Indiana University Health	**Original Creation Date:** 03/09/2005	**Publication Date:** 02/04/2025
	Owner: Elaine Skipworth (Director-Lab Transfusion Medicine)	**Next Review:** 02/04/2027
	Category: Lab Methodist, Lab Riley, Lab University	
	Education: Level 3	
Approval Signatures: Magdalena Czader (Physician) (02/04/2025)		

Procedure: Inventory Management

Printed copies are for reference only. Please refer to the electronic copy for the latest version.

Reference # 26052

I. PURPOSE

This procedure details the steps for daily inspection and counting of blood/blood components to maintain adequate inventories.

II. SCOPE

This SOP addresses the critical control points of inventory management and storage of all available blood products for both acceptability and availability. This includes all blood products in inventory at Methodist, University, and Riley Hospitals.

III. STATEMENTS/REQUIREMENTS

A. The available inventory will be supplied by approved blood suppliers.

B. All available blood products will be inspected and counted daily for the purposes of removing unacceptable units and maintaining acceptable minimum inventory levels.

C. Cerner Inventory Reports may be used to monitor product availability.

D. All blood products must undergo additional inspections prior to being dispensed for patient use.

E. Requests are placed with blood suppliers as patient needs require.

F. Standing Orders exist with blood suppliers for the following items:

1. RBC, all RBC blood products are leukoreduced and referred to as LPC.
2. Apheresis Platelets
3. Frozen Plasma
4. Liquid Plasma
5. Cryoprecipitate, single and pooled products
6. Whole Blood

G. Notify blood bank management or the Blood Bank physician if there are problems in obtaining blood or blood components.

H. Blood product shortages and triage of blood products will be managed according to Procedure: Blood Product Inventory Control policy.

IV. DEFINITIONS

AABB: Association for the Advancement of Blood & Biotherapies

Blood Product Triage: The process of prioritizing and allocating blood products to patients in need during blood shortages or high blood product use.

LPC: Leukoreduced Packed Cells

Minimum Inventory Level: Minimum inventory levels are the lowest amount of a product in stock to ensure blood bank will be able to meet customer demand. This is the trigger number to order additional products.

RBC: Red Blood Cells

SOP: Standard Operating Procedure

V. EQUIPMENT/RESOURCES

Daily Inventory Forms

VI. PROCEDURE

A. Visual Check of Blood Products

1. Visual Check: Inspect appearance of inventory each day using the following guidelines:
    a. LABELS are INTACT AND UNITS ARE NOT EXPIRED.
    b. Observe units for:
        i. Purplish or greenish color may indicate bacterial contamination and/or hemolysis.
        ii. Leaking tubing, seams, etc.
        iii. Questionable appearance
        iv. Lipemic
        v. Discolored or cloudy
        vi. Refer any questions to supervisor.
    c. Appearance Evaluation- Refer to Attachment 1: Blood Product Visual Inspection Guide
        i. NORMAL APPEARANCE: By completing the Daily Inventory Form you are documenting a "Normal" appearance of inventory.
            1. Form: BBT-F015 Riley Blood Bank - Daily Inventory
            2. Form: BBT-F016 Methodist Blood Bank- Daily Inventory
            3. Form: BBT-F017 University Blood Bank- Daily Inventory
        ii. ABNORMAL APPEARANCE: Remove unit(s) from inventory and place in physical and electronic Quarantine location until appropriate action and disposition is determined.

B. Storage and Counting Inventory of Blood Products

1. Maintain orderly and un-crowded arrangement of stock.
    a. Shelves labeled and designated for each ABO/Rh, CMV negative, irradiated and antigen negative (phenotyped), as applicable.
    b. Arrange short-dated units in front, left row, progressively getting fresher as units go back and to the right.
    c. RBC products

i. Mark units (less than 4 days) LPC units, whenever possible, to ensure they can be used before outdate.

ii. Release Short-dated, (less than seven (7) days remaining); reserved (phenotyped) units to stock, as patient requirements dictate.

iii. Rotate stock as additional units are received.

iv. Rotate stock as crossmatched inventory is released to stock

2. Disposition of outdated units:

a. Regular Units (see Cerner application Final Disposition, Procedure: Final Disposition / Wastage).

b. Determine if credit needed, i.e. transferred from outlying IUH facilities.

c. Consignment Units (see Cerner application Final Disposition, Procedure: Final Disposition / Wastage): Includes:

i. All AB+ LPC
ii. LPC received < 7 days before expiration
iii. All units designated consignment from supplier should be documented per the donor center's instructions for receiving credit.
iv. Partial Units (see Cerner application Final Disposition, Procedure: Final Disposition / Wastage)

3. Count number of each category of inventory each day.

4. Record each count in appropriate spaces of Daily Inventory forms.

5. Tally the total number of products by type on the Daily Inventory forms.

B. Replenishment of Inventory

1. UHBB

a. Determine the requested number of products.

b. If the current inventory is equal to or less than the Minimum Inventory Level, then request the number of products to reach the level.

c. Send the form to RHBB for products to be packed and shipped to UHBB or sent via pneumatic tube.

2. MHBB and RHBB

a. Compare the **Total Units Counted and Minimum Inventory Levels to the numbers to be received on the Standing Order**.

b. If the amount to be received is greater than the products needed, do not order any additional.

c. If the amount to be received is less than the Minimum Inventory Level number, place an order with the blood supplier.

C. Blood Product Triage Levels

1. Refer to Procedure: Blood Product Inventory Control for escalating triage levels.

a. MHBB Platelets ≤ 10
b. RHBB Platelets ≤ 10
c. MHBB O Pos Red Cells ≤ 100
d. RHBB O Pos Red Cells ≤ 100

e. MHBB O Neg Red Cells ≤ 75
f. RHBB O Neg Red Cells ≤ 100

D. Designated MTP and Emergency Release Product Management

1. Each Blood Bank location has designated MTP or Emergency Release products prepared for immediate use per Procedure: Emergency Uncrossmatched Blood Requests.
2. Daily the Massive Transfusion Protocol or Emergency Uncrossmatched prepared units should be monitored for Visual Check (see section A.1) and complete evaluate the units and paperwork for outdate.
   a. If the units are for an adult and within 24-48 hours of outdate of the units, then follow the Emergency Uncrossmatched Blood Request procedure to replace the units.
   b. If the units are for the pediatric setting, then follow the outdates indicated on the applicable Inventory form. The unit for pediatics should be replaced within 24-48 hours of the designated outdate.
   c. If the units are not within 24-48 hours of designated outdate, then do not replace these units.

E. Directed and Autologous Inventory Management

1. Directed and Autologous Inventory unit(s) should be segregated in a labeled location when in any AHC Blood Bank locations.
2. Documenting information pertaining to directed or autologous units: Go to (Cerner) "Product History Review".
   a. Click on Comment icon.
   b. Free text any pertinent information.
3. Autologous RBCs are discarded from inventory after expiration. **Autologous units never cross-over to general inventory**; See (SOP Procedure: Final Disposition / Wastage for discard procedure).
4. Directed Donor RBCs:
   a. Transfer to general inventory seven (7) days prior to expiration or seven (7) days after surgery. If intended transfusion date is not specified contact attending physician for release.
   b. Transfer to general inventory in (Cerner) Modify Products:
      i. ISBT units: X DD RBC.
      ii. Check in Patient Product Inquiry (PPI) to verify product removed from patient. (Cerner AUTO and DD buttons are changed to now dithered out).
   c. Discard expired directed units; see SOP Procedure: Final Disposition / Wastage.

VII. CLINICAL SIGNIFICANCE/SPECIAL CONSIDERATIONS

None

VIII. REFERENCES

AABB Technical Manual, current edition.
AABB Standards, current edition.
Quality System, AABB/IU Health.

IX. FORMS/ APPENDICES

Attachment 1: Blood Product Visual Inspection Guide

Form: BBT-F015 Riley Blood Bank - Daily Inventory

Form: BBT-F016 Methodist Blood Bank- Daily Inventory

Form: BBT-F017 University Blood Bank- Daily Inventory

X. APPROVAL BODY

None

PROCEDURE #:

BBT – 076

Indiana University Health
Indianapolis, IN 46202

Form #: BBT – F 015.07
Original Effective Date: 02/20/2013
Revision Date: 01.20.2025

Riley Blood Bank - Daily Inventory

Date:_____ **Evaluated /Inspected/Ordered By:**_____

1. Evaluate the inventory. Organize products by outdate and remove/dispose any expired products.
2. Count and inspect the inventory listed. Perform visual inspection according to SOP Inventory Management.
3. Tally the total units counted. Compare the total count to the restock level. If the current inventory is equal to or less than the Minimum Inventory Level, then request the number of products to restock to minimum levels.

BLOOD TYPE	***Count Inventory only AFTER MHBB and UHBB INVENTORY filled*** UF = <5 days old and CMV negative Fresh = < 8 days old and CMV negative IF less than 0, indicate 0 or leave blank — Current Counted INVENTORY: Immediate Use Fridge	Irradiated	CMV Neg	LPC	Pheno	Total Units Counted	Minimum Inventory Level	Volume Expected from Standing Oder	Replacement Volume to Order from Supplier
O Pos							150	9	
O Neg							125	8	
A Pos							150	9	
A Neg							75	1	
B Pos							50	2	
B Neg							20	1	
AB Pos							10	2	
AB Neg							5	1	
Pediatric O Pos	UF			Fresh			5	8	
Pediatric O Neg	UF			Fresh			6	6	
Pediatric A Pos	UF			Fresh			5	6	
Pediatric A Neg	UF			Fresh			2	2	
Pediatric B Pos	UF			Fresh			1	0	

Special Products and Emergency Units

MTP Tray = 6 LPC
Emergency Release Tray = 4 LPC

Emergency Set UP	Required Products Set Up	If Okay = √ If replaced = R
Pediatric Unit 1 Unit (O Neg) CMV-, IRR < 14 days	1 LPC	
MTP Pediatric >40Kg: (O-) 1 Tray with 6 LPC No age requirement	6 LPC	
MTP Pediatric >17kg to 40kg 4 units (O Neg) < 14 days	4 LPC	
MTP Pediatric <=17kg or <= 38 lbs 2 units (O Neg) < 8 days	2 LPC	
Whole Blood and Liquid Plasma LP Riley ER and OR Replaced per SOP *Cannot order from blood supplier*	Current Counted WB	Current Counted LP

Platelets	Current Counted	Minimum Inventory Level	Volume Expected from Standing Order	Ordered Volume from the Blood Supplier IF less than 0, indicate 0 or leave blank
O, A, B, AB	CMV Neg PRT	10	18	
AB Pedi (CMV Neg/PRT)		1		

	Current Counted TP	Min. Inv. Level	Replacement and restock	Current Counted FFP	Min. Inv. Level	Volume Expected from Standing Order	Replacement and restock	Current Counted Pedi FFP	Min. Inv. Level	Replacement and restock	Current Counted Pedi Single CRYO	Min. Inv. Level	Replacement and restock	Current Counted Pooled CRYO	Min. Inv. Level	Replacement an` restock
O		0			75	3						10	****** If <4-8 then RH staff will order in ARC Connect		10	
B		0			60	2						10			10	
A		6			100	7						10			10	
AB		2			36	2			30			5			10	

Indiana University Health

Indianapolis, IN 46202

Form #: BBT – F 016.06
Original Effective: 02/20/2013
Revision Date: 01/20/2025

Methodist Blood Bank-Daily Inventory

Date:_____ Inspected/Ordered By:_____

1. Evaluate the inventory. Organize products by outdate and remove/dispose any expired products.
2. Count and inspect the inventory listed. Perform visual inspection according to SOP Inventory Management.
3. Tally the total units counted. Compare the total count to the restock level. If the current inventory is equal to or less than the Minimum Inventory Level, then request the number of products to restock to minimum levels.

