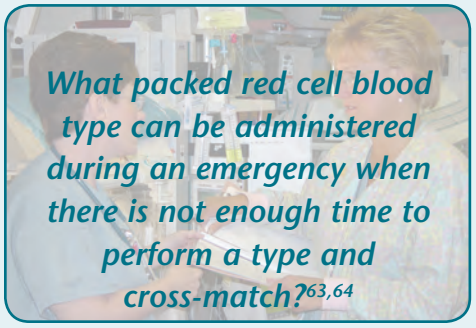
Clinical Tip



What packed red cell blood type can be administered during an emergency when there is not enough time to perform a type and cross-match?[63,64]

Type O-negative packed red blood cells may be provided during an emergency when time may not allow for cross matching of blood.[41]

Very low birthweight neonates (<1200 grams) may benefit from special product modifications such as leukoreduction of cellular products for CMV safety and irradiation of cellular products to reduce the risk of transfusion-associated graft vs host disease (TA-GVHD). Cellular products are packed red blood cells and platelets.

CMV Infection

- CMV infection is particularly problematic for very-low-birth weight infants, especially if the mother is sero-negative for CMV. This is because the infant would then lack any immunity to CMV.[65]
- The risk of acquiring cytomegalovirus (CMV) is proportional to the number of WBC's containing CMV virions in the blood (product).
- Packed red blood cells and platelets that are leukoreduced are considered to be 'CMV safe'. Packed red blood cells are **leukoreduced** (white blood cells removed) by filtration either soon after collection (before the PRBCs are stored – prestorage), after varying periods of storage in the laboratory, or at the bedside using a blood transfusion filter. Leukoreduction performed in the laboratory is subject to quality control, whereas leukoreduction at the bedside is not.
- The amount of leukocyte reduction that is achieved is a function of the filter system used. The American Association of Blood Bank standard is that leukoreduced blood products must have a residual content of leukocytes less than 5×10^6.[66] Transfusion with **prestorage** leukoreduced red blood cells or platelets is preferred whenever possible.
- CMV transmission risk can also be decreased by the use of CMV sero-negative donors but leukoreduction provides additional benefits that CMV sero-negative cellular components do not.

Who should receive filtered PRBCs?

All babies who receive a blood transfusion must receive filtered RBCs (and platelets).

Transfusion-Associated Graft Vs Host Disease (TA-GVHD)

Irradiation is another process that may be performed on cellular components. Even after leukoreduction, there are enough residual T lymphocytes left in the PRBCs to potentially cause transfusion-associated graft versus host disease (TA-GVHD). The risk of TA-GVHD is especially concerning when viable donor lymphocytes are transfused into patients with severe cellular immunodeficiency, such as very-low-birth weight infants. Irradiation renders lymphocytes unable to proliferate, thereby reducing the risk that the blood product will cause transfusion-associated graft versus host disease.[66]

Who should receive irradiated blood products?

The American Association of Blood Banks[66] recommends irradiation for preterm infants ≤ 1200 grams. Irradiation is also recommended for fetal intrauterine transfusion, exchange transfusion, or if the infant has acquired or congenital immunodeficiency, such as DiGeorge syndrome.[63,64,67] There are additional candidates for irradiated blood products, however, that is beyond the scope of this discussion. Irradiation may not always be practical or possible in all hospital settings, especially if neonatal blood transfusions are infrequently required by the population served at that facility.

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Clinical Tip (continued)

If an emergency blood transfusion is anticipated, (for example, if an emergency c-section for placental abruption is in progress), it is helpful to notify the blood bank ahead of time to request they prepare a unit of irradiated leukoreduced O-negative PRBCs in anticipation the infant may be severely anemic.

However, do not withhold a life-saving transfusion if:

a) There is not enough time to perform irradiation; or

b) Irradiation is not performed at that hospital.

Filtering of blood for the purpose of leukoreduction should always be performed prior to administering blood to an infant.

Staff Assignment

Goal: All staff members will know the process for rapidly accessing blood in an emergency.

Call the blood bank and inquire about the procedure to obtain O-negative packed red blood cells for emergencies in the delivery room or nursery (when cross-matching is not possible). This includes any paperwork that is necessary, whether a written order is required, and who may place the order for the blood (nurses, unit secretary, or physician). Ask whether this emergency supply of blood is available 24-hours per day, whether irradiated blood is available or not, whether the blood filter is sent with the packed red blood cells, and how long it will take to receive emergency blood once it is requested.