

Critical Blood Shortage : Emergency Action Plan	SLN-SOP.2216	Page 1 of 8
 KAISER PERMANENTE® KFH San Leandro Laboratory	Transfusion Services 2500 Merced Street, San Leandro, CA 94577	

1.0 Purpose

1.1	This document is a draft guidance for KP San Leandro when the blood supply becomes critically low. It will describe steps taken during various levels of sustained blood shortage.
1.2	This contingency shall be activated only after extensive efforts on the part of blood suppliers to restore blood inventory and redistribute products have been exhausted. - KP San Leandro is supplied by The American Red Cross (ARC). - The ARC also operates year-round donation sites across the Bay Area. The central East Bay donation site is located at 6230 Claremont Ave. Oakland Ca. 94618 which is 13 miles from KP San Leandro. - The ARC manages inventory across multiple sites (KP, non-KP, and university hospitals) and can help with inter-facility transfer of blood to sites of greatest need. - The ARC also obtains blood from other blood suppliers and/or other geographic regions when necessary.

2.0 Principles

2.1	Maximize benefit vs. risk - Blood is a precious resource. It has some lifesaving properties that can sustain patients through periods of acute blood loss, myeloablative treatment, and transfusion-dependence. Transfusion should be given only to patients who will receive a tangible and durable benefit. Transfusion recipients who are expected to derive the best outcome from blood may be prioritized over recipients who would derive marginal benefit. - Blood is also potentially harmful. There are some risks with each transfusion which must be weighed against the potential benefits. Transfusion should be avoided when the benefit to the patient is uncertain or when there are alternatives to transfusion. During critical blood shortage, even more effort should be extended to transfusion alternatives.
2.2	Equity and justice - During critical blood shortage, the limited inventory must be conserved to care for a wide range of patients and generally not consumed for one individual. - All patients should have access to some of the potential benefits of transfusion. Rationing of limited inventory should seek to distribute the resource as evenly as possible.
2.3	Immediacy of the need vs. future needs Priority should be given to patients whose demise is imminent without transfusion support. Patients who are critical and otherwise stable may have to wait until patients with more immediate needs are stabilized.

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| | <p>b. Protection of inventory for the anticipated needs of future patients is an important and responsible consideration.</p> |
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3.0 Policy

3.1	Activation of Emergency Action Plan Conditions a. The Blood Bank Medical Director is authorized to activate condition yellow, condition red, or condition black, after communicating with the Medical Executive Committee and the blood supplier. The Blood Bank Medical Director also changes the condition after communicating with the Med Exec and blood supplier. b. The Blood Bank Medical Director may specifically delegate responsibilities to another pathologist, another knowledgeable physician, the Lab Administrative Director, or the Blood Bank Supervisor.
3.2	During Condition Yellow: 3.2.1 Transfusion ordering practice will strictly follow medical center guidelines. Exceptions require prospective authorization (pre-approval) as described below. a. RBC transfusion trigger shall be a hemoglobin of 7 g/dL or less in critically ill patients, and 8 g/dL or less in critically ill cardiac patients. <u>Red cells shall be ordered one unit at a time.</u> b. Platelet transfusion trigger shall be a platelet count of 50 K/uL or less, in actively bleeding patients. When there is no active bleeding, the trigger shall be 10 K/uL or less. c. Plasma transfusion trigger shall be an INR of 1.8 or greater, in actively bleeding patients. No transfusion is indicated regardless of INR if the patient is not actively bleeding. d. Transfusion orders received when the trigger is not met shall require Blood Bank Medical Director prospective authorization and discussion with the ordering physician. e. The Blood Bank Medical Director may delegate authority to approve exceptions to include other pathologists, other knowledgeable physicians, the Lab Administrative Director, or the Blood Bank Supervisor. f. The Blood Bank Medical Director can allow exceptions for acute rapid bleeding to be processed without prior approval. Limits shall be imposed on transfusion support for rapid bleeding as described below. 3.2.2. Blood Bank dispensing practices will conserve valuable inventory types a. Red blood cells shall always be ABO-compatible. The Blood Bank already has the discretion to dispense any compatible type (not just group specific) depending on inventory considerations.