BLOOD TYPE	*Current Counted LPC*	Current Counted IRR LPC	Current Counted Pheno Units	Total Units Counted	Minimum Inventory Level	Standing Order Volumes	Replacement Volume to Order from Supplier
O Pos					125 IRR 4	13	
O Neg					100 IRR 2	8	
A Pos					125 IRR 2	9	
A Neg					50 IRR 2	1	
B Pos					15	3	
B Neg					1	1	
AB Pos					4	0	
AB Neg					3	0	

Special Products and Emergency Units MTP Tray = 6 LPC Emergency Release Tray = 4 LPC or TP products		
Emergency Set UP	**Required Products Set Up**	**If Okay = √ If replaced = R**
MTP Adult: (O+) **2 Trays with LPC**	O+ Tray 1 O+ Tray 2	
****MTP Adult: (O-)** **1 Tray with LPC**	O- Tray 1	
****Surgery (O Neg) Emerg. Release** Ck Pink forms to determine inventory	4 O Neg LPC	
In date ER Trays – Ck Pink forms to determine inventory	1=O- Tray 1=O+ Tray TP Tray 1 TP Tray 2	
In date ER Trays – Whole Blood Ck Pink forms to determine inventory	8 WB Total O+ or O-	
Whole Blood Used in Trauma Liquid Plasma Lifeline Usage, Replaced on Wed Standing Order	Current Counted WB	Current Counted LP
Lifeline 1 Tray with LPC	**O- Tray**	

Platelets	Current Counted	Minimum Inventory Level: 10	Replacement Volume to Order
CMV and Non-CMV Negative		Standing Order Volume: 10	

	Current Counted TP	Min. Inv. Level	Volume to Restock	Current Counted FFP	Minimum Inventory Level	Standing Order Volume	Volume to Restock	Current Counted Pooled CRYO	Restock Level of CRYO	Volume to Restock
O		6			50	3			12	
B		6			50	2			12	
A		12			100	6			12	
AB		6			36	3			12	

Print on Green Paper

***If O Negative inventory is low, then Special Products and Emergency Units may have to be adjusted with BB Management approval*

Indiana University Health

Indianapolis, IN

Form #: BBT – F 017.10
Original Effective: 02/20/2013
Revision Date: 01/20/2025

University Blood Bank-Daily Inventory

Date:_____ Inspected/Ordered By:_____

1. Evaluate the inventory. Organize products by outdate and remove/dispose any expired products.
2. Count and inspect the inventory listed. Perform visual inspection according to SOP Inventory Management.
3. Tally the total units counted. Compare the total count to the restock level. If the current inventory is equal to or less than the Minimum Inventory Level, then request the number of products to restock to minimum levels.
4. Send the form to RHBB for products to be packed and shipped to UHBB or sent via tube.

BLOOD TYPE	*Current Counted INVENTORY LPC*	Current Counted IRR LPC	Current Counted Pheno LPC	Total Units Counted	Minimum Inventory Level LPC	Volume of LPC To Restock IF less than 0, indicate 0 or leave blank	Special Products and Emergency Units MTP Tray = 6 LPC		
					50		Emergency Set UP	Required Products Set Up	If Okay = √ If replaced = R
O Pos					IRR: 5				
					30		MTP Adult (O+) 2 Trays with 6 LPC	O+ Tray 1	
O Neg					IRR: 5			O+ Tray 2	
					40		**MTP Adult: (O-) 1 Tray with 6 LPC	O- Tray	
A Pos					IRR: 3				
					20		Comments		
A Neg					IRR: 3				
B Pos					10				
B Neg					5				
AB Pos					1				
AB Neg					1				

Platelets	Current Counted	Minimum Inventory Level:	Requested Replacement of Platelets
PRT, CMV and Non-CMV Negative		4	

	Current Counted TP	Minimum Inv. Level	Volume to Restock	Current Counted FFP	Minimum Inv. Level	Volume to Restock	Current Counted Pooled CRYO	Minimum Inv. Level	Volume to Restock
O		6			50			12	
B		6			50			12	
A		6			50			12	
AB		6			50			2	

Print on Blue Paper when possible
***If O Negative inventory is low, then Special Products and Emergency Units may have to be adjusted with BB Management approval.*

Reference # 27383

Indiana University Health	**Original Creation Date:** 05/01/2003	**Publication Date:** 03/03/2024
	Owner: Elaine Skipworth (Director-Lab Transfusion Medicine)	**Next Review:** 03/03/2026
	Category: Lab Methodist, Lab Riley, Lab University	
	Education: Level 1	
Approval Signatures: Magdalena Czader (Physician) (03/03/2024)		

Procedure: Inventory Search

Reference # 26053

I. PURPOSE

To detail a procedure for blood product and derivative searches in the Cerner Millennium PathNet system.

II. SCOPE

This SOP addresses the procedure to search for blood products at any Indiana University Health Blood Bank locations. This procedure applies to all Blood Bank staff.

III. EXCEPTIONS

None

IV. DEFINITIONS

None

V. POLICY STATEMENTS

None

VI. BACKGROUND

1. **Inventory Search** application can search the blood bank inventory using the following kinds of searches:
    1. **Search entire inventory**: produces a list of all products currently in inventory. Selection Criteria section is all dithered out.
       Note: Not recommended to be used.
       Due to a very large volume of products in the Indiana University Health Blood Bank inventory, using this search option for all products and their different valid states (Assigned, Available, etc.) will take a very long time and may even cause a runtime error.
    2. **Search on selected criteria**: Search can be refined by specifying any or all of the following criteria

(Criteria with an asterisk are required)

1. **Product category**
    1. [All]
    2. Auto Blood
    3. Cryo
    4. Directed Donor Blood
    5. Ped Red Cells
    6. Plasma
    7. Platelets
    8. Red Cells
    9. Granulocytes
    10. Others that are not used by BB
2. **ABO:** defaults is (All) or the last ABO searched
3. **Rh:** defaults is (All) or the last Rh searched
4. **Days to expire:** default is the last number entered. Can select # of days up to maximum days for desired product
    1. Red Cell: 42 days
    2. FFP and Cryo: 365 days
    3. Platelets: 5 days
5. **Active states:** default is (All) or the last valid state(s) searched
    1. [All] - searches all states
    2. Assigned
    3. Autologous
    4. Directed
    5. Available
    6. Destroyed
    7. In Progress
    8. Quarantined
    9. Crossmatched
    10. Disposed
    11. Transfused
    12. Unconfirmed
    13. Modified Product
    14. Others that are not used by BB
6. **Antigens:** Dropdown list includes all the product modifiers and antigens on the Cerner database
7. **Owner area:** default is Indiana University Health

8. **Inventory area:** defaults to the last Inventory area searched.
9. **Dispense location:** defaults to (All)
10. **Inventory device:** N/A for IU Health

2. **Comments**  can be viewed and updated in Inventory Search. This button is activated when the row of a product is highlighted; otherwise, this button stays dithered out.

VII. MATERIALS

PC with Cerner software
Barcode reader

VIII. SPECIMEN REQUIREMENTS

None

IX. PROCEDURE

1. Access application by clicking on **"Inventory Search"** button from the Appbar. "**Search Selection:"** dialog box displays.
2. Select "Search on selected criteria"
    1. **Product:** Select one of the product categories
        1. [All]
        2. Auto Blood
        3. Cryo
        4. Directed Donor Blood
        5. Ped Red Cells
        6. Plasma
        7. Platelets
        8. Red Cells
        9. Others that are not used by BB
    2. **ABO:** Select desired "ABO"
        1. [All]
        2. O
        3. A
        4. B
        5. AB
        6. Others that are not used by BB
    3. **Rh:** Select desired "Rh"
        1. [All]
        2. POS
        3. NEG

4. Pooled Rh
5. Others that are not used by BB

4. **Days to expire:** Select up to maximum days for desired product
    1. Red Cell: 42 days
    2. FFP and Cryo: 365 days
    3. Platelets: 5 days
5. **Active states:** Check those states to be searched
    1. [All] - searches all states
    2. Assigned
    3. Autologous
    4. Directed
    5. Available
    6. Destroyed
    7. In Progress
    8. Quarantined
    9. Crossmatched
    10. Disposed
    11. Transfused
    12. Unconfirmed
    13. Modified Product
    14. Others that are not used by BB
        Note: A status can be deselected by removing the check mark
6. **Antigens:** Select the desired antigens/attributes from the available box, then select **"MOVE"** to move selection into the selected box
7. **Owner area:** Indiana University Health is the only default
8. **Inventory area:** Select inventory area(s) needed for the search ([All] is default).
9. **Dispense Location:** [All] is default.
10. **Search historical products** (N/A for IU Health)
11. **Search only products with the Electronic Entry Indicator.**
12. Click **"OK"** button.

3. **Entering Blood Bank Product Comments**
    1. Highlight the row of product that needs comments added.
    2. Click on the Comment button  from the toolbar. "Comments" window opens.
    3. Click **Add** button
        1. Enter comment by typing comments as free text.
        2. Review comment. If correction is needed click on **"Edit"**
        3. Change/edit text.
        4. Click **OK**

4. Click **"Close"** button

X. APPENDICES/ATTACHMENTS/FORMS/ LABELS

None

XI. REFERENCES/CITATIONS

Cerner Corporation of Kansas City, Missouri. Quality System, AABB/IU Health.
AABB Technical Manual, current edition.
AABB Standards, current edition.

Policy #:

BBCE – 009

Indiana University Health	**Original Creation Date:** 11/11/2024	**Publication Date:** 02/04/2025
	Owner: Elaine Skipworth (Director-Lab Transfusion Medicine)	**Next Review:** 02/04/2027
	Category: Lab Methodist, Lab Riley, Lab University	
	Education: Level 3	
Approval Signatures: Magdalena Czader (Physician) (02/04/2025)		

Procedure: Blood Product Inventory Control

Printed copies are for reference only. Please refer to the electronic copy for the latest version.

Reference # 101236

I. PURPOSE

This procedure addresses the management of the BBTS blood product inventory during blood shortages or high blood product use related to trauma or mass casualty incidents. Communication from the BBTS to the clinical teams is also addressed to ensure the best management and utilization for the available blood supply.

II. SCOPE

This procedure applies to blood product management at the AHC Blood Banks. All blood bank team members will comply with this procedure.

III. STATEMENTS/REQUIREMENTS

A. The BBTS blood product inventory is counted daily according to SOP Procedure: Inventory Management to ensure acceptable inventory levels are maintained.

B. Blood products will be transferred between University, Methodist, and Riley Hospital Blood Banks as needed.

C. When inventory is at defined triage levels, more restrictive transfusion practices will be implemented to ensure the best management of the blood supply.

D. The BBTS Management and physician team will communicate inventory shortages to clinicians and hospital staff.

IV. DEFINITIONS

AABB: Association for the Advancement of Blood & Biotherapies

Backline (Diagnotes): IU Health approved HIPAA compliant communication platform.

BBTS: Blood Bank Transfusion Service

Blood Product Triage: The process of prioritizing and allocating blood products to patients in need during a mass casualty incident or blood shortage.

MCI: Mass Casualty Incident is an event that overwhelms the local healthcare system, where the number of casualties vastly exceeds the local resources and capabilities in a short time

MHBB: Methodist Hospital Blood Bank

RHBB: University Hospital Blood Bank

SOP: Standard Operating Procedure

V. EQUIPMENT/RESOURCES

None

VI. PROCEDURES

A. Blood Product Shortages due to Suppliers or High Use
   1. Communication from Blood Suppliers
      a. Blood suppliers will notify the BBTS of blood shortages or when standing orders are not able to be filled.

   2. Blood Product Triage Levels
      a. MHBB Platelets ≤ 10
      b. RHBB Platelets ≤ 10
      c. MHBB O Pos Red Cells ≤ 100
      d. RHBB O Pos Red Cells ≤ 100
      e. MHBB O Neg Red Cells ≤ 75
      f. RHBB O Neg Red Cells ≤ 100
      g. Blood supplier projects > 2-hour delay in the next shipment and the alternate blood supplier is not able to supply blood product in a timely manner.

B. Notification Actions by Blood Bank Transfusion Service
   1. Blood Bank team member will notify blood bank management when a product inventory number reaches a triage level.
      a. Management will assess and confirm the supply issues.
      b. Inventory levels will be reviewed at all 3 blood bank sites and products transferred from site to site as necessary.

   2. Once shortage is confirmed, the BBTS physician on-call will be notified and provided the following information:
      a. Available inventory at all 3 blood bank locations.
      b. Current orders placed with suppliers and estimated time for delivery
      c. Product orders
      d. Patients using multiple product orders (i.e. surgery patients, ICU, transplant)
      e. MTPs

C. Assessment by BBTS Physician
   1. The BBTS physician will begin triaging patients based on volume issued and ability to safely delay the transfusion.

