

# Trends in Red Blood Cells Transfusions within the Biologics Effectiveness and Safety (BEST) Initiative Network, 2012-2018

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## INTRODUCTION

The U.S. FDA Center for Biologics Evaluation and Research (CBER) recently established the Biologics Effectiveness and Safety (BEST) Initiative – an active surveillance system for all CBER-regulated products including blood components, which allows assessment of utilization patterns. The 2015 National Blood Collection & Utilization Survey (NBCUS) Report found an overall decrease in the number of units of red blood cells (RBCs) transfused in recent years..

## OBJECTIVE

The aim of this study is to describe the utilization of RBCs from January 1, 2012 through December 31, 2018 using electronic health records (EHR) from three data sources participating in the BEST Initiative.

## METHODS

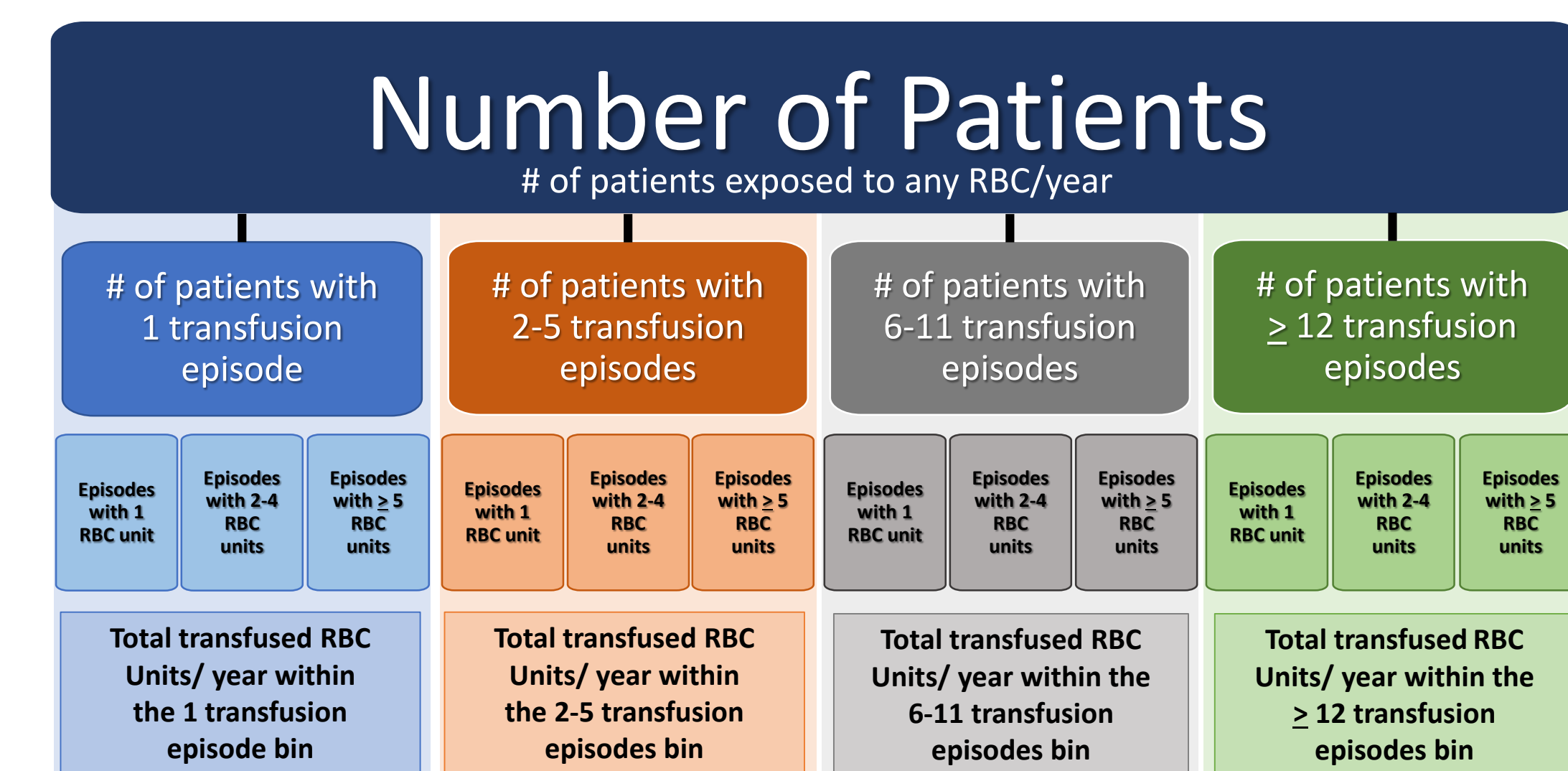
We queried approximately 15 million patient records from three EHR data sources participating in the BEST Initiative (Columbia University, University of Colorado, and Regenstrief Institute). As shown in Figure 1, using ISBT 128 codes, for each data source we determined:

