

Evaluation of incompatible co-administration of continuous intravenous infusions in a pediatric-neonatal intensive care unit

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Introduction

Intravenous medication administration is a complex procedure involving several steps and is therefore prone to errors. Moreover, critically ill children frequently need numerous drugs and other delicate infusions including blood products or parenteral nutrition to be applied via a limited number of available lumina. However, to the best of our knowledge, no study has assessed the compatibility of co-administered continuous infusion considering parenteral nutrition (PN) and blood products in the setting of a pediatric-neonatal intensive care unit (PICU/NICU) in daily clinical practice.

We aimed to evaluate and quantify incompatible co-administrations of continuous intravenous medication in daily clinical practice of a PICU/NICU.

Conclusion

The majority of infusion combinations in the studied PICU/NICU were compatible and covered by the internal compatibility charts. However, we also identified concurrent administrations of incompatible infusions or for which compatibility data is not available. A significant reduction of co-administrations of incompatible infusions could be achieved through optimal use of available lumina.

Patients & Methods

We conducted a retrospective, observational study in the setting of a 18-bed PICU/NICU. All concurrently administered continuous infusions including blood products and parenteral nutrition were analyzed for 2 months. Raw electronic data was retrieved and subjected to quality controls. Infusion combinations were classified as compatible, incompatible, no data, or variable according to the internal hospital charts, Trissel's database, and the Swiss summary of product characteristics (SPC). For situations with incompatible co-administrations, we assessed alternative distributions of infusions among the currently available lumen.

