

# Red Blood Cell Transfusion in the ICU: A Systematic Review

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# DISCLOSURE

The authors and report no actual or potential conflict of interest in relation to the design, conduct or reported findings of this Systematic Review of Literature (ROL).

# OBJECTIVES

1

1. Discuss the current state of research findings on RBC transfusion in the critical care setting.

2

2. Identify four primary clinical categories related to RBC transfusion in the ICU.

3

3. Evaluate the use of the Systematic Review of Literature as a methodology to assess practice change opportunities in clinical care.

# Background

Anemia is one of the most common abnormal laboratory findings in the population of critically ill patients

Approximately 95% of patients in the ICU for three days or more become anemic, and approximately 50% of these patients receive an average of five units of PRBCs while in the ICU. <sup>1,2</sup>

- ❖ Traditionally, the goal of administering PRBCs to the critically ill patient was to increase hemoglobin levels, to improve the blood's oxygen carrying capacity and to oxygenate hypoxic tissue. However, an emerging body of evidence is demonstrating that this clinical benefit is often not achieved.

# Purpose for Conducting This Systematic Review of Literature (ROL)

1

- To investigate the concept and limitations of RBC Transfusion as a clinical intervention.

2

- To evaluate the current published evidence for the use of RBC transfusion in the critically care setting.

# METHODS



• This systematic review was conducted using current PRISMA guidelines<sup>4</sup>



• A PICO question was formulated to guide the systematic search for relevant literature



• A medical librarian was consulted to ensure the selection of appropriate databases, and with Boolean operators



• The electronic databases used for this review included PubMed, CINAHL, Cochrane, MedLine, Scopus, BMJ Clinical Evidence, and Web of Science.



• Studies published between 2008 and 2016 were included.

Study characteristics were developed based upon the PICO question and included: methodology, inclusion criteria, intervention variables, and clinical outcomes

Risk of study bias was assessed using the CONSORT criteria

Each study was found to be at low to medium risk for bias due to a robust research design