- Transfused patients:** the number of unique patients with at least one unit of RBCs<sup>1</sup> transfused per year
- Transfusion episodes:** the number of patients having 1; 2-5; 6-11; or > 12 episodes containing at least one unit of RBCs per year;
- RBC Units per transfusion episode<sup>2</sup>:** the number of transfusion episodes having 1, 2-4, or ≥5 transfused RBC units/transfusion episode;
- Total units of transfused RBC per year:** the total numbers of RBC units transfused per year from each EHR data source during 2012-2018

<sup>1</sup>one unit of RBC equals presence of one RBC ISBT code within data source  
<sup>2</sup>transfusion episode is defined as an occurrence of at least one RBC specific ISBT 128 code per day, in a given year.

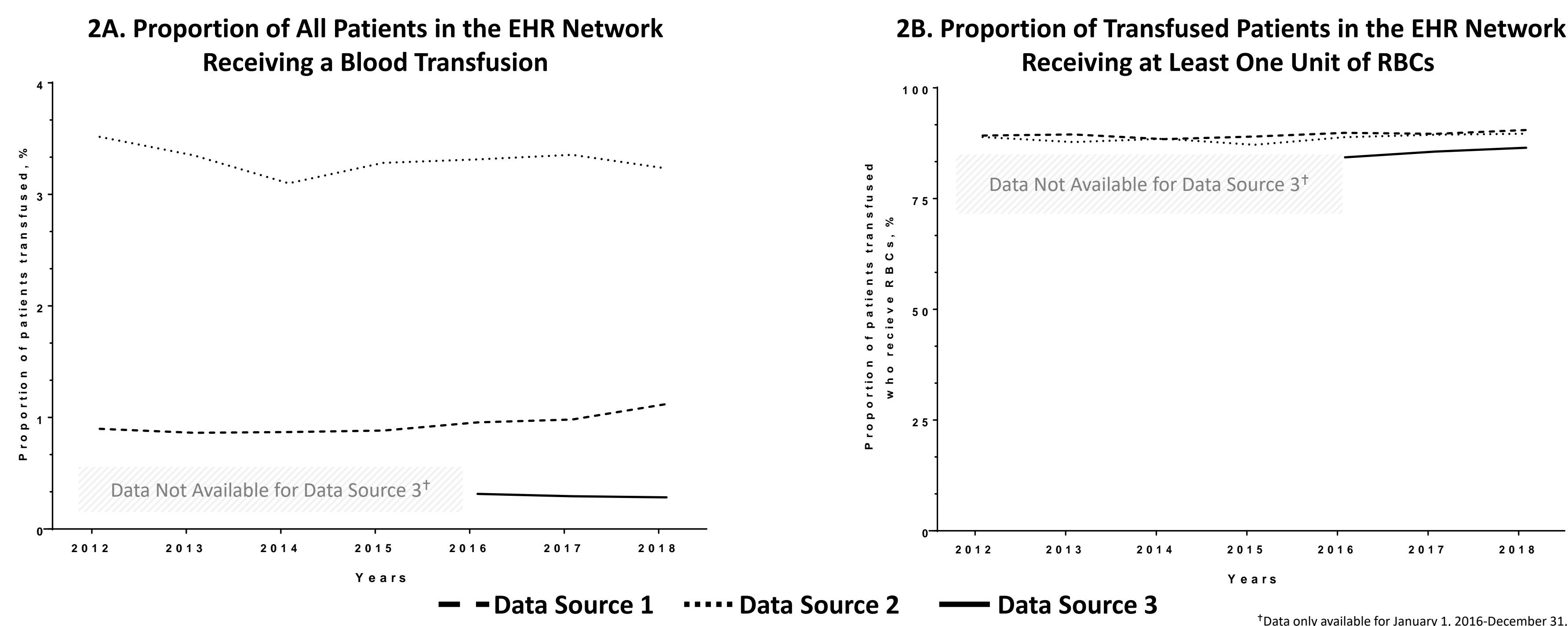
With the use of ISBT 128 codes, we also classified RBC units by collection (whole blood-derived and apheresis) and modification (leukocyte-reduction(LR) and irradiation(IR)) methods.