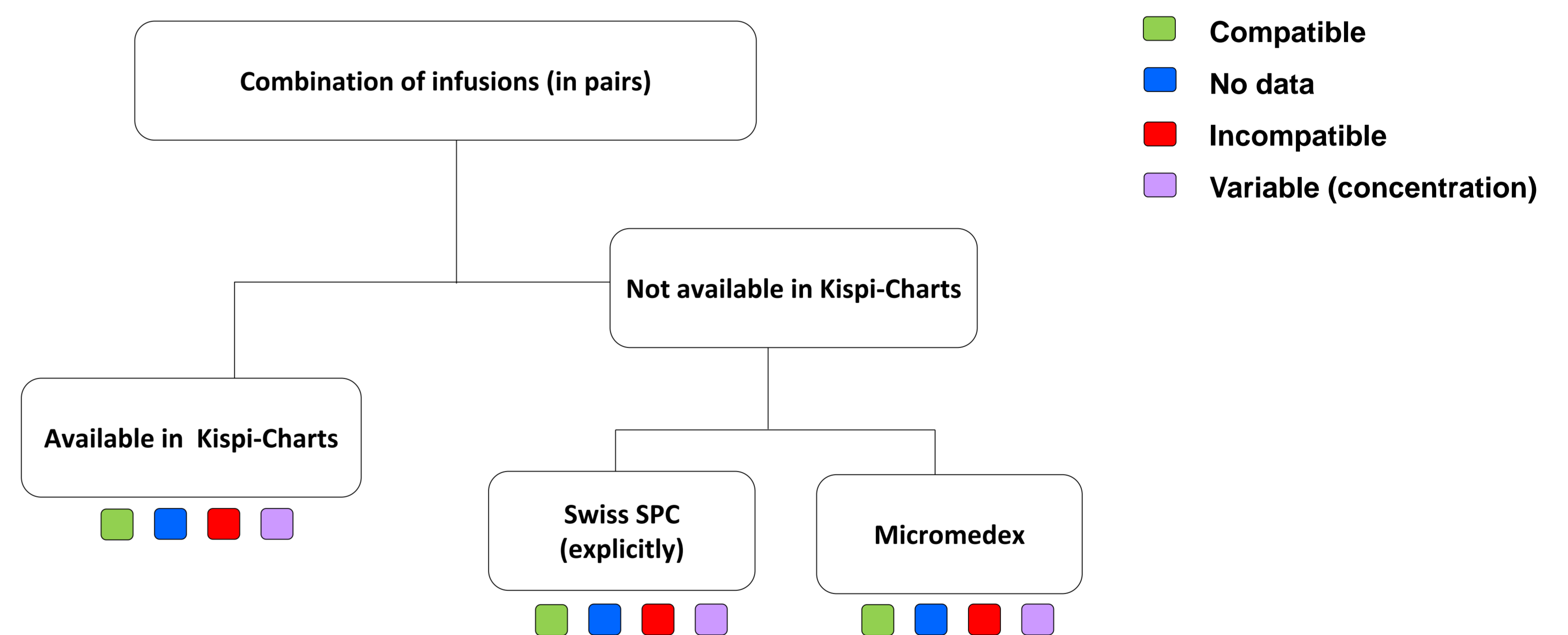


Fig. 1

Flow diagram for the classification of the combinations of continuous infusions

Results

Data of 100 patients was analyzed. On average, patients were exposed to 6 individual continuous infusions administered through 4 lumina. Among the 1446 co-administered continuous infusions, we detected 146 incompatible combinations (10%) resulting in 105 individually relevant incompatible situations. Furthermore, 185 (13%) combinations were not covered by internal compatibility-charts and for 207 combinations (15%) no data on compatibility was available. We found that 58% of the incompatible situations could have been avoided by a redistribution of the infusions among the available lumina.

Blood products and PN are the infusions most frequently involved in incompatible combinations or combinations without data on compatibility, as were Infusions with extreme pH values.

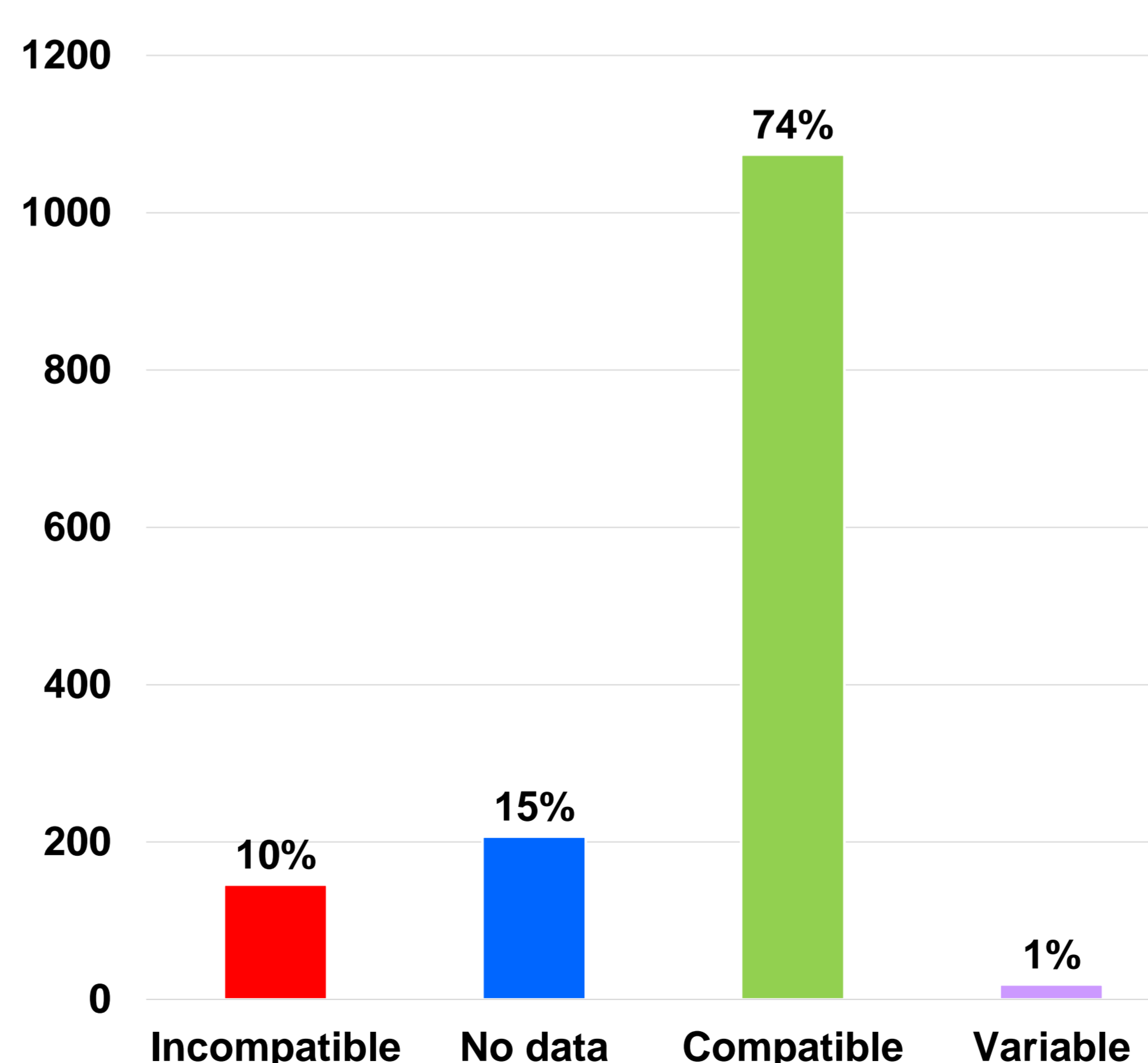


Fig. 2

Compatibility classification of combined infusions (N=1446)

