

# CLINICAL PROTOCOL:

## BLOOD UTILIZATION FOR PACKED RED BLOOD CELLS



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### Scope

The U.S. Department of Health and Human Services reports, approximately 15 million red blood cell (RBC) units are transfused annually in the United States [1]; about 85 million are transfused worldwide [1].

Clinical research has demonstrated that a restrictive transfusion strategy results in patient outcomes similar to those associated with more liberal strategies and may even improve outcomes [1]. At the same time, retrospective studies have suggested an association between transfusions and patient morbidity, increased hospital-acquired infections, and length of stay [1].

Blood utilization will focus on evidence-based guidelines relative to the transfusion of packed red blood cells (PRBCs).

The PCIN Quality Committee identified the following two focus areas relative to Blood Utilization:

- Single unit transfusion
- RBC transfusions for hemoglobin greater than 8

#### Population Included

Adults  $\geq 18$  years of age who are candidates for red blood cell transfusions

### Guidance

The PCIN Quality Committee and its designees reviewed the available information in medical literature and societal guidelines to devise these protocols.

Not all patients who meet the criteria in these guidelines will require transfusion. In certain clinical circumstances the provider may consider transfusion to be appropriate outside these guidelines. The decision to transfuse is a clinical decision based on a real-time clinical assessment by the provider responsible for patient's care. In all circumstances, the indication for transfusion, and the clinical decision and supporting data, should be documented in the medical record.

## Recommendations

### Single Unit Transfusions

- ✓ The standard adult dose for PRBC is one unit. This standard dose should be followed with additional units allowed only if specific clinical criteria are met. Two units or more may be considered for hemodynamically unstable patients as outlined in this guideline.
- ✓ One unit of transfused PRBCs should increase hemoglobin by 1 g/dl or hematocrit by approximately 3% [2]. In cases of elective transfusions, in order to minimize exposure of the patient to additional units, it is suggested that hemoglobin/hematocrit levels be determined after administration of each unit to determine if desired level has been achieved.
- ✓ A restrictive threshold (7.0 - 8.0 g/dl) should be used for the majority of hospitalized, stable patients without evidence of inadequate tissue oxygenation (evidence supports a threshold of 8.0 g/dl in patients with pre-existing cardiovascular disease) [3].



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- ✓ Transfusion decisions should be influenced by symptoms and hemoglobin concentration. Single unit red cell transfusions should be the standard for non-bleeding, hospitalized patients. Additional units should only be prescribed after reassessment of the patient and his/her hemoglobin value [3].

#### **Guideline by Hemoglobin Threshold and Clinical Indication**

- ✓ Not all patients will need a transfusion even with hemoglobin less than 7 g/dl

#### **Active Bleeding Independent of Hemoglobin**

- ✓ Active bleeding with greater than 1500 ml blood loss and hemodynamic instability [4]
- ✓ Massive hemorrhage or massive transfusion protocol initiated [4]

#### **Hemoglobin Less Than 7 g/dl (or Hematocrit Less Than 21%)\***

- ✓ Hemoglobin less than 7 g/dl and signs or symptoms of anemia unresponsive to management without transfusion [5,6,21]
- ✓ Hemoglobin less than 7 g/dl in a patient with stable ischemic heart disease and signs or symptoms of anemia unresponsive to management without transfusion [7,8,9]
- ✓ Hemoglobin less than 7 g/dl in a patient with acute upper gastrointestinal hemorrhage [10]
- ✓ Hemoglobin less than 7 g/dl in a patient with sepsis [8]
- ✓ Hemoglobin less than 7 g/dl with marrow suppression due to chemotherapy and/or radiotherapy [11,12,13,14, 22,23,24]

#### **Hemoglobin Less Than 8 g/dl (or Hematocrit Less Than 24%)\***

- ✓ Hemoglobin less than 8 g/dl in patients with acute coronary syndrome or evidence to support the need for increased oxygen delivery indicated by any of the following: [15,16,21]
  - Tachycardia and/or hypotension unresponsive to pharmacologic therapy
  - New EKG changes
  - Recurrent chest pain
  - Mixed venous hemoglobin oxygen saturation less than 60% after optimization of oxygen
  - Acute respiratory failure, inadequate cardiac output, or inadequate oxygenation
- ✓ Hemoglobin less than 8 g/dl in a patient with bone marrow suppression or bone marrow failure (e.g. thalassemia, myelodysplasia, marrow aplasia) AND long-term transfusion dependency whose anemia cannot be managed with erythropoietic stimulating agents and/or unable to tolerate lower threshold [17,18,22,23,24].

#### **Hemoglobin Less Than 9 g/dl (or Hematocrit Less Than 27%)\***

- ✓ Hemoglobin less than 9-10 g/dl in a sickle cell anemia patient undergoing surgery to bring the hemoglobin to 10 g/dl [19,20] Haven't had a stroke or other comorbidities.

\* **Note:** Hemoglobin is preferred over hematocrit as a more accurate measure of the severity of anemia though some Providers continue to use hematocrit. Hemoglobin is used by the World Health Organization to define anemia.

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*Approved: {Insert Date}*

