



# The Four Rights of Fluid Stewardship in Critical Illness: Comparing Pharmacy Recommendations in COVID-19 and Non-COVID-19 Patients

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## BACKGROUND

- Intravenous fluids (IVFs) are essential medications in the intensive care unit (ICU) to avoid dehydration.
- Volume overload leads to adverse outcomes, including increased mortality, in critically ill patients.<sup>1-3</sup>
- Fluid stewardship (FS) can be used by pharmacists to balance the risks of volume overload and dehydration.<sup>4</sup>
- Pharmacist recommendations regarding IVFs can be categorized into one of the Four Rights of FS.<sup>4</sup>



- The extent to which the coronavirus disease 2019 (COVID-19) pandemic has affected recommendations related to the Four Rights of FS has yet to be studied.

**Study Purpose:** To determine whether the rate of pharmacist-driven FS recommendations differs between COVID-19 and non-COVID-19 patients in the ICU

## METHODS

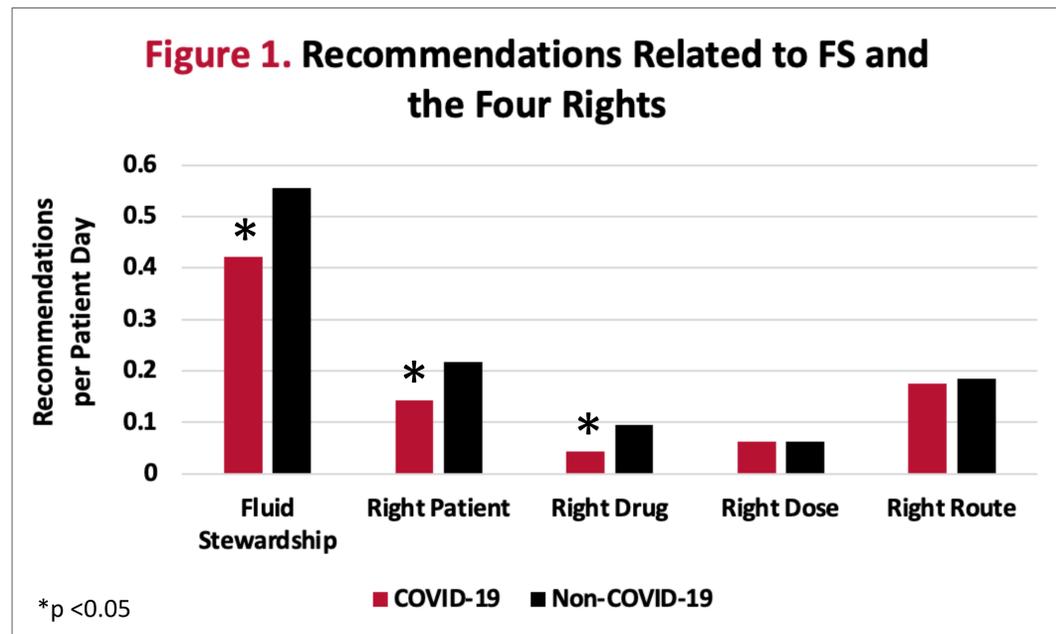
- **Design:** IRB-approved, retrospective, single-center cohort study
- **Time Frame:** June 2016-June 2019 and May 2020-September 2020
- **Setting:** Community teaching hospital
- **Inclusion Criteria:**
  - Adult (≥18 years old)
  - Critically ill
  - Followed by academic rounding team
- **Groups:**
  - Patients with COVID-19
  - Patients without COVID-19
- Recommendations for each patient day were extracted from pharmacy notes in TheraDoc.
- Recommendations were reviewed for relevance to fluid stewardship and classified based on the Four Rights.

## OUTCOMES

- **Primary Outcome:** Number of FS recommendations per patient day
- **Secondary Outcome:** Number of FS recommendations related to each Right per patient day

- **Statistics:** Outcomes were analyzed in SPSS using two-sided, independent t-tests with an alpha level of 0.05.

## RESULTS



**Pharmacists made fluid stewardship recommendations more often in critically ill patients without COVID-19 than with COVID-19.**

**This difference was due largely to recommendations related to the Right Patient and Right Drug.**

## DISCUSSION

- Risk of acute respiratory distress syndrome in COVID-19 highlights the need to avoid volume overload in infected patients.
- Given the importance of FS in COVID-19 pathophysiology, the lower recommendation rate in COVID-19 patients is surprising.
- One possible explanation for the difference between the groups is that pharmacists had limited direct contact with COVID-19 patients.
- **Limitations:**
  - Results from one institution have limited generalizability.
  - Retrospective design depended upon pharmacists to document recommendations and upon reviewers to interpret this documentation.
  - Recommendation acceptance and patient outcomes were not considered.
- **Research Needs:**
  - Determine whether a relationship exists between FS recommendation rate and patient outcomes that could justify standardization of FS at bedside in ICU pharmacy practice.

## REFERENCES

1. Boyd JH, Forbes J, Nakada TA, et al. Fluid resuscitation in septic shock: a positive fluid balance and elevated central venous pressure are associated with increased mortality. *Crit Care Med.* 2011;39(2):259-265.
2. Brotfain E, Koyfman L, Toledano R, et al. Positive fluid balance as a major predictor of clinical outcome of patients with sepsis/septic shock after ICU discharge. *Am J Emerg Med.* 2016;34(11):2122-2126.
3. Neyra JA, Li X, Canepa-Escaro F, et al. Cumulative Fluid Balance and Mortality in Septic Patients With or Without Acute Kidney Injury and Chronic Kidney Disease. *Crit Care Med.* 2016;44(10):1891-1900.
4. Hawkins WA, Smith SE, Newsome AS, et al. Fluid Stewardship During Critical Illness: A Call to Action. *J Pharm Pract.* 2020;33(6):863-873.

For complete results, check here:

