



## The direct labor cost for providing life-saving blood to air medical transport for pre-hospital transfusion



Penny C. Szklarski\*, Garrett S. Booth

Department of Pathology, Microbiology and Immunology, Vanderbilt University Medical Center, United States

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### ABSTRACT

An IRB approved 2-year review and cost analysis of all packed red blood cells (pRBCs) issued, transfused and returned to the blood bank by air medical transport services for pre-hospital transfusion was performed. The cost to the blood bank for issuing and returning pRBCs that were not transfused in the pre-hospital setting was \$3.24 per unit. Over the study period, there were 334 pRBCs not transfused by air medical services and returned to the blood bank totaling \$1082.16 in direct labor costs, a trivial amount for providing possibly life-saving blood for pre-hospital transfusion.

Studies have shown that pre-hospital transfusions of packed red blood cells (pRBCs) are associated with increased survival rates within the first 24 h, a decrease in the odds of stroke, and a reduction in the number of pRBCs needed within the first 24 h following a Level 1 trauma activation [1]. Recently, we have shown [2] the logistical and blood product variability utilized in the pre-hospital medical transport, but the financial implication for the diagnostic laboratory to maintain such a program remains unknown. To reduce wastage of pRBCs, the Vanderbilt University Medical Center (VUMC) transfusion medicine service requires that all pRBC units not transfused expiring within 7 days of expiration be returned to the blood bank for replacement. There are direct labor costs [3] associated with issuance and return to inventory for products prepared for the pre-hospital environment. Each pre-hospital uncrossmatched trauma RBC has a transfusion administration record attached for documentation of transfusion, these units are electronically issued in our laboratory information system (LIS; SSC Soft Computer, Clearwater, Florida) using a generic trauma patient name and medical record number. These units will then be returned to available status, the electronic location of the units changed to reflect the current physical location for tracking purposes, and a segment will be taken from the pRBC for post transfusion crossmatch. Those pRBCs

that are not transfused within 7 days of expiration are returned to the blood where the unit temperature is taken for acceptability for re-issue, documented on a return form, and the location of the unit is changed in the LIS.

An IRB approved two-year retrospective review was performed to determine the number of pRBCs issued, transfused and returned from Lifeflight, VUMC's air medical transport service [4]. During the study period, there was a total of 334 pRBCs issued to Lifeflight that were not transfused before the 7 days expiration window and returned to the blood bank. The direct labor cost for all steps required by the medical technologists to perform issuance and return of those unused pRBCs was calculated using the U.S. Bureau of Labor Statistics for the average salary of a medical technologist. The total cost of issuing and returning unused pRBCs to the blood bank was \$1082.16 (Table 1).

The total time needed for medical technologists to prepare and return unused pRBCs for pre-hospital transfusion is less than 8 min which translates to a direct labor cost of \$3.24 per unit. Therefore, we can provide pRBCs to Lifeflight for less than \$50 per month. Taking into consideration previous studies and publications, the benefits of pre-hospital transfusions in critically ill patients outweigh the minimal cost to the blood bank for providing life-saving pRBCs.

\* Corresponding author at: Pathology, Immunology, and Microbiology, Vanderbilt University, Medical Center, Nashville, TN, 4605 TVC, United States.  
E-mail address: [penny.c.szklarski@vumc.org](mailto:penny.c.szklarski@vumc.org) (P.C. Szklarski).

**Table 1**  
Estimated time and cost of issuance and return of pRBCs for pre-hospital transfusion.

Task	Time in seconds	Cost (US\$)
<b>Issue</b>		
Emergency issue pRBCs in LIS	120	\$0.86
Reprint TAR	10	\$0.07
Change status and location in LIS	90	\$0.65
Affix labels and transfusion administration record to pRBC	30	\$0.22
Label a tube with donor label for donor segment	20	\$0.14
Check labeling by second technologist for accuracy	30	\$0.22
<b>Return</b>		
Check returned pRBC with infrared thermometer	30	\$0.22
Complete a return of product form	90	\$0.65
Change location of pRBC in LIS	20	\$0.14
Place pRBC and return form in proper locations	10	\$0.07
<b>Totals</b>	<b>450</b>	<b>\$3.24</b>

### Declaration of Competing Interest

The authors declare no competing financial interests.

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