	b. The Blood Bank already has substantial discretion in choosing platelet units for each patient. The Blood Bank will continue allocating either conventional platelets, PAS-platelets (platelet additive solution), or PR-platelets (pathogen reduced) based on inventory considerations. The Blood Bank may give any ABO platelet type. c. RhD-neg blood products will only be given to women with reproductive capacity less than 50 years old. All other patients including women 50 years and older, women after hysterectomy, and men of any age, shall immediately be given RhD-pos blood. d. CMV-neg blood is already not necessary as all San Leandro blood is leukoreduced and regarded as CMV-safe. Nevertheless, any transfusion orders with CMV-neg special requirement shall be disregarded. e. Irradiation requirement will still be honored, but the Blood Bank Medical Director shall be informed of these requests and may require that ordering physicians obtain prior approval depending on inventory considerations. f. For emergency bleeding, the Blood Bank may dispense group A thawed plasma for any recipient ABO type. There shall be no limit on the use of group A plasma for emergency bleeding. 3.2.3 Massive Hemorrhage and Large Volume Transfusion will be limited a. Massive hemorrhage and large volume transfusions occurring over a short time interval to the same patient shall have limitations imposed. b. After 45 units of blood products (i.e. 5 MTP packs: 20 RBC, 20 FFP, 5 platelets) are transfused, the Blood Bank Medical Director and the clinical team lead must have a discussion before transfusions continue. The blood inventory and the clinical situation shall be weighed. Transfusion support may be terminated at this point. c. If deemed meritorious, transfusion support can continue to a maximum of 90 units of total blood product (i.e. 10 MTP packs) at which point transfusion support will be terminated.
3.3	During Condition Red 3.3.1 Transfusion ordering practice will strictly follow special severe transfusion guidelines. Exceptions require prospective authorization (pre-approval) as described below. a. RBC transfusion trigger shall be a hemoglobin of 6 g/dL or less in critically ill patients, and 7 g/dL or less in critically ill cardiac patients. Red cells shall be ordered one unit at a time. b. Platelet transfusion trigger shall be a platelet count of 50 K/uL or less in actively bleeding patients. When there is no active bleeding, the trigger shall be 5 K/uL. c. Plasma transfusion trigger shall be an INR of 1.8 or greater in actively bleeding patients. No transfusion is indicated regardless of INR if the patient is not actively bleeding.