   2. Options for consideration

a. Delay transfusion
b. Check patient labs
c. Reduced doses
d. MTPS (send platelets every other dose)
e. Postpone non-emergent IR cases
f. Postpone elective surgeries

D. Notification Actions by BBTS Leaders

1. Blood bank will notify each hospital of any blood shortage in the daily Tier 3 huddles.
    a. The Tier 3 huddles have representation from all clinical leaders, the Nurse Associate Administrator, and the physician safety officer.
    b. A message will be placed in Diagnotes "Blood Product Shortages (Riley, Methodist, University)" room by the TS physician.

2. Blood bank will notify the system blood banks in the Daily Statewide Lab Huddle.
    a. Messages will be sent to other IU Health blood banks to see if products can be transferred between facilities.

3. Blood bank will continue to provide notification updates in both tier 3 huddles and in Diagnotes to keep clinical teams informed.

4. Once inventory returns to adequate levels, the blood shortage and triaging will be deactivated by the TS physician on call.

E. Mass Casualty Incident

1. The BBTS will be informed of a MCI.

2. The BBTS will perform an inventory count and notify blood suppliers.

3. Orders will be placed as needed to maintain adequate inventory levels.

4. The BBTS physician will triage blood products according to section C.

5. Blood product inventory status will be communicated to the clinical team by Tier 3 huddles and Diagnotes "Blood Product Shortages messages.

VII. CLINICAL SIGNIFICANCE/SPECIAL CONSIDERATIONS

None

VIII. REFERENCES/CITATIONS

AABB Standards, current edition.

IX. FORMS/APPENDICES

None

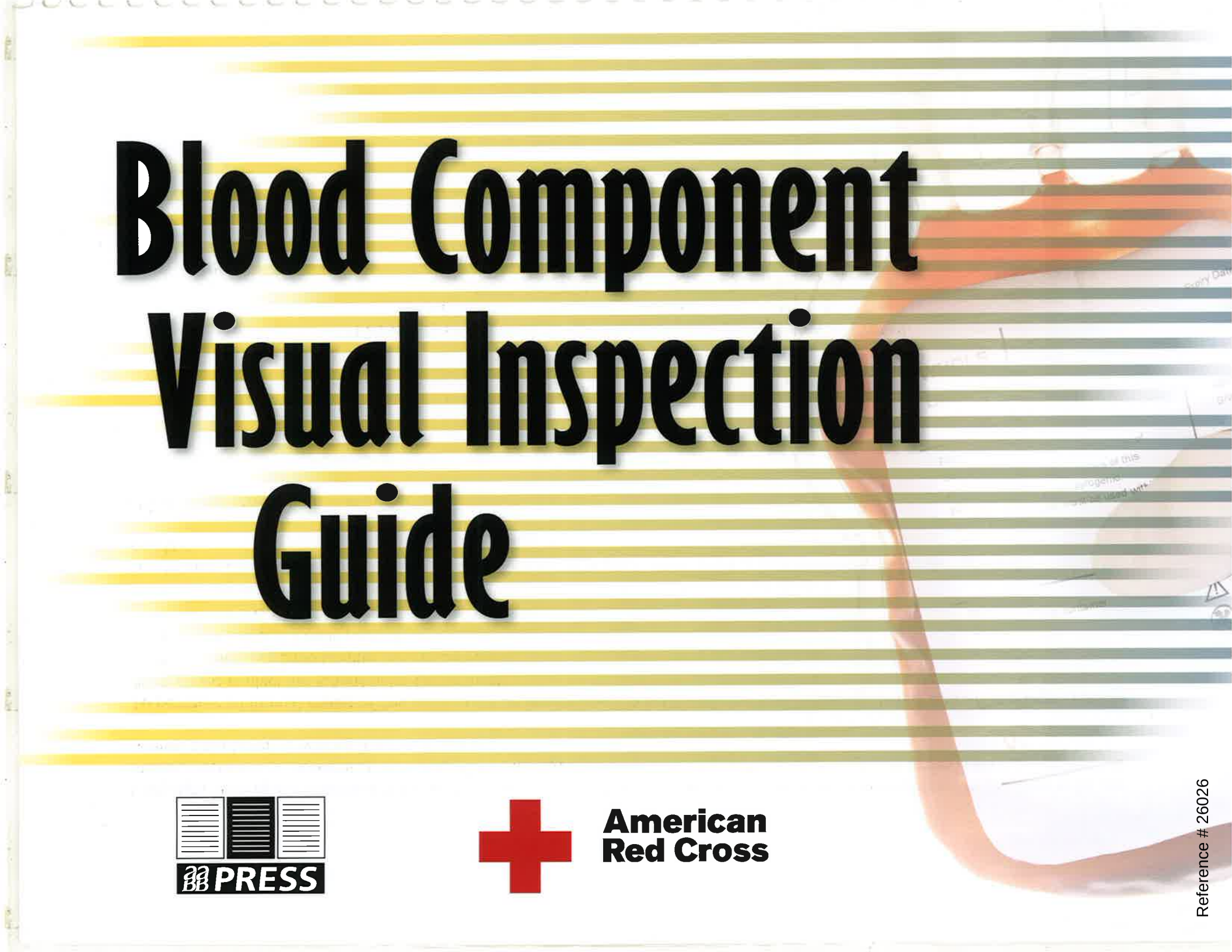
X. APPROVAL BODY

None

PROCEDURE:

BBT-115

Blood Component Visual Inspection Guide



AABB PRESS

American Red Cross

Reference # 26026

Blood Component Visual Inspection Guide

About This Guide

This guide was originally developed by staff at the American Red Cross Biomedical Services Headquarters in 2006. Subsequently, the AABB Clinical Transfusion Medicine Committee reviewed the document and endorsed its content. This reformatted guide is produced by AABB in cooperation with the American Red Cross.

Users should remember that photographs in this guide are for reference purposes only, and that no two components look exactly alike. This guide is not intended to show every condition that may be found in a component. Rather, it is meant to be a bench-top aid that supplements the visual inspection of blood components. Over time, users of the guide will become familiar with what is "normal." When a unit with an unusual appearance is discovered, the guide may be used in conjunction with appropriate procedures requiring visual inspection.

Contents of This Guide

This guide is organized into several sections as follows:

- Introduction: overview, purpose
- Description of normal components: plasma, platelets, cryoprecipitate, granulocytes, whole blood, red cells
- Description of conditions: hemolysis, lipemia, icterus, particulate matter, clots, fibrin strands, cold agglutinins, discoloration, bacterial contamination, foreign objects
- Additional sample images: red cells and whole blood, plasma, platelets, cryoprecipitate
- Quick reference tables

How to Use This Guide

Users should not depend solely on this guide in determining whether to accept or reject any blood component. A supervisor should be consulted when there is any question. Color photographs that are exposed to sunlight or fluorescent lighting can fade over time. Thus, the color of aged and faded photographs may not match what was originally intended. To make the guide last as long as possible, it should be kept closed when not in use. If the pages become soiled, they may be wiped clean with a paper towel moistened in 10% bleach solution, and then wiped with a paper towel moistened in water.

Blood Component Visual Inspection Guide

Overview

Numerous conditions may affect the Safety, Quality, Identity, Purity, and Potency (SQuIPP) of a final blood component, making it either unsafe for transfusion or unacceptable in appearance to customers. Heat, cold, mishandling, contaminants, manufacturer defects, donor illness, and other factors can cause a blood component to be unsuitable for transfusion.

Some of the conditions that can occur that make a component unsafe for transfusion or cause hospital staff, patients, or their families to question the safety include, but are not limited to:

- Hemolysis
- Lipemia
- Icterus
- Particulate Matter
- Discoloration
- Bacterial Contamination
- Foreign Objects

Purpose

The purpose of this guide is to assist staff who handle blood components to identify components that have an unusual appearance. The guide provides definitions and causes of these conditions.

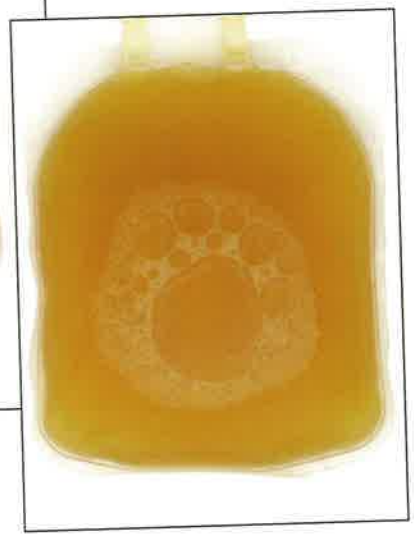
Blood Component Visual Inspection Guide

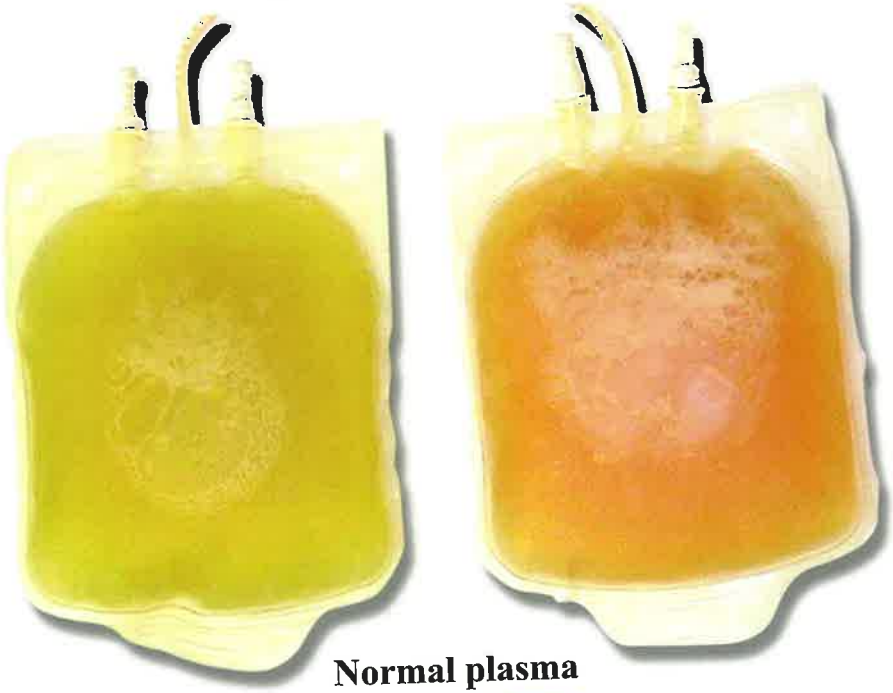
Description of Normal Components

Plasma

Plasma is the non-cellular portion of blood, which contains various proteins and clotting factors. The component is liquid without cellular elements or excessive visible particles. The appearance of the component varies based on specific donor conditions, but generally liquid plasma is clear to semi-opaque while frozen plasma is opaque. Normal colors range from pale to dark yellow and/or slightly green-tinged.

