

# Blood Bank II

---

D. Joe Chaffin, MD  
Summit Pathology, Loveland, CO

## Blood Donation & Pretransfusion Testing

### I. Blood Donation

#### A. Allogeneic (homologous) whole blood donation

1. Process tightly regulated by FDA and AABB
2. Donor screening by history
  - a. Most facilities use FDA-approved template from AABB called “uniform donor history questionnaire” (UDHQ); printed at end of this handout
  - b. Necessary information
    - 1) Full name (generally, formal ID required)
    - 2) Home and/or work address
    - 3) Date of birth/age
      - a) Minimum age 17 unless in a state where donations approved at age 16.
    - 4) Reasons for previous deferral
    - 5) Date of last donation
      - a)  $\geq 8$  weeks for whole blood
      - b)  $\geq 16$  weeks for double red cell collections
      - c)  $\geq 4$  weeks for infrequent plasmapheresis
      - d)  $\geq 2$  days for platelet apheresis procedures
  - c. Not required, but often asked
    - 1) Race
    - 2) Social security number
      - a) Identity theft concerns
      - b) Alternative ID numbers (unique to donor)
  - d. HIV information
    - 1) Information on signs/symptoms and risk factors for HIV
    - 2) Donor told not to donate if they have any risk factors
    - 3) Notification of alternate ways to get an HIV test if needed
  - e. Donor is formally notified of risks of the procedure
  - f. Donor questions
    - 1) Version 1.1 of UDHQ (current version approved by FDA) has 48 questions
      - a) AABB has published versions 1.2 and 1.3, but only 1.1 is currently approved (as of 3/2009)
    - 2) Donor centers may add additional questions, but only at end of questionnaire
      - a) Additional questions may only make rules more restrictive; never less restrictive

- b) Commonly added questions are about medications or health issues not covered in UDHQ
- g. Deferrals based on history
  - 1) **Permanent deferrals**

<p style="text-align: center;"><b><u>Infectious Risks</u></b></p> <ul style="list-style-type: none"><li>-High-risk behavior for AIDS (including IVDA, male-male sex, exposure)</li><li>-Receiving money or drugs for sex</li><li>-Serologic positive for HIV, HBV, HCV, HTLV</li><li>-Viral hepatitis after 11<sup>th</sup> birthday</li><li>-Transfusion of clotting factor concentrates (in hemophilia)</li><li>-History of Babesiosis or Chagas' disease</li><li>-Growth hormone from human sources (pre-1985)</li><li>-Insulin from bovine sources</li><li>-Dura mater graft</li></ul> <p style="text-align: center;"><b><u>Malignancies (see below)</u></b></p> <ul style="list-style-type: none"><li>-Leukemia or lymphoma</li></ul> <p style="text-align: center;"><b><u>Teratogens</u></b></p> <ul style="list-style-type: none"><li>-Tegison<sup>®</sup></li></ul>
---

2) **Three year deferrals**

<p style="text-align: center;"><b><u>Infectious Risks</u></b></p> <ul style="list-style-type: none"><li>-Recovered from malaria</li><li>-Immigrants from malaria-endemic areas (<i>after 5 consecutive years of living there</i>)</li></ul> <p style="text-align: center;"><b><u>Teratogens</u></b></p> <ul style="list-style-type: none"><li>-Soriatane<sup>®</sup></li></ul>
--

3) **One year deferrals**

<p style="text-align: center;"><b><u>Infectious Risks</u></b></p> <ul style="list-style-type: none"><li>-Needle sticks or other contact with blood</li><li>-Sex contact with person with HIV or hepatitis</li><li>-Sex contact with person who used needles for drugs</li><li>-Rape victims</li><li>-Incarcerated &gt; 72 consecutive hours</li><li>-Paying money/drugs for sex</li><li>-Blood transfusion (Allogeneic); <i>including plasma/clotting factors in nonhemophiliacs</i></li><li>-Allogeneic transplant of organ/skin/bone</li><li>-Living with person with active hepatitis</li><li>-Receiving HBIG</li><li>-Tattoos/piercings (unless by regulated entity)</li><li>-Travel to malaria-endemic areas</li><li>-Syphilis or gonorrhea</li><li>-Non-prophylactic rabies vaccination</li><li>-“Travel” to Iraq</li></ul>
---