	d. Transfusion orders received when the trigger is not met shall require Blood Bank Medical Director prospective authorization and individual discussion with the ordering physician. e. The Blood Bank Medical Director may delegate authority to approve exceptions to include other pathologists, other knowledgeable physicians, the Lab Administrative Director, or the Blood Bank Supervisor. f. The Blood Bank Medical Director can allow exceptions for acute rapid bleeding to be processed without prior approval. Limits shall be imposed on transfusion support for rapid bleeding as described below. 3.3.2 Blood Bank dispensing practices will conserve valuable inventory types a. Red blood cells shall always be ABO-compatible. The Blood Bank already has the discretion to dispense any compatible type (not just group specific) depending on inventory considerations. b. RhD-neg blood products given to women with reproductive capacity less than 50 years old shall be limited to 10 units of RBC. These women will be switched to RhD-pos after the limit is reached. All other patients including women 50 years and older, women after hysterectomy, and men of any age, shall immediately be given RhD-pos blood. c. The Blood Bank already has substantial discretion in choosing platelet units for each patient. The Blood Bank will continue allocating either conventional platelets, PAS-platelets (platelet additive solution), or PR-platelets (pathogen reduced) based on inventory considerations. The Blood Bank may give any ABO platelet type. d. CMV-neg blood is already not necessary as all San Leandro blood is leukoreduced and regarded as CMV-safe. Nevertheless, any transfusion orders with CMV-neg special requirement shall be disregarded. e. Irradiation requirement will still be honored if possible, but the Blood Bank Medical Director shall be informed of these requests and may require that ordering physicians obtain prior approval depending on inventory considerations. f. For emergency bleeding, the Blood Bank may dispense group A thawed plasma for any recipient ABO type without limit. 3.3.3 Massive Hemorrhage and Large Volume Transfusion will be severely limited a. Massive hemorrhage and large volume transfusions to a single patient occurring over a short time interval shall have limitations imposed. b. The Blood Bank Medical Director shall be notified immediately when 27 units of blood products are transfused (i.e. 3 MTP packs). The Blood Bank Medical Director and the clinical team lead must have a discussion before transfusions continue. Transfusion support could be terminated at this point. c. The blood inventory and the clinical situation shall be weighed. If deemed meritorious, transfusion support can continue to a maximum of 45 units of blood products (i.e. 5 MTP packs: 20 RBC, 20 FFP, 5 platelets) or until the number of units transfused reaches 50% or more of the entire Blood Bank on site inventory. When this point has been reached, transfusion support shall be terminated.
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	d. Exceptions to this limit may involve consultation with the Ethics Committee.
3.4	During Condition Black: 3.4.1 Transfusion ordering practice will strictly follow super severe transfusion guidelines. Exceptions require prospective authorization (pre-approval) as described below. - RBC transfusion trigger shall be a hemoglobin of 5 g/dL or less in critically ill patients, and 6.5 g/dL or less in critically ill cardiac patients. Red cells shall be ordered one unit at a time. - Platelet transfusion trigger shall be a platelet count of 30 K/uL or less in actively bleeding patients. Platelets shall not be transfused if there is no active bleeding regardless of platelet count. - Plasma transfusion trigger shall be an INR of 1.8 or greater in actively bleeding patients. No transfusion is indicated regardless of INR if the patient is not actively bleeding. - Transfusion orders received when the trigger is not met shall require Blood Bank Medical Director prospective approval and individual discussion with the ordering physician. - The Blood Bank Medical Director may delegate authority to approve exceptions to include other pathologists, other knowledgeable physicians, the Lab Administrative Director, or the Blood Bank Supervisor. - The Blood Bank Medical Director can allow exceptions for acute rapid bleeding to be processed without prior approval. Limits shall be imposed on transfusion support for rapid bleeding as described below. 3.4.2 Blood Bank dispensing practices will conserve valuable inventory types - Red blood cells shall attempt to be ABO-compatible when possible. ABO-incompatible will be offered if no ABO-compatible units are available. Do not dispense ABO-incompatible unless there is no other option. - RhD shall be disregarded for all patients. - CMV-neg and irradiated special requirements shall be disregarded for all patients. - The Blood Bank already has substantial discretion in choosing platelet units for each patient. The Blood Bank will continue allocating either conventional platelets, PAS-platelets (platelet additive solution), or PR-platelets (pathogen reduced) based on inventory considerations. The Blood Bank may give any ABO platelet type. - For emergency bleeding, the Blood Bank may dispense group A thawed plasma for any recipient ABO type without limit. 3.4.3 Massive Hemorrhage and Large Volume Transfusion will be severely limited. - Massive hemorrhage and large volume transfusions occurring over a short time interval to a single patient shall have severe limitations imposed. - The Blood Bank Medical Director shall be notified immediately when 18 units of blood products are transfused (i.e. 2 MTP packs). The Blood Bank Medical Director and the clinical team lead must have a discussion before transfusions continue. Transfusion support could be terminated at this point.

	c. The blood inventory and the clinical situation shall be weighed. If deemed meritorious, transfusion support can continue to a maximum of 36 units of blood products (i.e. 4 MTP packs) or until the number of units transfused reaches 50% or more of the entire Blood Bank on site inventory. When this point has been reached, transfusion support shall be terminated. d. The Blood Bank Medical Director will change the conditions as the blood supply improves. There will be communication with the Medical Executive Committee and the blood supplier.
3.5	The Blood Bank Medical Director will change the conditions as the blood supply improves. There will be communication with the Medical Executive Committee and the blood supplier.

