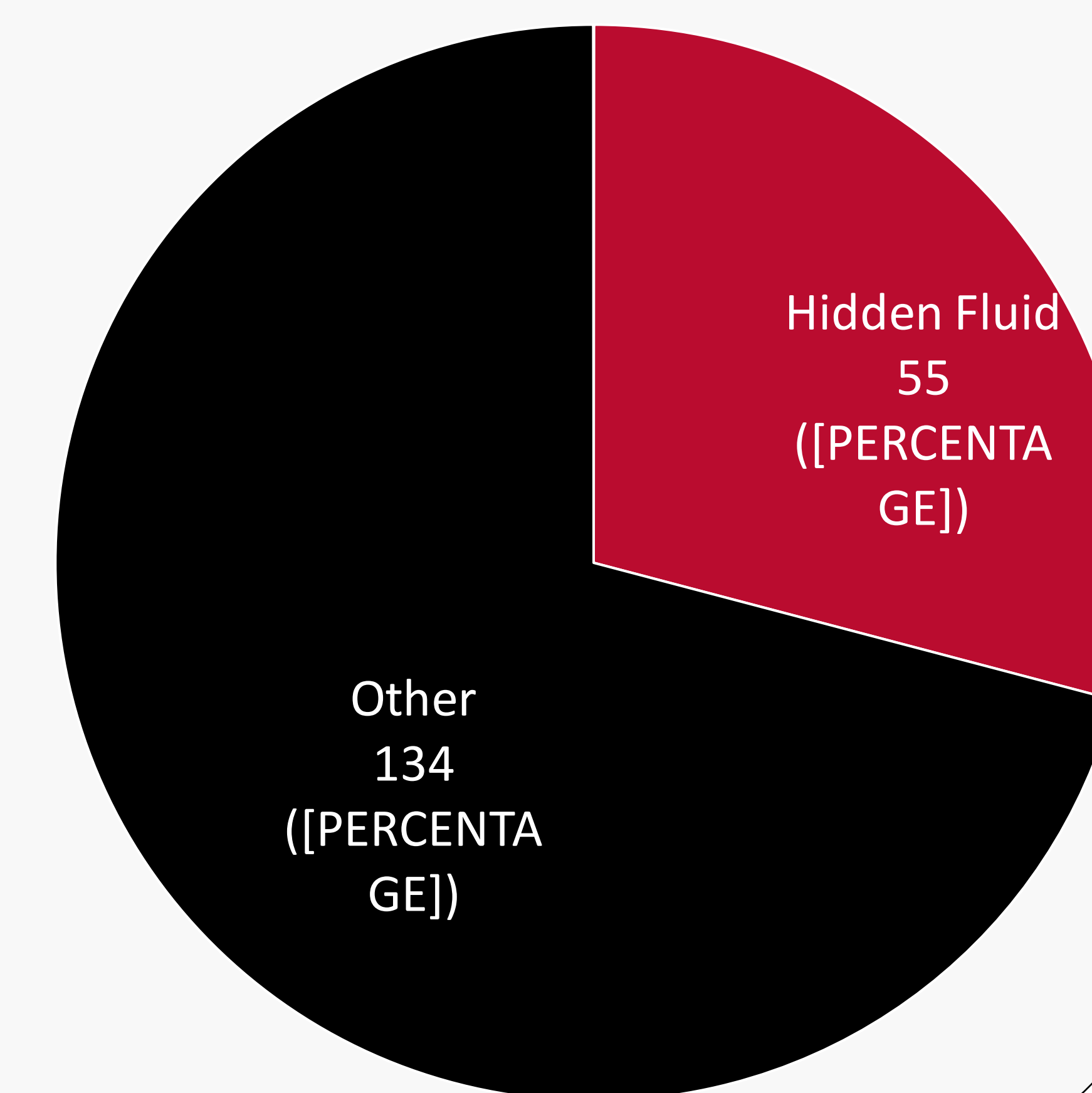


Table 1. Hidden Fluid Recommendation Examples

|               |  |
|---------------|--|
| Right Route   | Conversion from IV to PO   |
| Right Patient | Parenteral nutrition discontinuation                             |
|               | Enteral water discontinuation                                    |
| Right Dose    | Concentration of antibiotics, vasopressors or sodium bicarbonate |
|               | Parenteral nutrition volume adjustment                           |
|               | Enteral water volume adjustment                                  |