- 4) Special situations
  - a) Malignancy deferrals

- i) At discretion of medical director (FDA/AABB do not mandate)
  - ii) Studies do not show that malignancy can be transmitted via transfusion
  - iii) Most defer hematologic malignancies (leukemia/lymphoma) permanently, but some accept cured childhood leukemias
  - iv) For solid malignancies, many defer “indefinitely” and consider re-entry after 1-5 years disease-free
  - v) BCC and localized skin SCC do not require deferral.
- b) Heart and lung disease
- i) No specific mandated deferrals
  - ii) FDA says: Donor should be free of acute lung disease
  - ii) AABB says: Donor should be free of heart/lung disease unless determined suitable by medical director
  - iii) Individual medical directors determine what is acceptable, most often based on time since diagnosis, presence of limitations on activities, and proper medical follow-up
- c) Defer pregnant women through 6 weeks postpartum.
- d) Defer people having non-routine dental work for 72 hours.
- e) Questions 46 and 47 ask about being in Africa or being exposed to someone who was there.
- i) This is primarily to prevent transmission of HIV group O (exceptionally rare in the US- no reported cases since 1996).
  - ii) Being born in, living in, or having sexual contact with someone born or living in these countries in central and western Africa since 1977 is a permanent deferral: Cameroon, Benin, Central African Republic, Chad, Congo, Equatorial Guinea, Kenya, Gabon, Niger, Nigeria, Senegal, Togo, or Zambia.
  - iii) If traveled to these countries since 1977 and got a blood transfusion: Permanent deferral
  - iv) HOWEVER, if an FDA-approved anti-HIV screening test that is sensitive for HIV group O is used, these questions may be omitted.
  - v) Note that the current AABB UDHQ (1.1) does not include all of these countries (updated with FDA Guidance 8/09).

**Pathology Review Course**

- 5) Defer permanently for vCJD risk all donors who:
  - a) Spent more than 3 months cumulative in the UK, 1980 to 1996
  - b) Lived in France for over 5 years, 1980 to now
  - c) Received dura mater transplant, pituitary growth hormone injections, or bovine insulin injection
  - d) Were transfused in the UK, 1980 to now
  - e) Lived in Europe for over 5 years cumulative between 1980 and now
  - f) Have family history of CJD or vCJD
  - g) Were military members/dependents:
    - i) Stationed at Northern Europe bases (Germany, UK, Belgium, Netherlands) for 6 months from 1980 to 1990
    - ii) Stationed at other Europe bases (Greece, Turkey, Spain, Portugal, Italy) for 6 months from 1980 to 1996
- 6) Immunizations
  - a) General rule: no deferral for killed, toxoid, or recombinant/synthetic vaccines
  - b) Live attenuated vaccines (either viral or bacterial) give deferrals of varying lengths (see below).

<b>Immunization Deferrals</b>	
<b>Four Weeks:</b>	Rubella Varicella
<b>Two Weeks:</b>	Measles Mumps Oral polio Yellow fever Oral typhoid
<b>No Deferral:</b>	Anthrax Cholera DPT Hepatitis A Hepatitis B Influenza Lyme disease <i>Pneumococcus</i> Polio (injection) RMSF Typhoid (injection)
<b>12 Months:</b>	Unlicensed vaccines

- c) Smallpox vaccination
  - i) Set of deferrals depending on presence/absence of vaccine scab and post-vaccination symptoms

- ii) Without complications: defer until scab falls off or 21 days, whichever is longer
- iii) With complications: defer until 14 days after symptoms resolve