Figure 1. Graphical Representation of Counting Patients, Transfusion Episodes, and RBC Units



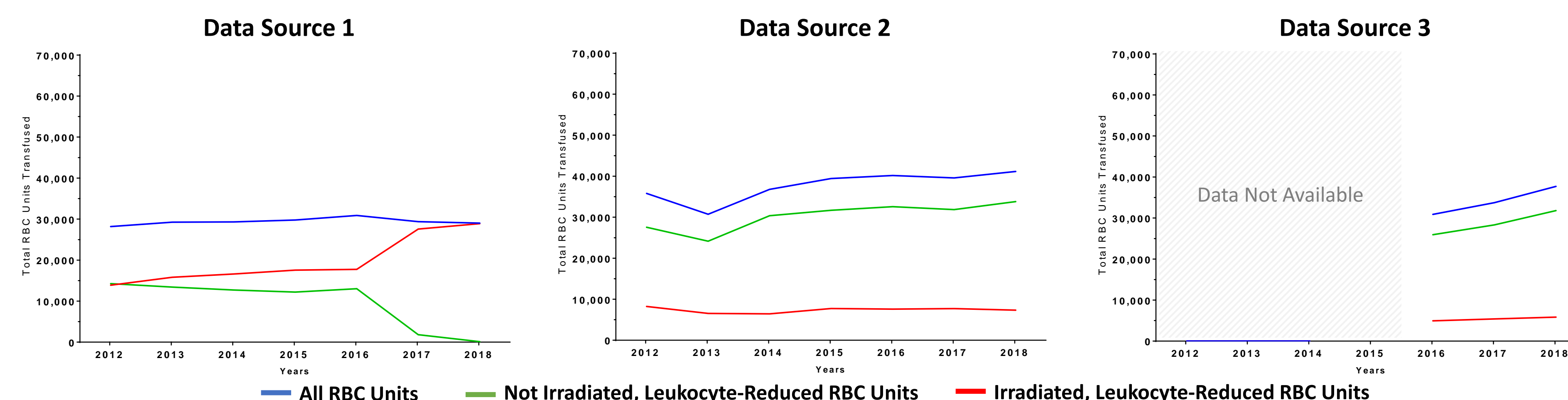
## RESULTS

Figure 2. Trends in Any Transfusion and RBC Transfusion within the BEST Initiative EHR Network, 2012-2018