4.0 Summary of Transfusion Guidelines: Guide for Transfusion Service Clinical Laboratory Scientists and Physicians

Critical Blood Shortage: Emergency Action Plan				
		Yellow	Red	Black
Transfusion Guidelines: Strict Adherence Required. *Exceptions to be discussed with Blood Bank Medical Director.	RBC transfusion orders	Hb $\leq$ 7 g/dL for critically ill patients. Hb $\leq$ 8 g/dL for critically ill patients with cardiac disease. *One unit at a time and reassess clinical need.	Hb $\leq$ 6 g/dL for critically ill patients. Hb $\leq$ 7 g/dL for critically ill patients with cardiac disease. *Symptomatic but not life-threatening anemia will not be transfused.	Hb $\leq$ 5 g/dL for critically ill patients. Hb $\leq$ 6.5 g/dL for critically ill patients with cardiac disease. *Symptomatic but not life-threatening anemia will not be transfused.
	Platelet transfusion orders	Platelet count $\leq$ 50 K/uL in actively bleeding patient. Platelet count $\leq$ 10 K/uL in non-bleeding patient.	Platelet count $\leq$ 50 K/uL in actively bleeding patient. Platelet count $\leq$ 5 K/uL in non-bleeding patient.	Platelet count $\leq$ 30 K/uL in actively bleeding patient. No platelet transfusion in non-bleeding patient.
	Plasma transfusion orders	INR $\geq$ 1.8 in actively bleeding patient. No plasma transfusion in non-bleeding patient.	INR $\geq$ 1.8 in actively bleeding patient. No plasma transfusion in non-bleeding patient.	INR $\geq$ 1.8 in actively bleeding patient. No plasma transfusion in

				non-bleeding patient.
Massive Transfusion Limitations	Blood Bank Medical Director and Clinical Team Lead must discuss merits of transfusion before support continues	45 units of total blood products (i.e. 5 MTP packs).	27 units of total blood products (i.e. 3 MTP packs).	18 units of total blood products (i.e. 2 MTP packs).
	Transfusion Support Terminates *Exceptions to be discussed with Blood Bank Medical Director.	90 units of total blood product (i.e. 10 MTP packs).	45 units of total blood products (i.e. 5 MTP packs) or if the number of units used reaches 50% or more of the entire Blood Bank on site inventory.	36 units of total blood products (i.e. 4 MTP packs) or if the number of units used reaches 50% or more of the entire Blood Bank on site inventory.
Blood Bank Dispensing Practice	ABO Adherence for RBC transfusion	ABO-compatible RBCs always given.	ABO-compatible RBCs always given.	ABO-compatible RBCs attempted to be given. ABO-incompatible RBCs offered if there is no alternative.
	RhD-neg Adherence for RBC transfusion	RhD-neg given only to women with reproductive capacity and age < 50 years old.	RhD-neg given only to women with reproductive capacity and age < 50 years old. Limited to 10 units RhD-neg RBC. Afterwards, switch to RhD-pos.	RhD disregarded for all patients.
	Plasma transfusion	May use group A plasma for any ABO recipient for emergency transfusion. No limit.	May use group A plasma for any ABO recipient for emergency transfusion. No limit.	May use group A plasma for any ABO recipient for emergency transfusion. No limit.
	CMV-neg requests	Disregarded. All blood is leukoreduced and CMV-safe.	Disregarded.	Disregarded.
	Irradiated requests	Honored.	Honored if possible.	Disregarded.

5.0 References

1.	Adapted from Kaiser Santa Clara Transfusion Service
2.	Contingency plan implementation. Neurath D, Cober N, Owens W, Giulivi A. <i>Transfus Apher Sci.</i> 2012 Jun;46(3):337-40.