Figure 2. Secondary Endpoints

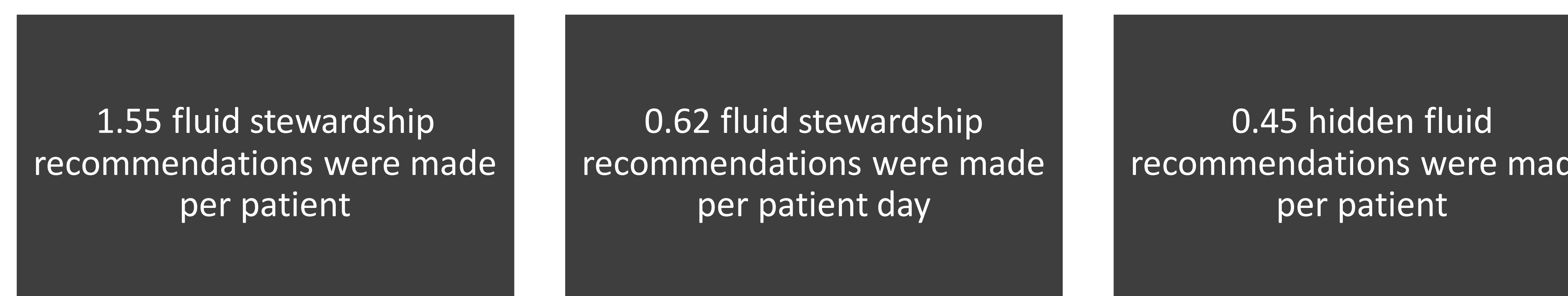
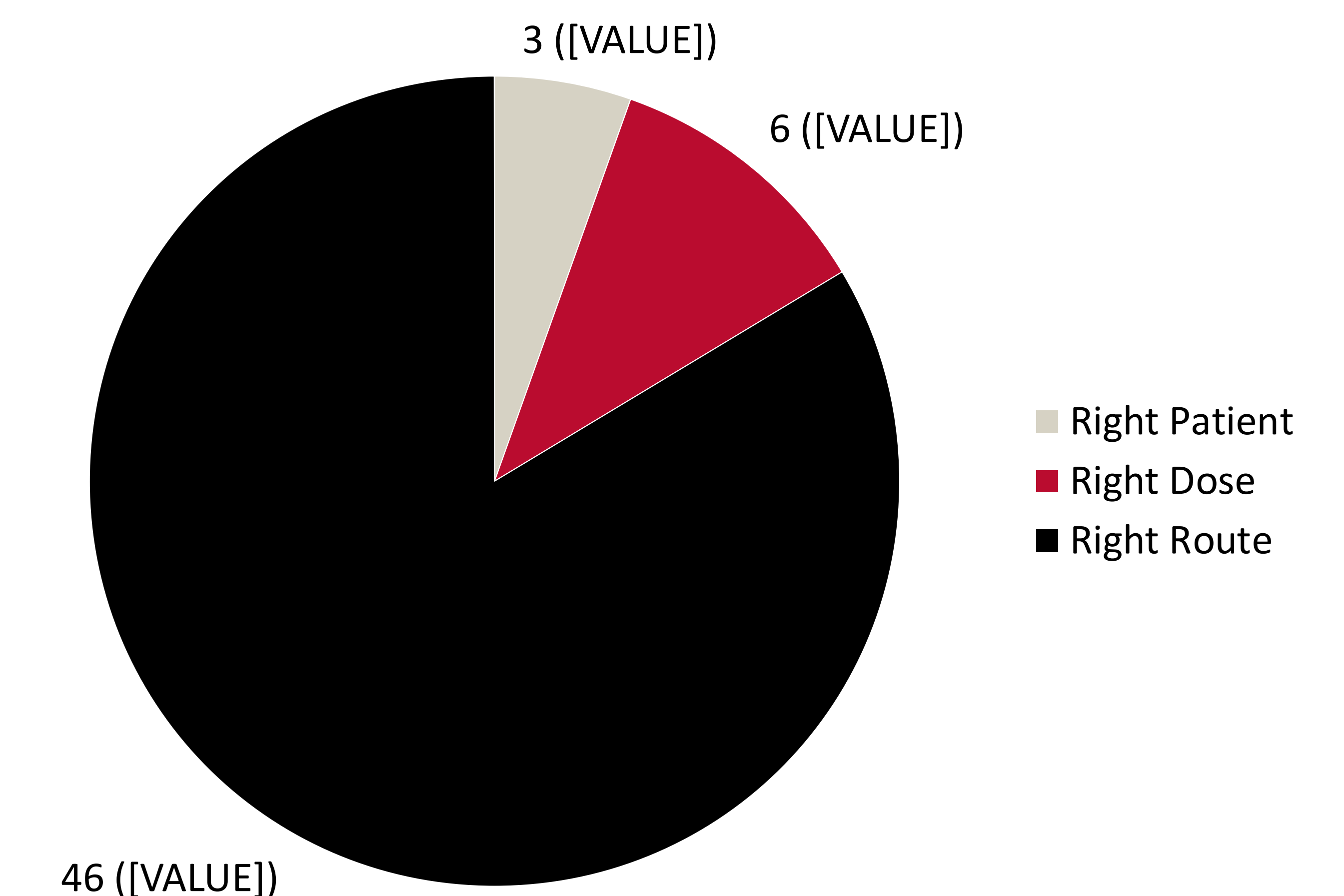


Figure 3. Characterization of Hidden Fluid Recommendations



## CONCLUSIONS

- 1 in 5 recommendations made by a critical care pharmacist is related to fluid stewardship
- Almost 30% of those recommendations are related to hidden fluids
- Most hidden fluid recommendations are categorized as pertaining to the right route
- Limitations:**
  - Small sample size
  - Single center
  - Retrospective design
  - Recommendations limited to those documented by the pharmacy team
- Future research should explore the clinical impact of these pharmacist-driven recommendations on patient outcomes

## REFERENCES

<sup>1</sup>Malbrain, M.L.N.G., Regenmortel, N., Saugel, B. *et al.* Principles of fluid management and stewardship in septic shock: it is time to consider the four D's and the four phases of fluid therapy. *Ann. Intensive Care* 8, 66 (2018) doi:10.1186/s13613-018-0402-x

<sup>2</sup>Hawkins, W. Anthony, *et al.* "Fluid Stewardship During Critical Illness: A Call to Action." *Journal of Pharmacy Practice*, July 2019, doi:10.1177/0897190019853979

<sup>3</sup>Bashir, Muhammad Umair, *et al.* "Hidden Obligatory Fluid Intake in Critical Care Patients." *Journal of Intensive Care Medicine*, vol. 32, no. 3, Mar. 2017, pp. 223-227, doi:10.1177/0885066615625181.