Normal plasma





Normal plasma

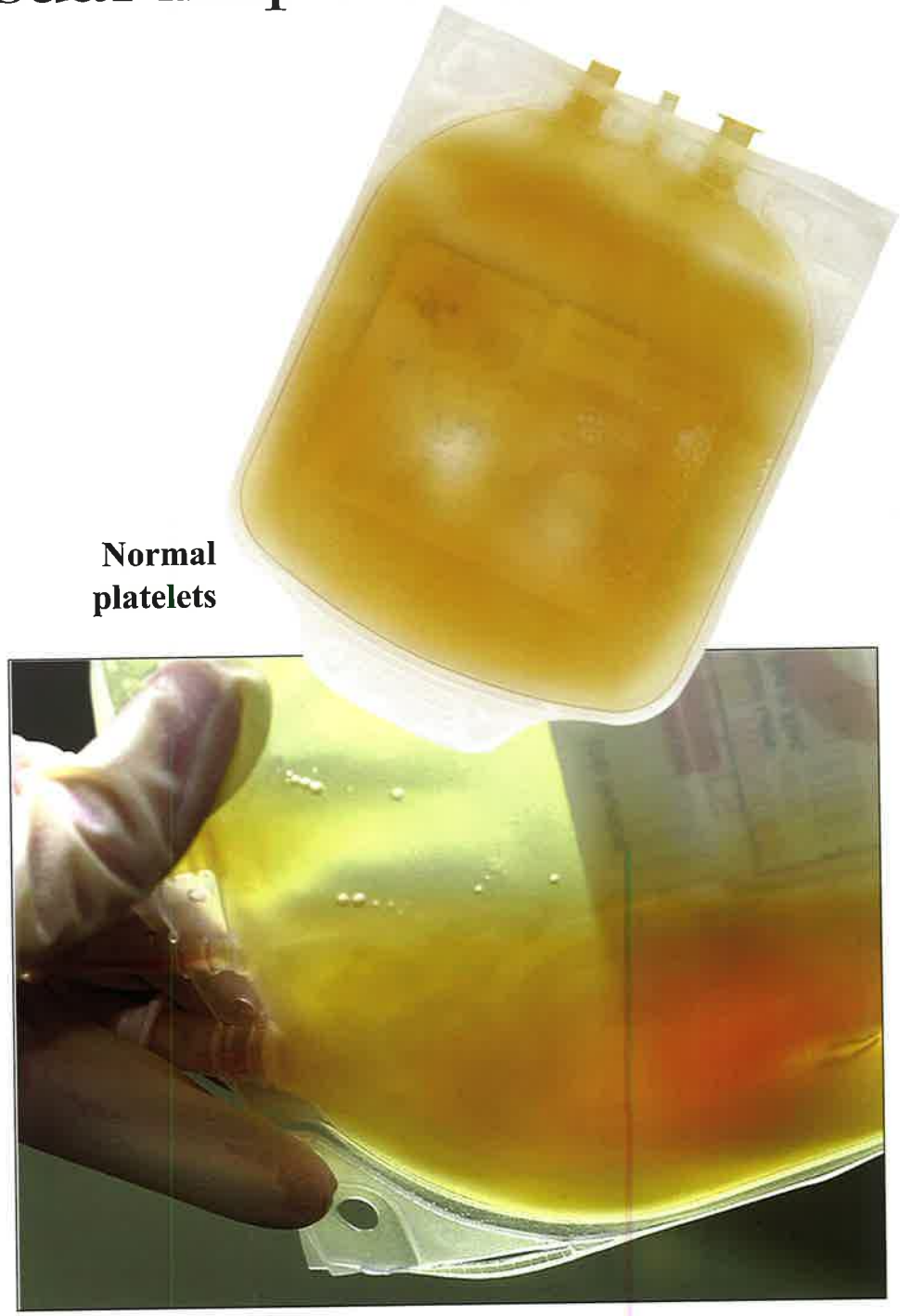
Blood Component Visual Inspection Guide

Platelets

Platelets are a cellular component of blood that function as part of the clotting or coagulation process. During the manufacturing process, a light centrifugation speed is used to separate the lighter platelets from the heavier red blood cells. This "platelet-rich" plasma will have the range of colors generally seen with plasma but be slightly more opaque than plasma due to the presence of the cellular platelets. Following a second, harder centrifugation process, the platelets will separate from the plasma and will appear as a white mass at the bottom of the bag. After removing most of the supernatant plasma, the platelet mass is re-suspended in the residual plasma. Apheresis platelets are collected from a single donor using continuous centrifugation as opposed to the two–step process used for whole blood derived platelets. The product volume of apheresis platelets is much larger, but the appearance is very similar to platelets produced from whole blood.

Due to the presence of the plasma, platelet components will generally be in the same color range as plasma components, but may contain varying amounts of red blood cells. Depending on the red blood cell content, the components may range in color from light pink, to salmon to bright red. The presence of red blood cells may cause the component to turn darker and appear brownish in color the longer the product is stored.

Although the individual platelet cells are too small to be seen by the naked eye, microscopically the platelet cells have a unique discoid shape. When the re-suspended platelets are rotated under a light source, the discoid–shaped platelets produce a shimmering opalescence or "swirling" effect. In addition to the re-suspended platelets and red blood cells, the platelet components may normally contain varying amounts of other small aggregates.



Normal platelets

Blood Component Visual Inspection Guide

Cryoprecipitate

Cryoprecipitate is produced by the concentration of certain coagulation factors following the freezing and controlled thawing of plasma. Following cold centrifugation of the thawed plasma, a cold (cryo) precipitate is concentrated at the bottom of the bag. The cryoprecipitate which remains after removal of the supernatant plasma will appear thick, opaque, whitish and "paste-like." At this stage, the cryoprecipitate may be mistaken in appearance for a fibrin clot. Upon freezing and re-thawing cryoprecipitate at 35-37 degrees C, the cryoprecipitate mass will dissolve and re-suspend in the small amount of residual plasma and appear as an even, thick, whitish liquid.

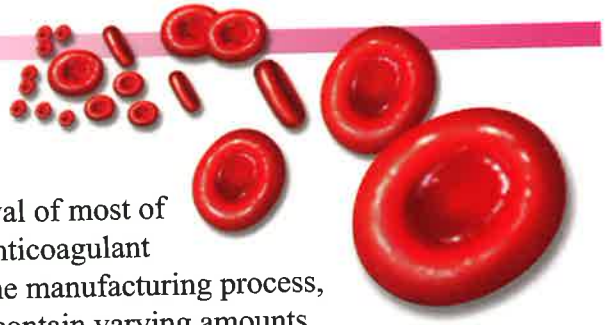
Granulocytes

Granulocytes are the white blood cell elements of whole blood. Although the granulocyte cells are visually white in appearance, the collection and manufacturing process used to prepare this component results in a component that also contains a significant amount of red blood cells. The visual appearance of a granulocyte component is similar to a red blood cell component.

Whole Blood

Whole blood (WB) consists of the cellular (red blood cells, white blood cells, and platelets) and plasma elements of blood suspended in an anticoagulant solution. The component is an even, liquid suspension of the cellular elements and plasma elements and ranges in color from bright cherry red to very dark burgundy. Upon resting (or following centrifugation) the cellular elements, being heavier, will settle or layer to the lowest points of the storage bag. The component will then contain an upper layer of plasma (various shades of yellow) with a lower layer of cells in various shades of red. Depending on the method of separation, a narrow layer of white blood cells and platelets may appear between the red cell mass and plasma and will be white in color.

Blood Component Visual Inspection Guide



Red Blood Cells

Red blood cells (RBCs) contain the red cellular elements remaining after the removal of most of the plasma and original anticoagulant solution. Depending on the manufacturing process, the component may also contain varying amounts of white blood cells and platelets. Many RBC components contain an additional preservative/ additive solution, which is added to the concentrated red blood cells after the removal of plasma/platelets and/or white blood cells. The component is an even, liquid suspension of the red blood cells in the remaining plasma and additive solution. RBC components without an additive solution will appear "thicker" than components containing an additive solution. The RBC components can be various shades of red in color.

A brighter cherry red color may be seen with components that have fewer total red blood cells (for example, a component from a donor with a lower hematocrit), and/or a component prepared by filtration that includes a sterile air-venting process.

A darker red, burgundy, or very dark burgundy color may be seen with components having a higher total red blood cell content (for example, a component from a donor with a higher hematocrit) or a non-additive RBC component.

Normal red cells

Blood Component Visual Inspection Guide

Description of Conditions

Hemolysis

Definition

Hemolysis (hemo - blood, lysis - dissolution) is the destruction of red blood cells, in which the pigment carrying protein, hemoglobin, is freed from the cells and discolors the surrounding plasma (fluid portion of the blood). Hemolysis can be partial, in which some of the red blood cells are destroyed, or complete, when all of the red blood cells are destroyed.

Effects

Component	Appearance
WB/RBC	• dark purple – black • less opaque • sheen
Plasma	• pink to red in color • liquid state – translucent • frozen state – opaque
Platelets	• pink to red in color • translucent

Causes of hemolysis

This list is not all–inclusive.

- a traumatic venipuncture
- incompatible solutions
- temperature extremes (too hot or too cold)
- over-centrifugation
- excessive pressure during leukoreduction
- stripping
- bacterial contamination
- normal aging process
- small bore or kinked tubing
- heat sealers

Criteria for acceptability

Based on the standard of the Council on European Standards the Red Cross has chosen to adopt less than 0.8% at the end of storage as the upper limit for hemolysis. The Red Cross uses a visual (qualitative) evaluation to determine acceptability.

Percent Hemolysis

(Photograph for illustrative purposes only)

Blood Component Visual Inspection Guide

Lipemia

Definition

Lipemia is an excessive amount of fatty substances in the blood, including cholesterol.

Causes of gross lipemia

Lipemia can be

- temporary and normal (following a high–fat meal), or
- chronic, and associated with a disease state, such as hypercholesterolemia.

Effects

Component	Appearance
WB/RBC	A grossly lipemic WB/ RBC will appear similar to a strawberry milkshake.
Plasma	Opaque (milky) appearance
Platelets	Opaque (milky) appearance

Criteria for acceptability

Lipemia itself does not affect the safety of a product but might interfere with the ability to perform viral marker tests. Donor samples used in performing infectious disease testing are visually evaluated for excessive lipemia. The acceptability level for lipemia is derived from the sample requirements in the industry's testing methods.

Lipemic Plasma

Blood Component Visual Inspection Guide

Icterus

Definition

Icterus is a condition in which excessive amounts of bile pigments produced by the liver, such as bilirubin, are present in the plasma.

Causes of Icterus

There are several conditions that can lead to icteric plasma, such as

- in vivo (inside the human body) hemolysis
- obstruction of the bile duct, and
- liver disease.

Effects

Component	Appearance
WB/RBC (Difficult to see except in separated plasma or segments)	Bright neon yellow to brown
Plasma	Bright neon yellow to brown
Platelets	Bright neon yellow to brown

Criteria for acceptability

Donors with jaundice are not usually eligible to donate blood. Evaluating for icterus is not a required test to determine acceptability for component release.

Readers are asked to submit a photo of Icterus for inclusion when encountered.

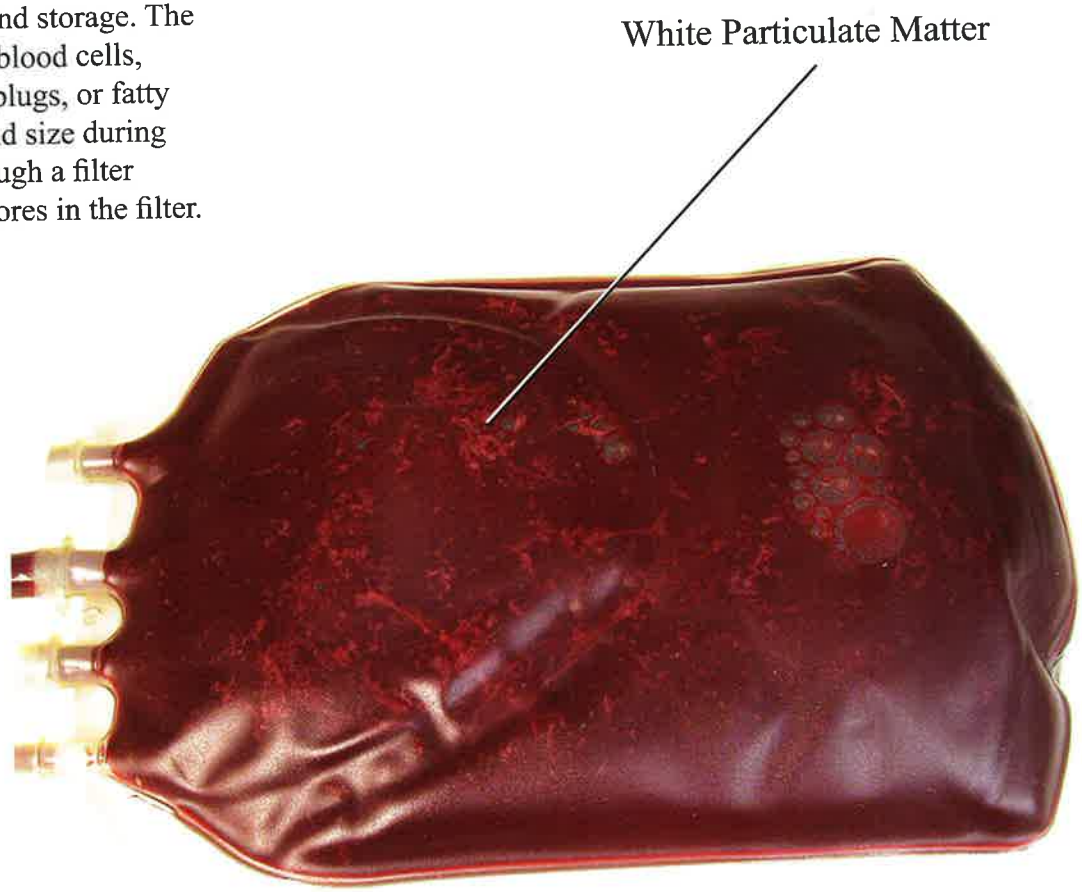
Blood Component Visual Inspection Guide

Particulate Matter

Particulate matter consists of various blood elements that are formed in the routine processes of collection, manufacturing, and storage. The particulate matter can consist of red blood cells, white blood cells, platelets, coagulation factors, protein materials, tissue plugs, or fatty substances. These particles may increase in quantity and size during storage. All blood components must be transfused through a filter designed to remove particles of a size larger than the pores in the filter.