7) Drugs

- a) UDHQ only requires questioning about a limited number of medications
  - i) Some facilities add more questions to protect donor
- b) UDHQ V 1.1 drug deferrals for teratogenicity:
  - i) Etretnate (Tegison©): Permanent deferral
  - ii) Acitretin (Soriatane©): Three year deferral
  - iii) Isotretinoin (Accutaine©): 30 day deferral
  - iv) Finasteride (Proscar©, Propecia©): 30 day deferral
  - v) Dutasteride (Avodart): 6 month deferral
- c) UDHQ V 1.1 drug deferrals for infection risk:
  - i) Growth hormone (human pituitary source): Permanent deferral
  - ii) Bovine insulin: permanent deferral
  - iii) HBIG: 1 year deferral
  - iv) Unlicensed vaccine: 1 year deferral
- d) Aspirin/aspirin like meds for platelets (48 hours)
- e) Other common drug deferrals:
  - i) Feldene: 48 hours for platelet donors
  - ii) Clopidogrel (Plavix) and ticlopidine (Ticlid): 2 weeks for platelet donors

3. Donor screening by physical criteria

- a. General appearance
- b. Arm check
  - 1) Check *both* arms for evidence of IV drug use and for venous access
- c. Physical requirements

<b>Weight:</b>	≥ 110 lbs (50 Kg)
<b>Temperature:</b>	≤ 99.5° F (37.5 C)
<b>Pulse:</b>	50-100 bpm (unless athlete)
<b>Blood pressure:</b>	≤ 180/100
<b>Hemoglobin or Hematocrit:</b>	≥ 12.5 g/dl or 38%

4. Donation specifics

- a. Amount drawn
  - 1) 450 +/- 45 ml still most common
    - a) 500 mL bag also being used; limit is 500 +/- 50
  - 2) Maximum of 10.5 ml/Kg is allowed (to allow for double red cell collection via apheresis.)
- b. Time limit
  - 1) Within 15 minutes is best, but no upper limit in *Standards* or CFR.

## *Pathology Review Course*

5. Testing donor blood
  - a. ABO grouping
  - b. Rh typing
    - 1) Weak D required if D negative (see BB 1)
  - c. Antibody screen
    - 1) Check for unexpected antibodies in donor serum.
    - 2) May use pooled serum from several donors rather than testing each donor individually.
    - 3) *AABB Standards*: if positive, may still use red cells, but only to make products with minimal plasma (ie, can't use FFP, cryo, or platelets).
    - 4) Label must reflect any positive results that are identified as clinically significant antibodies.
  - d. Infectious disease screening (as of 3/2010); see appendix on pg. 14 and further details in Blood Bank IV.
    - 1) HbsAg
    - 2) Anti-HBc
    - 3) Anti-HCV
    - 4) HCV nucleic acid testing (HCV NAT)
      - a) HCV window period decreased from ~ 70 days with anti-HCV alone to between 10 and 30 days with HCV NAT
    - 5) Anti-HIV-1/2
    - 6) HIV-1 NAT
      - a) HIV window period decreased from 16 days with combination of anti-HIV and p24 to about 10 days with HIV NAT.
    - 7) Anti-HTLV-I/II
    - 8) Serologic test for syphilis
    - 9) West Nile virus
    - 10) *Trypanosoma cruzi* (Chagas' disease); approved by FDA; most centers using though not required yet.

### **B. Donor reactions**

1. Vasovagal reactions
  - a. Most common reaction (2-5% of healthy donors)
  - b. Signs/symptoms
    - 1) **Bradycardia**
    - 2) Hypotension
    - 3) Syncope
    - 4) Nausea/vomiting
    - 5) Incontinence
  - c. Treatment is supportive
    - 1) Distinguish from hypotensive shock
    - 2) Elevate feet, cold compresses on neck
2. Hypotensive shock
  - a. Extremely uncommon
  - b. Signs/symptoms
    - 1) **Tachycardia**

- 2) Hypotension
- 3) Loss of consciousness
- 4) Shock parameters
- c. Treatment
  - 1) IV fluids
3. Hyperventilation
  - a. Especially common in first-time donors and children
  - b. Signs/symptoms
    - 1) Shortness of breath
    - 2) Facial twitching
    - 3) Seizure activity (unusual)
  - c. Treat with rebreathing (the paper bag thing)
4. Local injuries
  - a. Hematomas: Less than 1% (bruises almost 25%)
  - b. