

Intravenous fluid stewardship in acutely unwell patients: a Quality Improvement Project

Introduction

Intravenous fluids (IVF) are a ubiquitous treatment in hospitalised patients. For some conditions, such as hypovolaemic shock, fluids are lifesaving. However, overuse of fluids and fluid overload has been shown to be an independent predictor of mortality in critically ill patients¹.

The culture of giving acutely unwell patients lots of fluids goes back to Shoemaker's study which hypothesized that aggressive fluid resuscitation in critically ill patients would optimise tissue perfusion². Since this study the benefit of aggressive fluid resuscitation has not been shown to be beneficial for critically ill patients - but the culture still permeates.

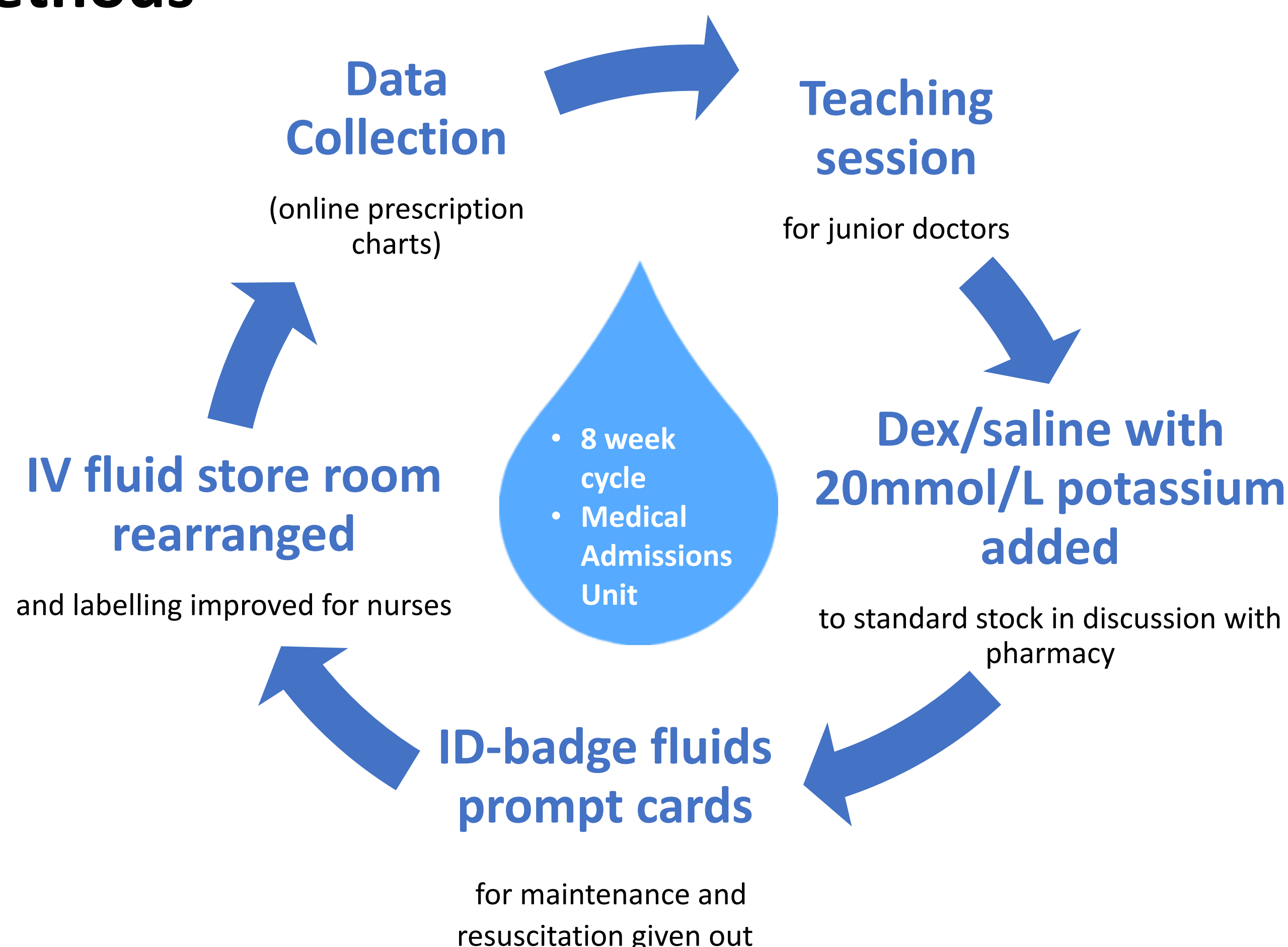
Furthermore, the choice of intravenous fluid is important – the SMART and SALT-ED trials showed that fluid resuscitation with a balanced crystalloid (Hartmann's) over 0.9% NaCl caused a lower incidence of acute kidney injury and patients requiring renal replacement therapy^{3,4}.