Particulate matter can be further classified into:

- clots
- fibrin strands
- aggregates
- white particulate matter
- flocculent material
- cold agglutinins



Blood Component Visual Inspection Guide

Clots

Causes

Clots are formed in blood from the interaction of a series of proteins created in the liver (called coagulation factors), and may also include platelets. Anticoagulants are used in the collection and manufacturing process to prevent or minimize clotting. Clots may develop due to conditions such as the following:

- traumatic venipuncture
- insufficient mixing of component with anticoagulant, including inadequate stripping
- insufficient volume of anticoagulant
- bacterial contamination

Effects

Component	Appearance
WB/RBC	Dark purple to very dark burgundy masses that do not disperse easily by gentle manipulation or change in temperature
WB/RBC Segments	Red to black stringy mass that does not disperse easily by gentle manipulation or change in temperature. May appear as red, ribbon-like curls
Plasma (liquid phase) Thawed Cryoprecipitated AHF	A thick, whitish, opaque mass that does not disperse easily by gentle manipulation or change in temperature
Platelets	Thick, whitish, opaque masses that do not disperse easily by gentle manipulation or change in temperature

Criteria for acceptability

Visible clots must not be present in the component at time of distribution.

All blood components must be transfused through a filter designed to remove clots and aggregates. (*Circular of Information for the Use of Human Blood and Blood Components,* AABB, America's Blood Centers, American Red Cross, Armed Services Blood Program, 2009.)

Blood Component Visual Inspection Guide

Fibrin Strands

Causes

Fibrin strands are formed through partial activation of coagulation factors that occur in the plasma portion of a component. Fibrin strands do not contain cellular elements. They may develop due to conditions such as the following:

- traumatic venipuncture
- insufficient mixing of component with anticoagulant, including inadequate stripping
- insufficient volume of anticoagulant
- bacterial contamination

Effects

Component	Appearance
Any component, including segments	Thin, whitish, thread-like strands that do not disperse easily by gentle manipulation or change in temperature

Criteria for acceptability

All blood components must be transfused through a filter designed to remove clots and aggregates. (*Circular of Information for the Use of Human Blood and Blood Components,* AABB, America's Blood Centers, American Red Cross, Armed Services Blood Program, 2009.)

Aggregates

Causes

Aggregates, which are intact cells and/or cellular debris that have become entrapped by fibrin strands, may occur during the manufacturing or storage process forming small masses. These small masses may come together to form compact masses or clumps.

White particulate matter (p. 13) commonly seen in platelets may be mistaken for aggregates. Further evaluation may be required to differentiate.

Aggregates generally follow platelet activation and may be reversible or irreversible. Aggregates develop due to conditions such as the following:

- inappropriate storage conditions including resting, temperature, or agitation
- mechanical manipulation
- bacterial contamination

Aggregates may also be seen in red blood cells.

Effects

Component	Appearance
Platelets	Visible, small, whitish masses, some of which may appear waxy and plaque-like
Red Blood Cells	See White Particulate Matter

Criteria for acceptability

Products which do not contain clumps are acceptable.

Reference: 1. Devine, D. V. , et. al. Transfusion, Volume 39, p. 724. July 1999.
2. 21 CFR 640.24 (c)

Blood Component Visual Inspection Guide

White Particulate Matter

Causes

The formation of visually detectable white particulate matter in blood components is associated with the

- absence of leukocyte reduction
- use of higher g-forces in centrifugation to make components
- normal manufacturing and production processes
- normal storage process

Effect

Component	Appearance
WB/RBC or segments and Platelets	Generally described as one of the following: • crystalline material • fatty material • tissue • waxy appearing globs • white specks

Criteria for Acceptability

White particulate matter is an acceptable aggregate, based on numerous studies and FDA guidance. These components are suitable for release.
(FDA Update on Particulate Matter in Blood Bags, October 31, 2003)
See Note under Flocculent Material*

Flocculent Material

Causes

Flocculent material is sometimes formed following the freezing and then thawing of plasma components.

Effect

Component	Appearance
Plasma (liquid phase)	A "cloudy," "fuzzy," or "fluffy" white precipitate that may have a tissue paper-like appearance. This material disperses easily by gentle manipulation or increase in temperature.

Criteria for Acceptability

Flocculent material is an acceptable precipitate. Components containing flocculent material are suitable for release.

See Note Below*

***Note:** All blood components must be transfused through a filter designed to remove clots and aggregates. (*Circular of Information for the Use of Human Blood and Blood Components,* AABB, America's Blood Centers, American Red Cross, Armed Services Blood Program, 2009.)

Cold Agglutinins

Causes

The blood of some individuals contains a protein substance (antibody) which can react with the individual's own red blood cells resulting in clumping, or agglutination of the red blood cells. This condition is generally benign since the antibody is only present in low levels and only reacts at temperatures well below normal body temperature (37 degrees C). If the antibody is present in high amounts and/or reacts at temperatures close to body temperature, the antibody may be associated with a disease process.

Effect

This cold-reactive auto-agglutinin (cold agglutinin, cold auto-antibody) may give the initial appearance that a red cell or whole blood unit is clotted. If the component is examined or inverted after it has cooled (for example, when removed from the refrigerator) the entire red cell mass may move within the component bag as one large "clump." This motion may appear similar to the action of the lava in a lava lamp. As the component gradually warms, the red cell mass will begin to disperse and may appear granular, similar to coffee grounds. As the temperature increases further, the granules may completely disperse and an even suspension of red blood cells may be seen. By contrast, when a blood component is clotted there will generally be many stringy masses or clumps of varying sizes rather than one complete solid mass. The appearance of a clot does not change by varying the temperature and the solid masses are not dispersed by warming or gentle manipulation.

Criteria for Acceptability

Not acceptable for release unless authorized through medical approval.

Readers are asked to submit a photo of Cold Agglutinins for inclusion when encountered.

Blood Component Visual Inspection Guide

Discoloration

Definition

Discoloration refers to unusual color in blood components generally seen due to various metabolic conditions and rarely associated with contamination. A wide range of colors and shades are typical and expected.

Causes

The following may cause discoloration in blood components:

- medications, such as oral contraceptives
- vitamins
- copper metabolism defect
- bacterial contamination (see Bacterial Contamination section)
- incorrect preparation or equipment failure

Effects

Discoloration effects are most apparent in the plasma portion of blood or blood components.

Appearance	Possible Cause
Pale green	Oral contraceptive
Dark greenish brown	Icterus
Bright or fluorescent green	Drug therapy or possible bacterial contamination
Bright yellow to orange	Vitamins
Reddish	The presence of red blood cells or hemoglobin

Criteria for acceptability

Generally, liquid plasma is clear to semi-opaque and frozen plasma is opaque. Normal colors range from pale to dark yellow and/or slightly green-tinged.

If the final platelet apheresis product contains more than 2 mL of red blood cells, a sample of donor blood should be attached to the container for compatibility testing.

If bacterial contamination is suspected, further investigation is required.

Blood Component Visual Inspection Guide

Bacterial Contamination

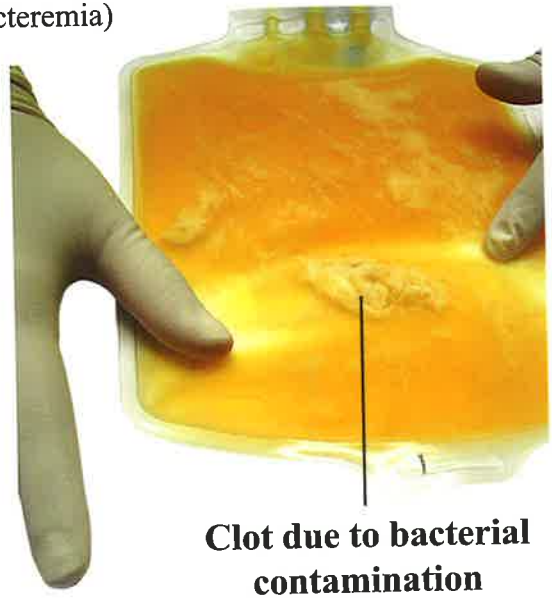
Definition

Bacterial contamination is the presence and growth of bacteria in a blood component. Blood and blood components provide a rich source of nutrients for bacteria. Normally, human blood is free of bacteria and manufacturing processes are designed to maintain sterility.

Causes

Bacterial contamination may be caused when bacteria begin to grow and multiply in the component bags due to any of the following:

- a donor has bacteria already present in his or her blood (a condition known as bacteremia)
- the skin is not cleaned properly prior to phlebotomy, or
- the sterility of the collection set is compromised (because of, for example, a pinhole leak or manufacturing defects).



Clot due to bacterial contamination

Effects

Components that are contaminated often have an unusual appearance and contain clots and/or hemolysis. It is vital to recognize this in a component.

Component	Appearance
WB/RBC (Difficult to see except in separated plasma or segments)	• product appears darker than the segments • unusual color, for example, purplish in color • unusual gas bubbles • a zone of hemolysis above the red cell mass • plasma or supernatant is murky, purple, brown or red • clots • fibrin strands
Plasma	• clots • fibrin strands • murky
Platelets	• clots • fibrin strands • unusual color

Criteria for acceptability

Products with unusual appearance are not acceptable for release.

Blood Component Visual Inspection Guide

Foreign Objects

Definition

Foreign objects generally consist of a part of the collection set that has become detached or loose within the component container. On rare occasions, due to manufacturing defects, other foreign objects may be found in bags. See photographic examples.

Causes

- Manufacturer defect
- Operator error
- Handling during transport

Criteria for acceptability

Not acceptable for release. Visible evidence of foreign objects must not be present at the time of release.