# DATA EXTRACTION

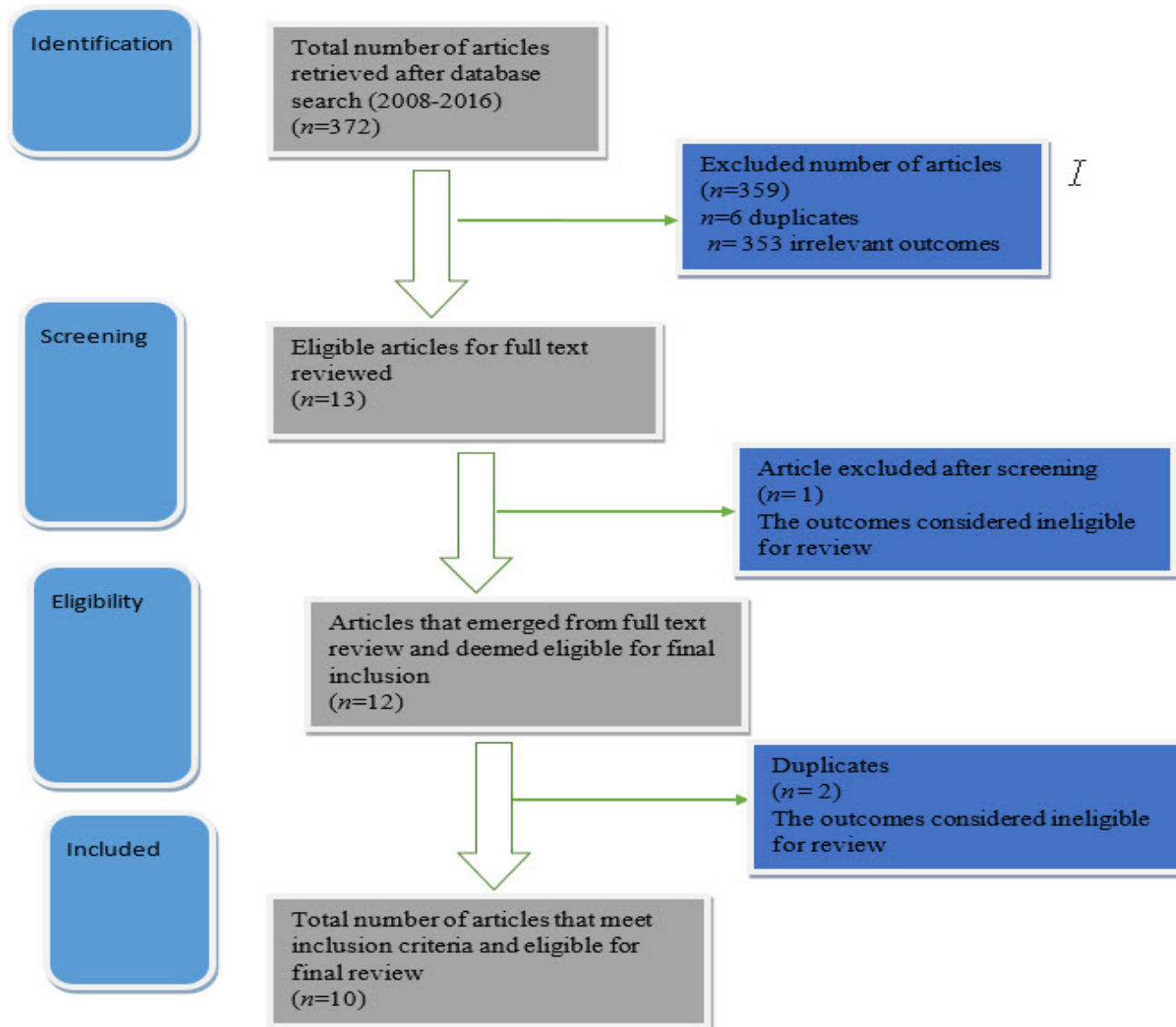
Sutton, D.H., & Raines, D.A. (2017). The risks associated with red blood cell transfusion: Implications for critical care practice. *Critical Care Nursing Clinics of North America*.

- A total of 372 studies were retrieved.
- The screening process eliminated duplicate articles (N=6) and articles with irrelevant outcomes (N=353).
- Criteria for irrelevant outcomes included transfusion in a situation with active bleeding, non-critically ill population, or use of volume replacement other than red blood cell transfusion.
- Thirteen studies remained for further review. One article (N=1) was excluded because the outcome was not considered eligible for inclusion, two articles (N=2) were found to be duplicated. The remaining ten studies were selected for inclusion in this review.

# SYSTEMATIC ROL ARTICLE SELECTION



# PRISMA FLOW CHART



# RESULTS

A

- The studies examined the effects of transfusing one unit of PRBCs in the critically ill patient.

B

- The majority of study designs were either retrospective or prospective, and only one was a randomized-controlled trial

C

- A common finding among all studies was that transfusion of a single unit of PRBCs in the critically ill patient increases risk and may lead to higher morbidity and mortality.

D

- Based on these findings, it appears that all included studies identified some risk associated with the transfusion of a single unit of PRBCs in the critically ill patient.

# ANALYSIS of RESULTS by CATEGORIES

1

- No increased risk in single versus double transfused PRBCs

2

- Risk increases as the number of transfused PRBCs increases

3

- Immune changes occur due to transfusion of PRBCs

4

- Patient survival following a transfusion of PRBCs is not increased

The evidence demonstrates the occurrence of health risks associated with receiving a PRBC transfusion in the critically ill population.

The findings reveal that in some at-risk patients, even a single unit of PRBCs may result in acute respiratory distress syndrome, acute renal injury, cardiogenic shock, infection, and higher mortality and morbidity rates when compared to other ICU patient populations.

This review demonstrates the need to conduct further more rigorous research studies of this common therapeutic intervention in the critically ill population to ascertain relative risk and benefit.

# CONCLUSIONS

# REFERENCES

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