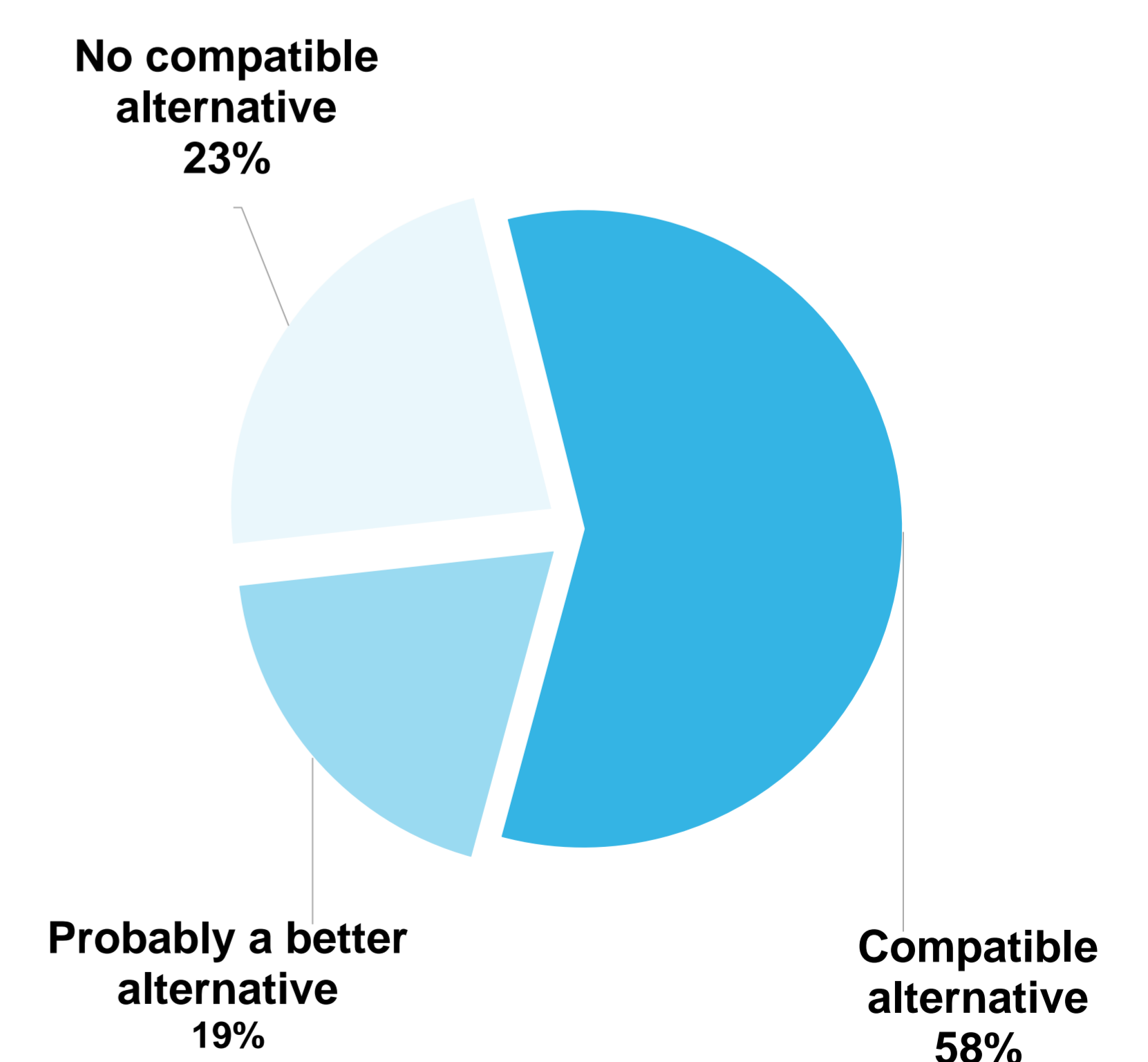


Fig. 3

Potential for alternative distribution of incompatible infusions among current available lumina (N=105)