Foreign Object – Piece of Detached Cannula in Red Cells

Blood Component Visual Inspection Guide

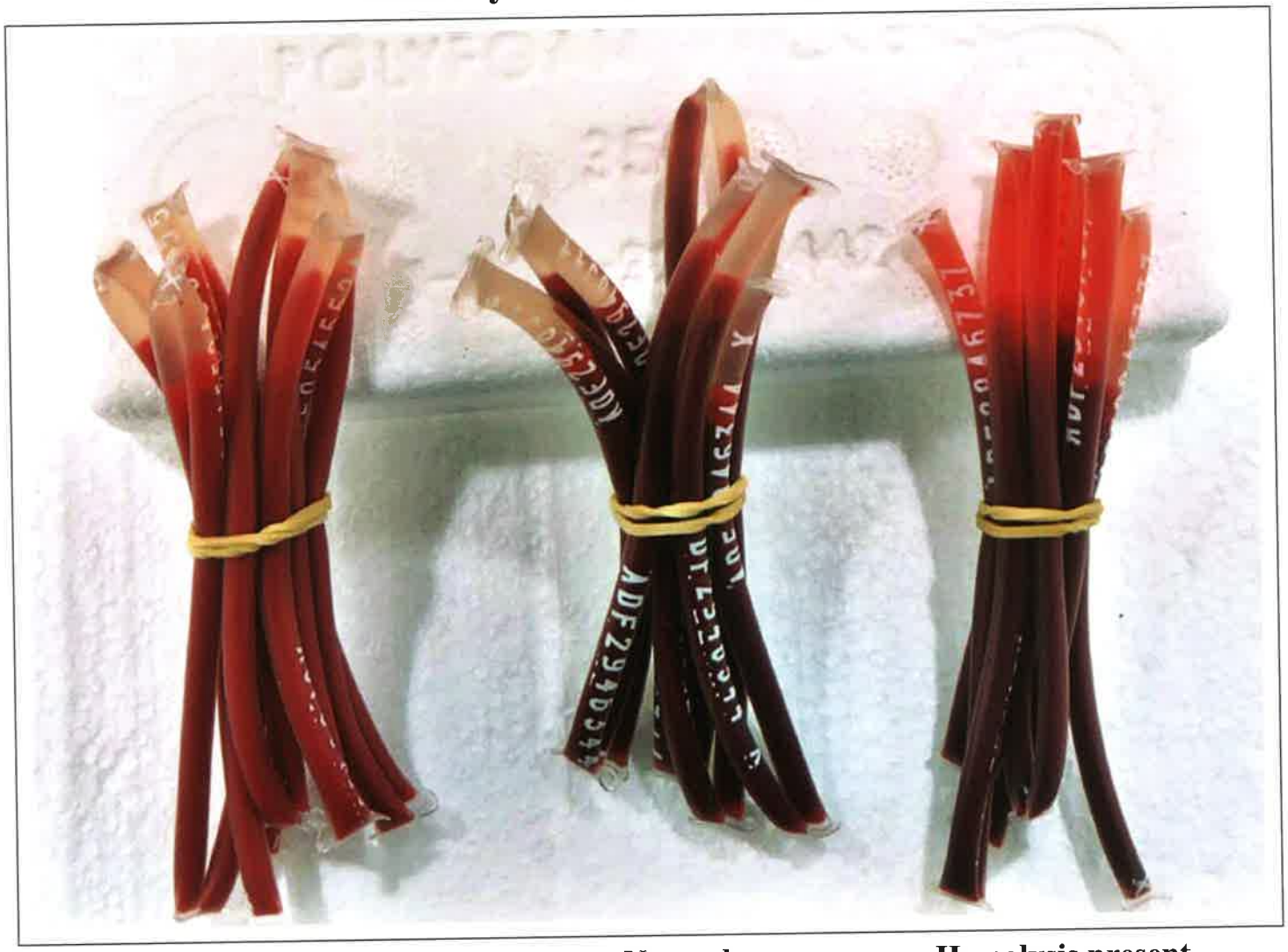
Red Cells and Whole Blood

Normal Red Cells

Blood Component Visual Inspection Guide

Red Cells and Whole Blood

Hemolysis – Red Cell Segments

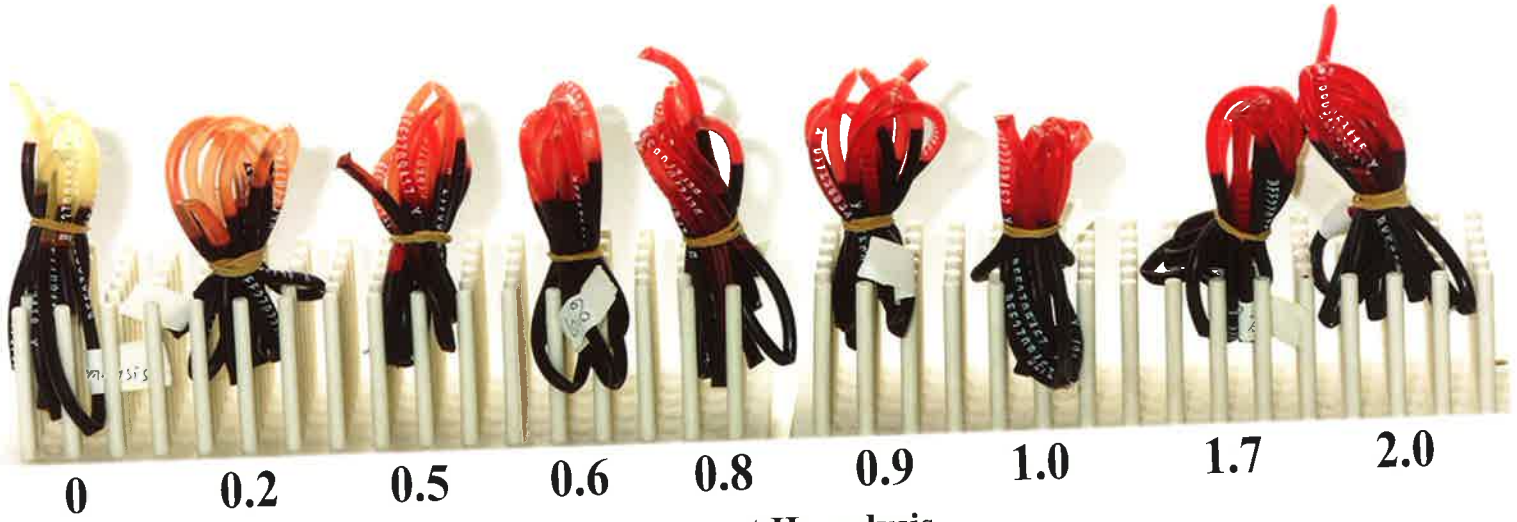


Normal | Normal | Hemolysis present

Blood Component Visual Inspection Guide

Red Cells and Whole Blood

Hemolysis – Red Cell Segments

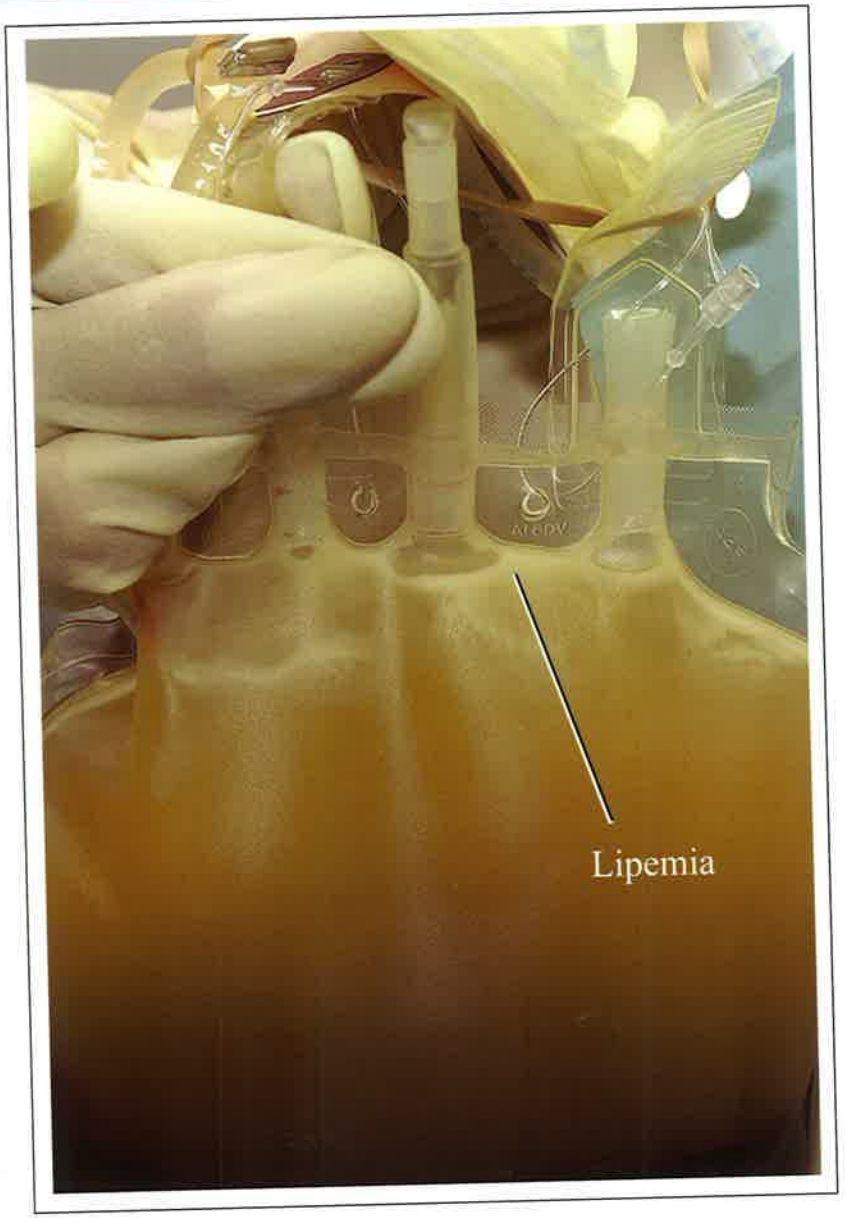


Percent Hemolysis

(Photograph for illustrative purposes only.
Not for diagnostic purposes)