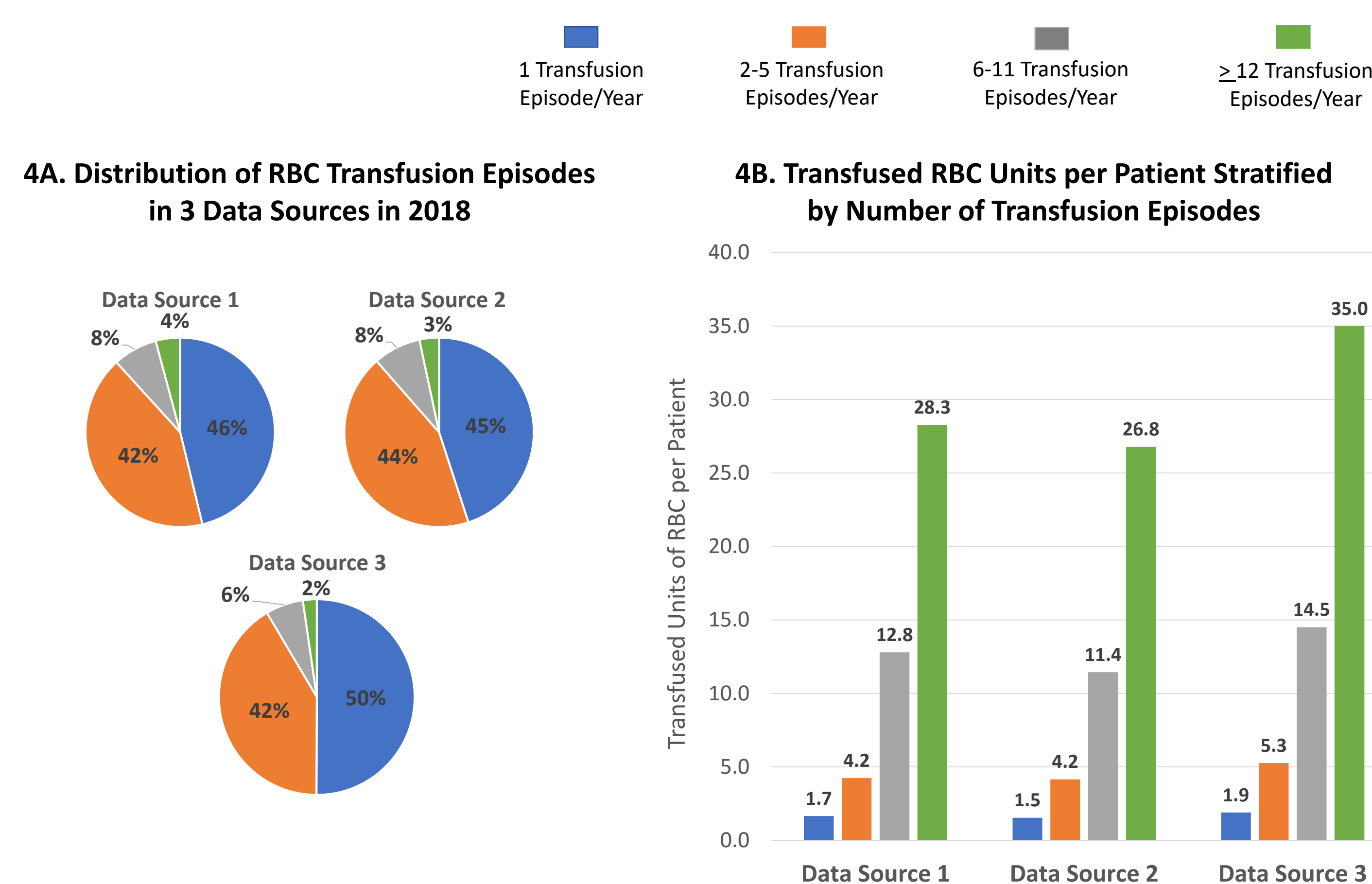
- The proportion of patients receiving a blood transfusion remained relatively stable over the period of the study (Figure 2A).
- On average, of the total number of patients transfused with any blood component, 90% (data source 1), 89% (data source 2), 87% (data source 3) of patients received at least one unit of RBCs (Figure 2B).
- In each data source, the proportion of patients receiving RBCs appears to be stable over the period of study (Figure 2B).

Figure 3. Temporal Trends in Number of RBC Units Transfused within the BEST Initiative EHR Network, 2012-2018



- Over the study period, the total number of RBC units transfused reveals a stable pattern for data sources 1 and 2, and an increase in data source 3.
- Data sources 2 and 3 demonstrate similar practices in their use of IR, and LR RBC units. Data source 1 switched to universal IR RBC units in 2018. All three data sources reported very little to no use of non-LR RBCs.

Figure 4. Patients Receiving RBC Transfusion (A); Number of Transfused RBC units per Patient (B), Stratified by the Number of Transfusion Episodes\* in 2018



- About 90% of patients (in all three data sources) have 5 or fewer transfusion episodes (designated as orange and blue) per year (Figure 4A).
- A minority, ~3%, of patients (designated as green) have 12 or more transfusion episodes per year.
- This small proportion of patients receive a disproportionate number of RBC units per year (Figure 4B).

## CONCLUSION

We demonstrated that within the BEST Initiative data sources, RBC transfusions can be identified using ISBT 128 coding system at patient, transfusion episode, and unit levels. Using these tools, we found that the numbers of RBC transfusions per year, particularly in relation to the number of patients receiving any RBC transfusion, appeared relatively stable. The RBC transfusion trends in this small network-based cohort contrast with that described by the NBCUS, and they may or may not reflect aggregate national trends which needs to be further investigated. However, access to ISBT 128 codes within EHR data sources provides the ability to capture large number of transfusions, and future queries promise even more granular capture of blood transfusion details and identification of blood utilization patterns.

Disclaimer: The views expressed in the poster are those of the authors and may not reflect the views of the Food and Drug Administration.

Access to ISBT 128 codes provides more granular capture of blood transfusions and utilization patterns.

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