It is clear that balanced crystalloids or normal saline do not offer the appropriate daily electrolyte requirements for maintenance IVF - dex/saline + KCL is a preferred maintenance IVF.

Objectives

- Evaluate current intravenous fluid practice
- Improve knowledge amongst healthcare professionals
- Improve intravenous fluid practice

Methods



Results

- Reduction in the amount of 0.9% NaCl used for both fluid resuscitation and maintenance
- Increase in use of Plasmalyte for fluid resuscitation
- The use of dex/saline + KCL for maintenance fluids was substantially increased which was unsurprising as there was no stock of this fluid on the ward prior to interventions
- Overall reduction in the amount of IVF administered to patients over the 4 week period (despite there being very similar number of patients in both groups).

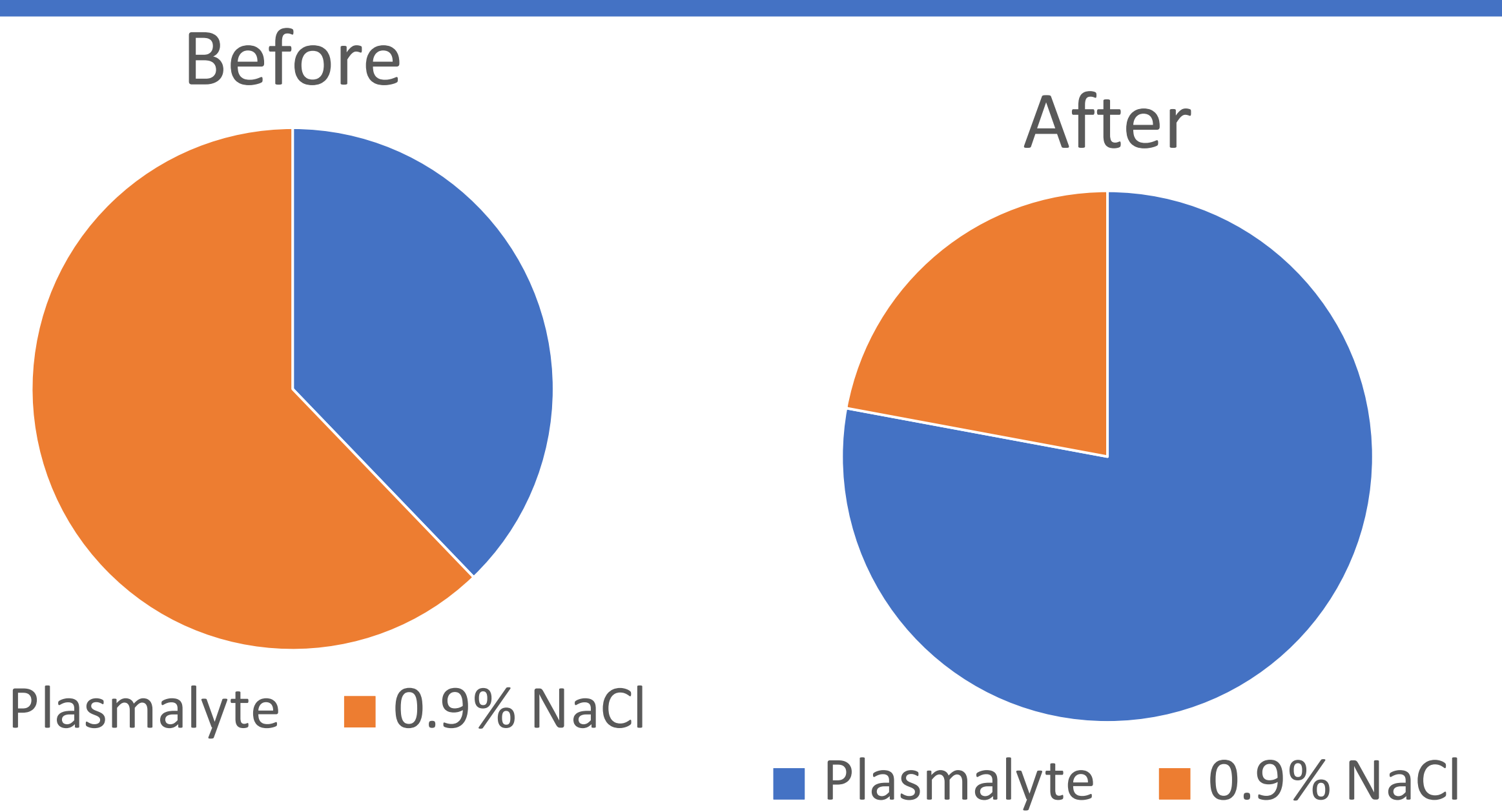


Figure 1: Resuscitation fluids

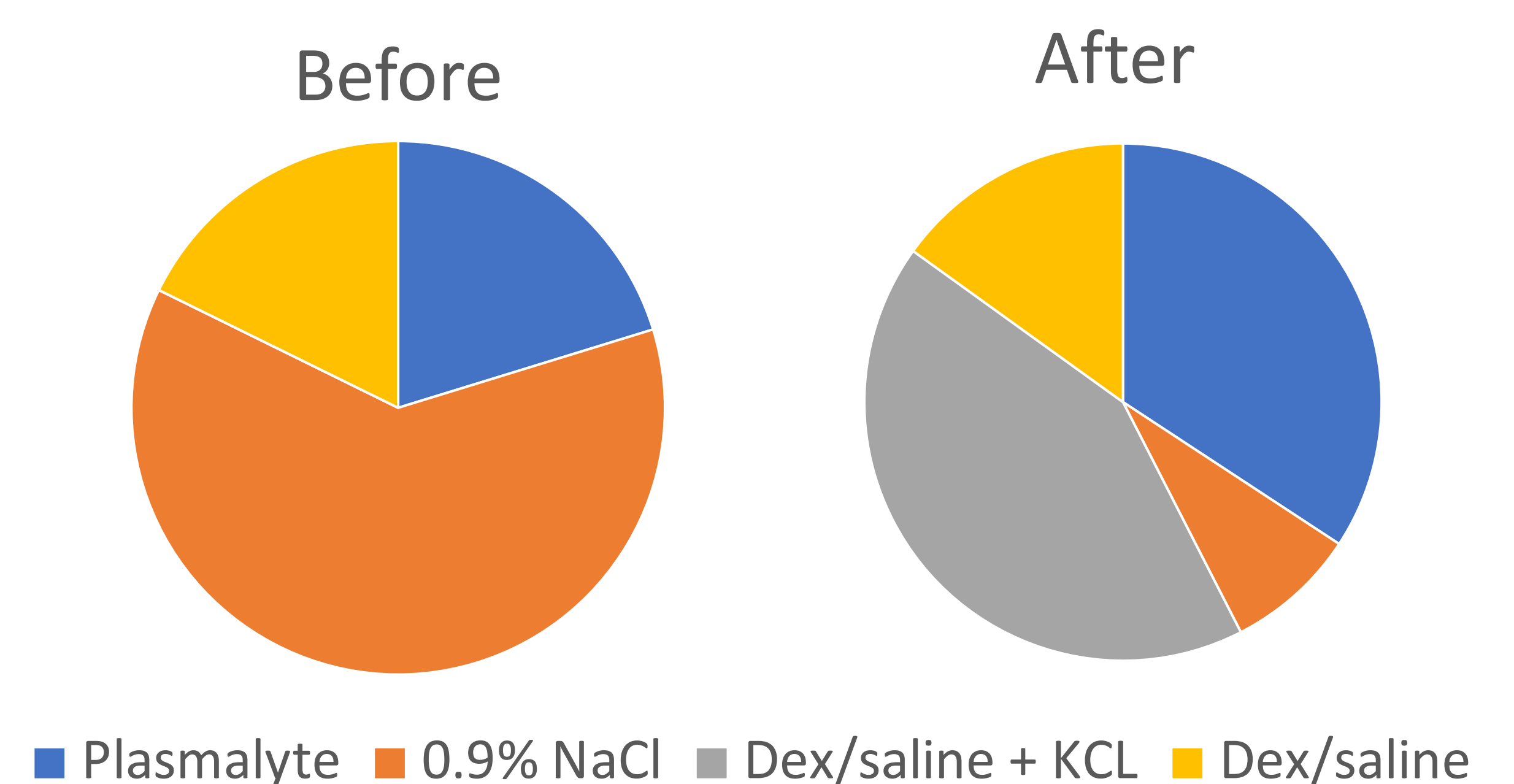


Figure 2: Maintenance fluids

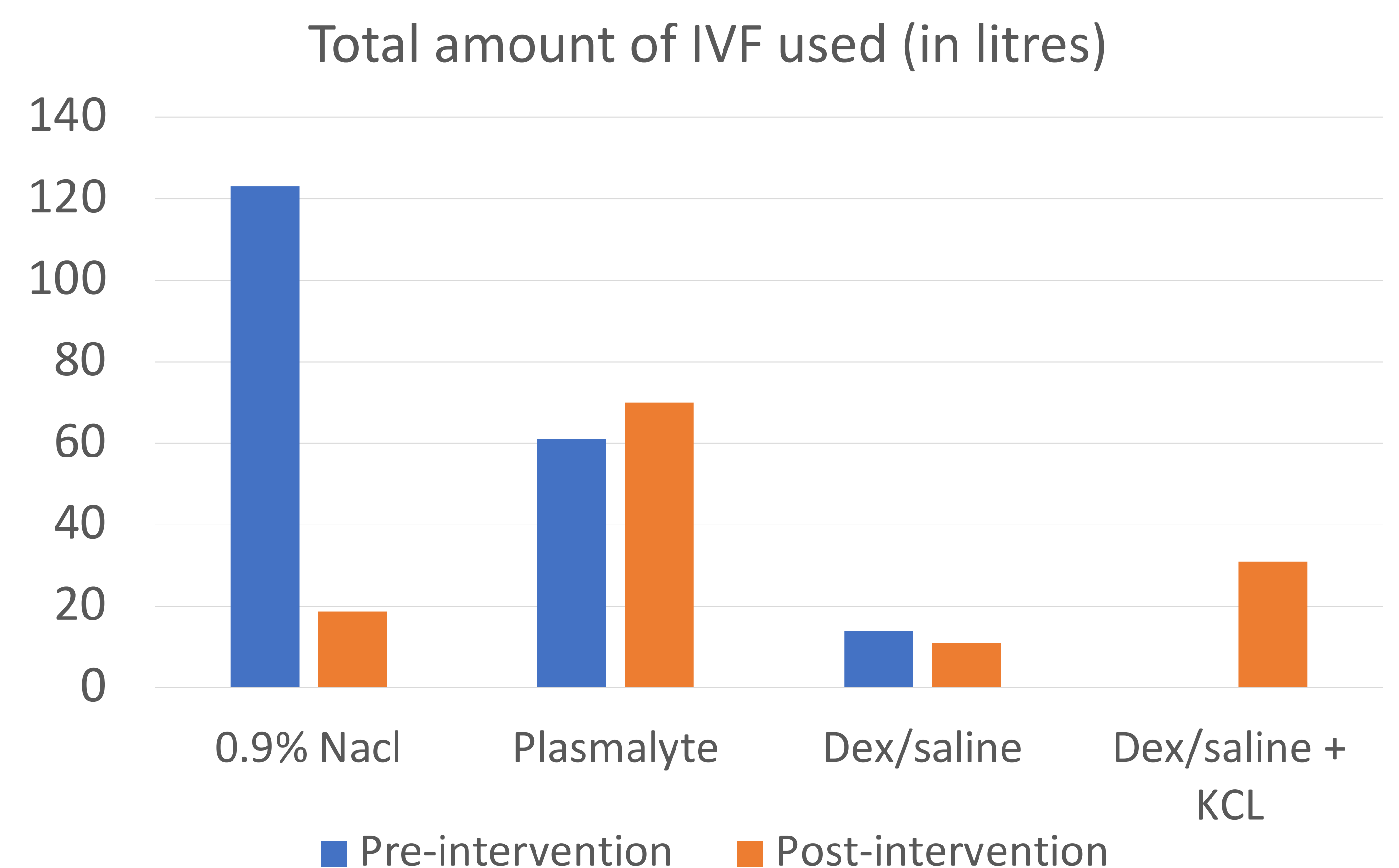


Figure 3: Total fluid use

Conclusions

On the back of large trials using balanced crystalloids instead of 0.9% NaCl appears to be a preferred approach for fluid resuscitation. Furthermore, physiology and knowledge of daily electrolyte requirements would suggest that using dex/saline + KCL is a preferred maintenance IVF. In this QIP we show how several small interventions within a unit can significantly improve IVF stewardship for a sustained period.

References

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2. William C. Shoemaker, Harry B. Kram, Crystalloid and colloid fluid therapy in resuscitation and subsequent ICU management, *Baillière's Clinical Anaesthesiology*, Volume 2, Issue 3, 1988, Pages 509-544
3. Semler MW, Self WH, Wanderer JP, et al. Balanced Crystalloids versus Saline in Critically Ill Adults. *The New England journal of medicine.* 2018; 378(9):829-839. PMID: 29485925
4. Self WH, et al. "Balanced crystalloids versus saline in noncritically ill adults". *The New England Journal of Medicine.* 2018. 378(10):819-828