Blood Component Visual Inspection Guide

Red Cells and Whole Blood



A layer of lipemia present in a centrifuged Whole Blood

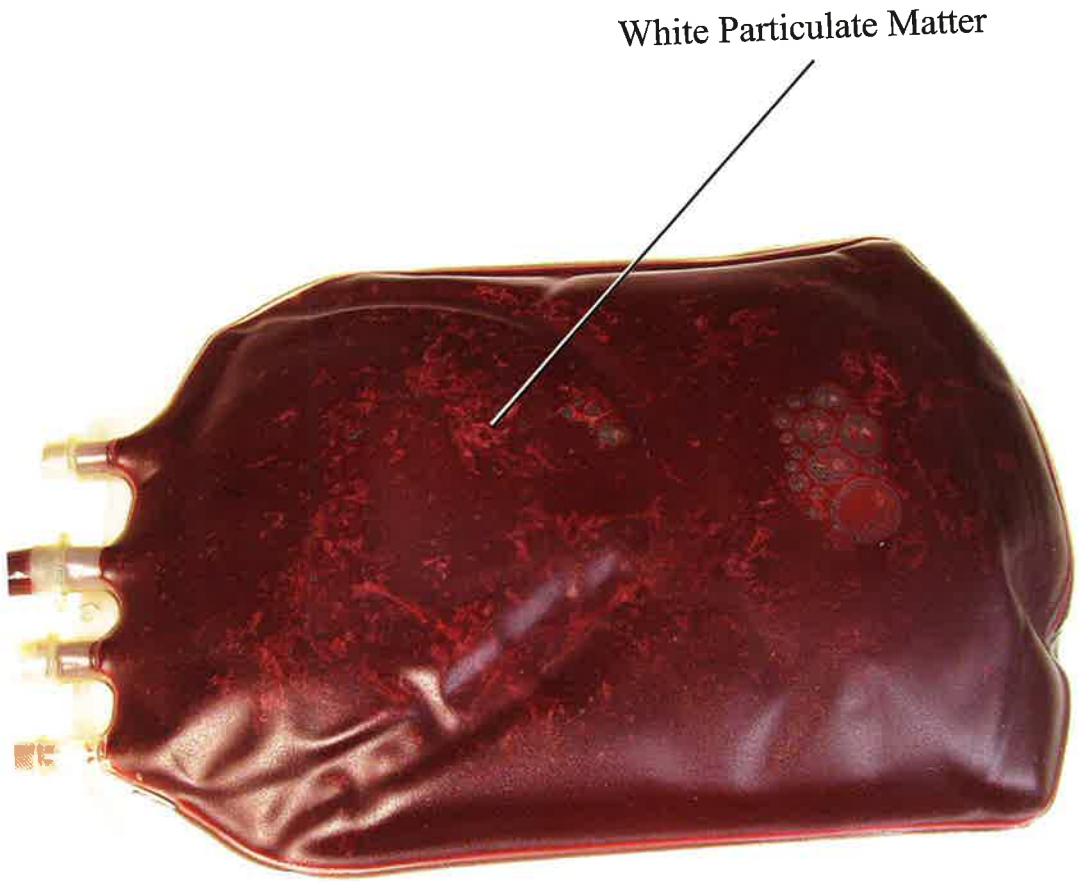
Blood Component Visual Inspection Guide

Red Cells and Whole Blood

Clots remaining in primary bag after filtration

Blood Component Visual Inspection Guide

Red Cells and Whole Blood



White Particulate Matter in Red Cells

Blood Component Visual Inspection Guide

Red Cells and Whole Blood

Foreign Object – Piece of Detached Cannula in Red Cells

Blood Component Visual Inspection Guide

Plasma

Normal Plasma

Normal Plasma

Blood Component Visual Inspection Guide

Plasma

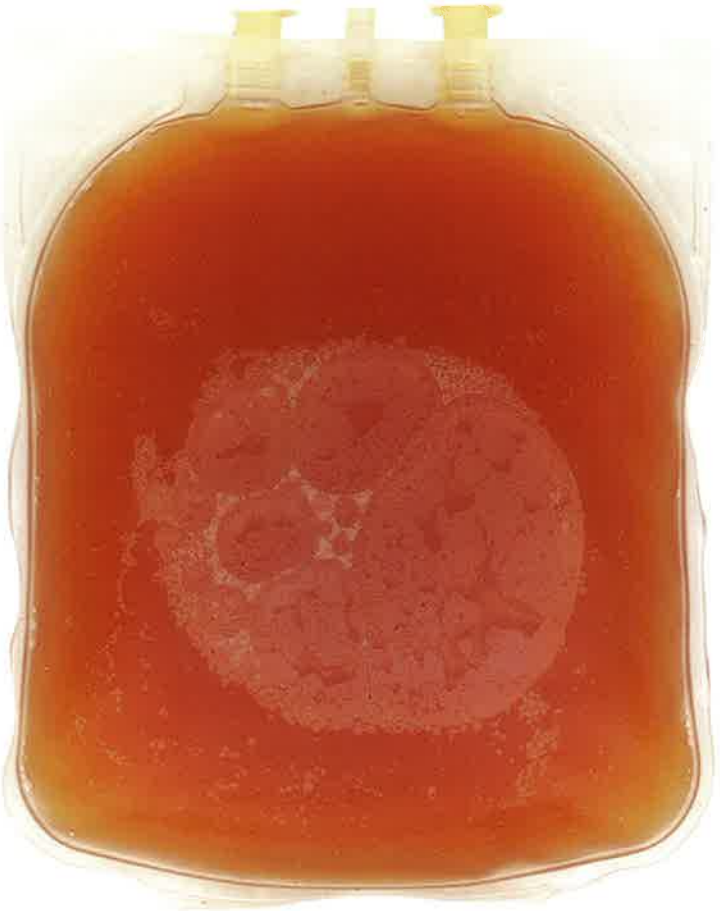
Normal Plasma

Normal Plasma – Green Tinged

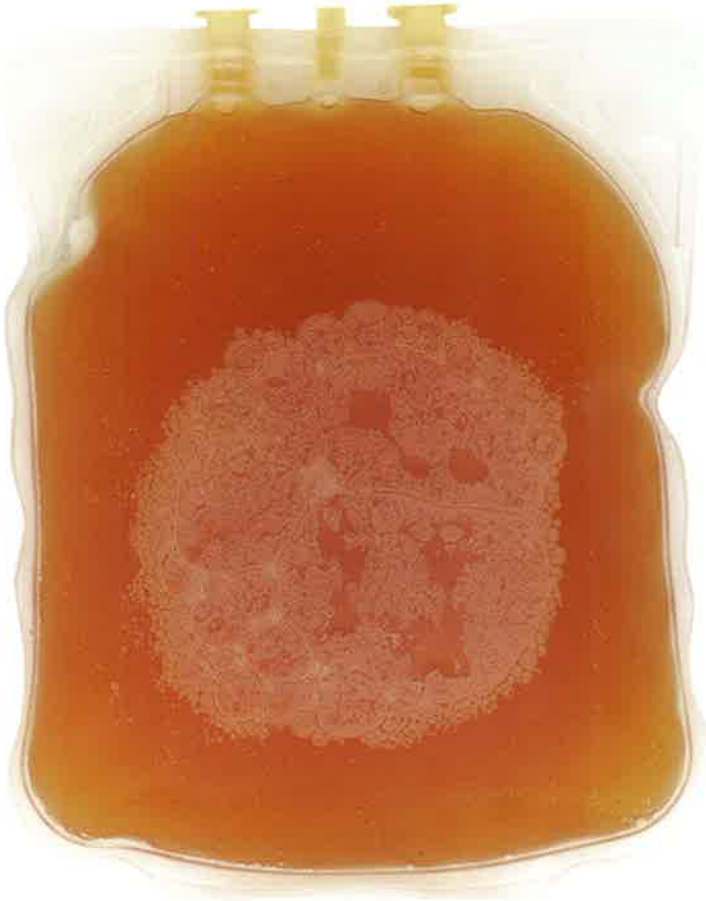
Normal Plasma

Blood Component Visual Inspection Guide

Plasma



Normal Plasma containing red blood cells



Normal Plasma containing red blood cells

Blood Component Visual Inspection Guide

Plasma

Lipemic – Plasma

Lipemic – Plasma

Blood Component Visual Inspection Guide

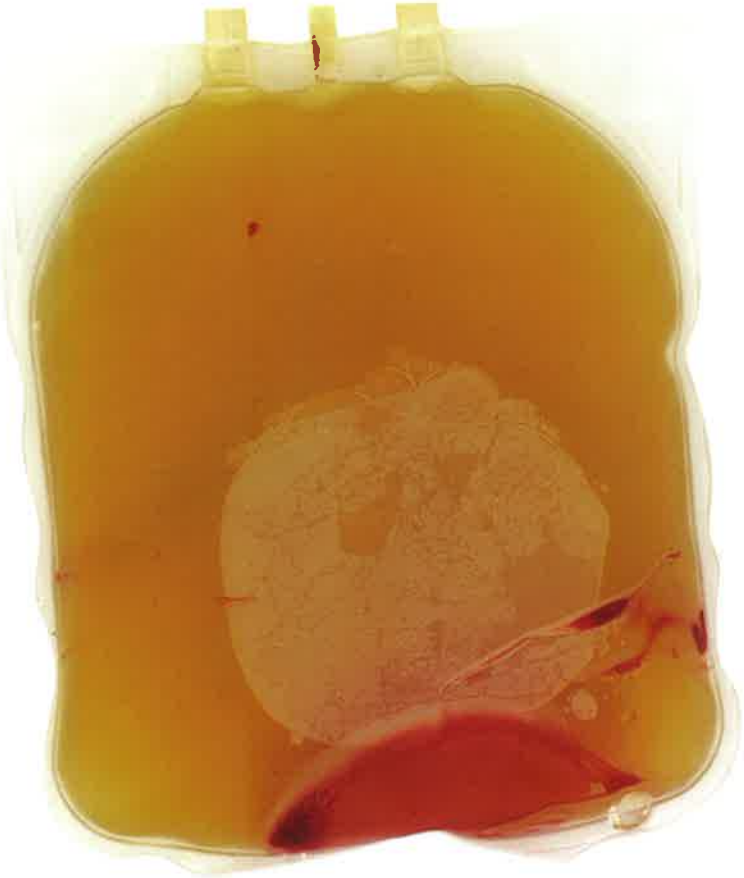
Plasma

Lipemic – Plasma

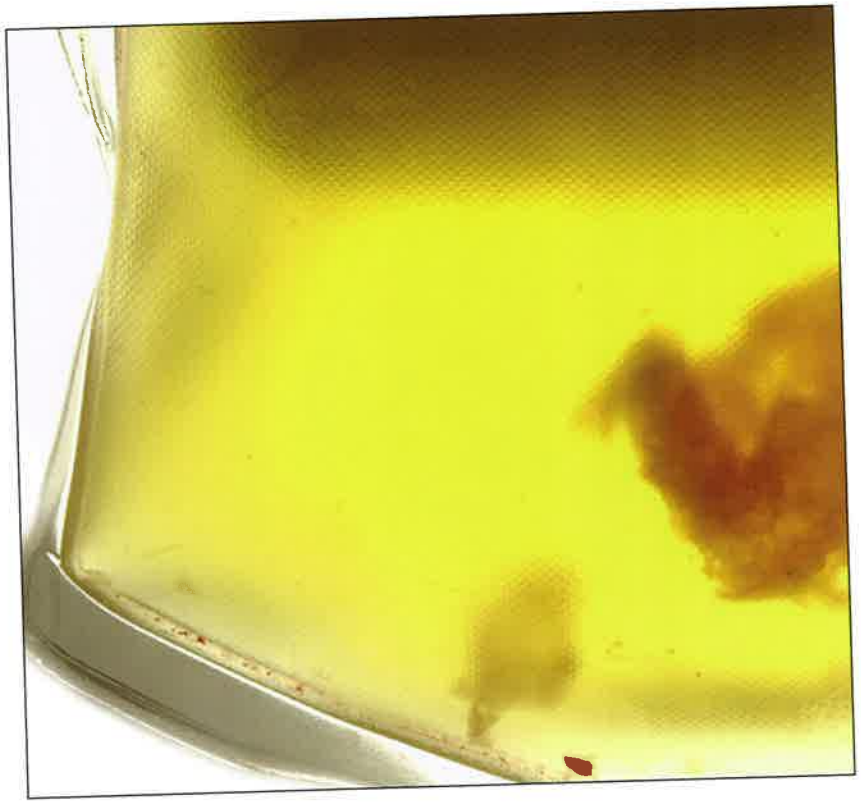
Lipemic – Plasma

Blood Component Visual Inspection Guide

Plasma



Red Cells in Centrifuged Plasma



Yellow Clot in Plasma

Blood Component Visual Inspection Guide

Platelets

Normal Platelets

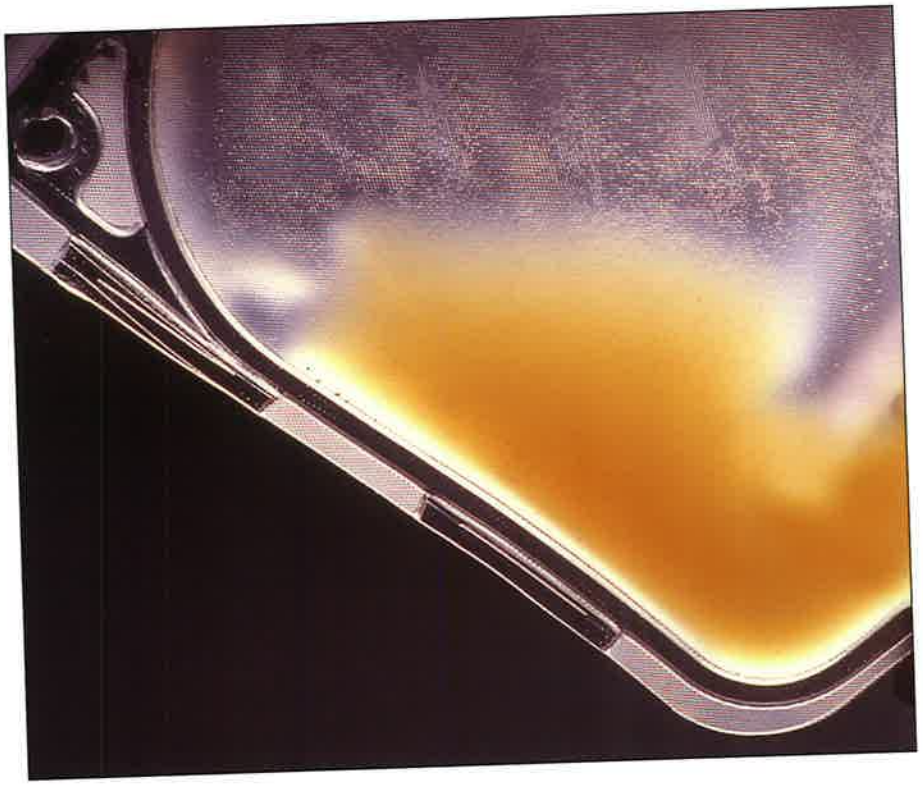
Normal Apheresis Platelets

Blood Component Visual Inspection Guide

Platelets

Platelets Swirl*

*Please note: The limitations of photography make it difficult to accurately capture the swirling phenomenon.



Platelets No Swirl

Blood Component Visual Inspection Guide

Platelets

Platelets – 0.1 mL RBCs

Platelets – 0.5 mL RBCs

Blood Component Visual Inspection Guide

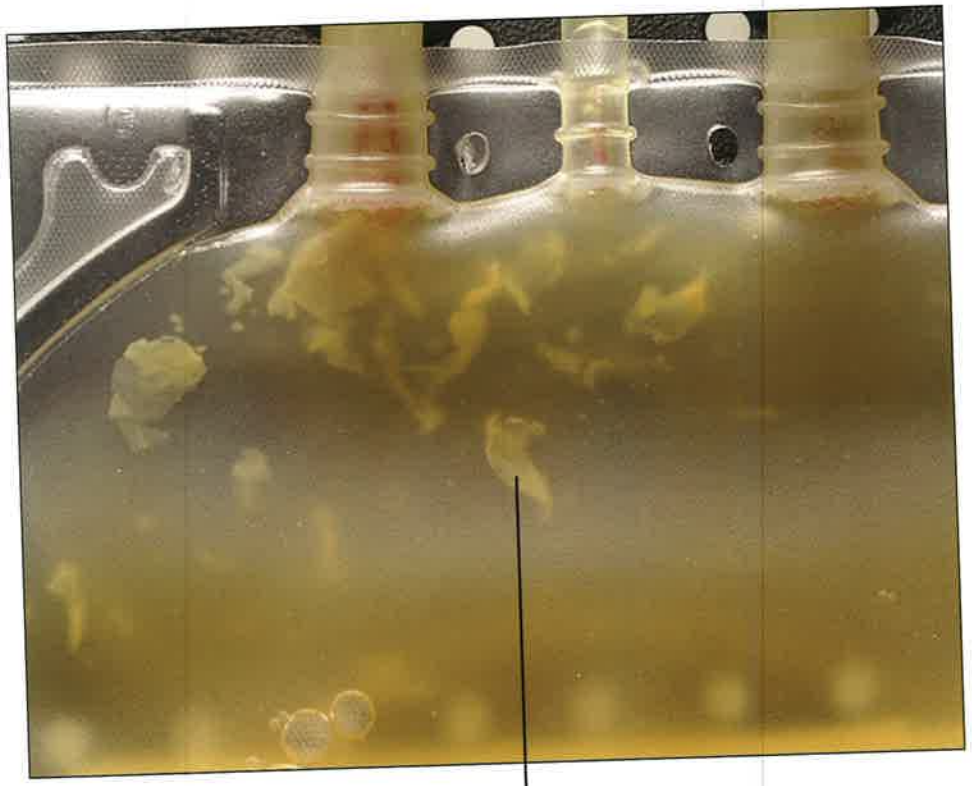
Platelets

1.0 mL RBC in Apheresis Platelet Product

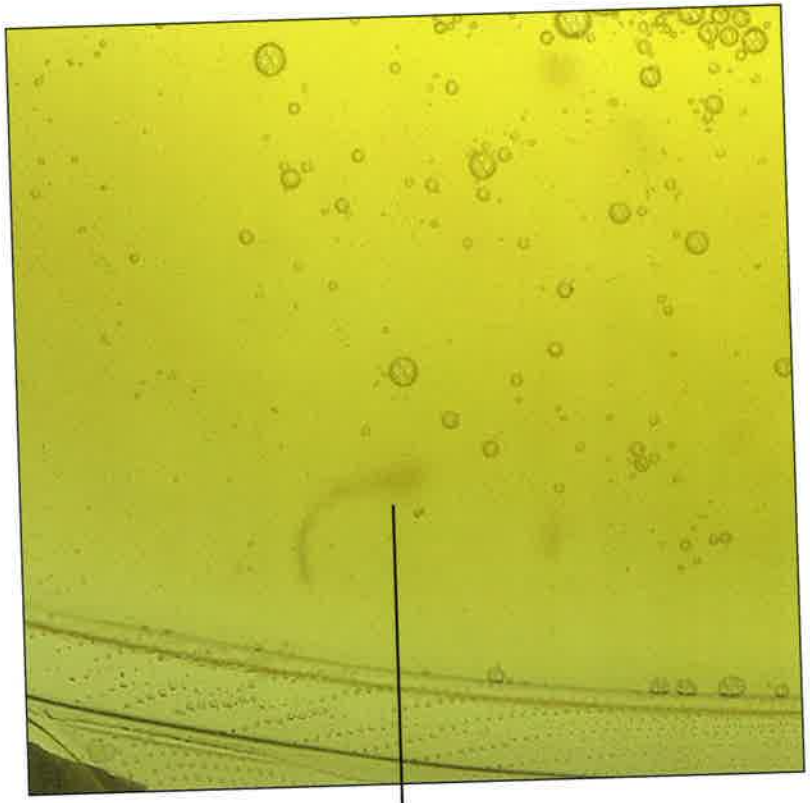
2.0 mL RBC in Apheresis Platelet Product

Blood Component Visual Inspection Guide

Platelets



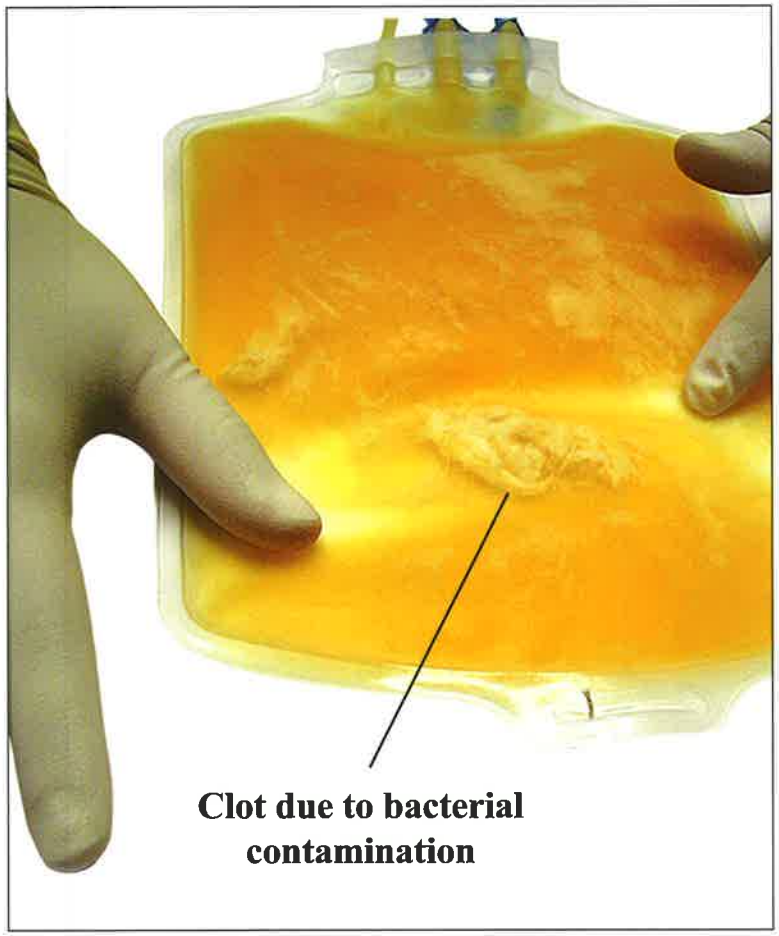
Particulate Matter (clots) – Platelets
Not Acceptable for Transfusion



Particulate Matter – Platelets

Blood Component Visual Inspection Guide

Platelets



Clot due to bacterial contamination

This photo is a bacterially contaminated apheresis platelet unit which was discovered at a blood center before product release. The product was subsequently found to be contaminated with E. coli.

The donor had no signs of infection at the time of donation and met all eligibility criteria. On follow-up questioning, the donor indicated that she was treated several weeks prior to donation for a urinary tract infection. She did not have a post treatment culture to verify that the infection was successfully cleared with antibiotics. She was tested subsequent to follow-up and did have a positive culture result.

Visual Inspection Reference Guide

Cryoprecipitate

Normal Cryoprecipitate

Blood Component Visual Inspection Guide

Quick Reference Tables

Hemolysis	
Component	**Appearance**
WB/RBC	• Dark purple – black • Less opaque • Sheen
Plasma	• Pink to red in color • Liquid state – translucent • Frozen state - opaque
Platelets	• Pink to red in color • Translucent

Lipemia	
Component	**Appearance**
WB/RBC	• A grossly lipemic WB/RBC will appear similar to a strawberry milkshake
Plasma	• Opaque (milky) appearance
Platelets	• Opaque (milky) appearance

Icterus	
Component	**Appearance**
WB/RBC (difficult to see except in separated plasma or segment)	• Bright neon yellow to brown
Plasma	• Bright neon yellow to brown
Platelets	• Bright neon yellow to brown

Clots	
Component	**Appearance**
WB/RBC (difficult to see except in separated plasma or segment)	• Dark purple to very dark burgundy masses that do not disperse easily by gently manipulation
WB/RBC segments	• Red to black stringy mass that does not disperse easily by gentile manipulation or change in temperature
Plasma (liquid state) Thawed Cryoprecipitate AHF	• A thick, whitish, opaque mass that does not disperse easily by gentile manipulation or change in temperature
Platelets	• A thick, whitish, opaque mass that does not disperse easily by gentile manipulation or change in temperature

Fibrin Strands	
Component	**Appearance**
Any component including segments	• Thin, whitish, thread-like strands that do not disperse easily by gentle manipulation or change in temperature

Aggregates	
Component	**Appearance**
RBC	• See white particulate matter
Platelets	• Visible, small, whitish masses, some of which may appear waxy and plaque-like

Blood Component Visual Inspection Guide

Quick Reference Tables

White Particulate Matter	
Component	**Appearance**
WB/RBC or segments and Platelets	Generally described as one of the following: • Crystalline material • Fatty material • Tissue • Waxy appearing globs • White specks

Flocculent Matter	
Component	**Appearance**
Plasma (liquid plasma)	• A "cloudy," "fuzzy," or "fluffy" white precipitate that may have a tissue paper-like appearance. This material disperses easily by gentile manipulation or increase in temperature.

Discoloration	
Appearance	**Possible Cause**
Pale green	• Oral contraceptives
Dark greenish brown	• Icterus
Bright or florescent green	• Drug therapy or possible bacterial contamination
Bright yellow to orange	• Vitamins
Reddish	• The presence of red blood cells or hemoglobin

Bacterial Contamination	
Component	**Appearance**
WB/RBC (difficult to see except in separated plasma or segments)	• Product appears darker than the segments • Unusual color; for example purplish in color • Unusual gas bubbles • A zone of hemolysis above the red cell mass • Plasma or supernatant is murky, purple, brown or red • Clots • Fibrin strands
Plasma	• Clots • Fibrin strands • Murky
Platelets	• Clots • Fibrin strands • Unusual color

Payment Events	Status	Timestamps

docusign

Certificate Of Completion

Envelope Id: 0258EEE0-F2A7-4520-8509-CDD111CB9724 Status: Completed

Subject: Complete with Docusign: Inventory management.pdf, BBT-F 015.07 RH.pdf, BBT-F 016.06 MH.pdf, BBT...

Source Envelope:

Document Pages: 58 Signatures: 0 Envelope Originator:

Certificate Pages: 1 Initials: 0 Jayanna Slayten

AutoNav: Enabled 950 N Meridian St

EnvelopeId Stamping: Disabled Indianapolis, IN 46204

Time Zone: (UTC-05:00) Eastern Time (US & Canada) jslayten@iuhealth.org

IP Address: 162.1.161.248

Record Tracking

Status: Original Holder: Jayanna Slayten Location: DocuSign

2/6/2025 3:40:45 PM jslayten@iuhealth.org

Signer Events	Signature	Timestamp

In Person Signer Events	Signature	Timestamp

Editor Delivery Events	Status	Timestamp

Agent Delivery Events	Status	Timestamp

Intermediary Delivery Events	Status	Timestamp

Certified Delivery Events	Status	Timestamp
Jayanna Slayten jslayten@iuhealth.org Coordinator-Quality Reporting IU Health Security Level: Email, Account Authentication (None)	VIEWED Using IP Address: 162.1.160.12	Sent: 2/6/2025 3:56:27 PM Viewed: 2/6/2025 3:56:33 PM

Electronic Record and Signature Disclosure:
Not Offered via DocuSign

Carbon Copy Events	Status	Timestamp

Witness Events	Signature	Timestamp

Notary Events	Signature	Timestamp

Envelope Summary Events	Status	Timestamps
Envelope Sent	Hashed/Encrypted	2/6/2025 3:56:27 PM
Certified Delivered	Security Checked	2/6/2025 3:56:33 PM
Completed	Security Checked	2/6/2025 3:56:34 PM

Payment Events	Status	Timestamps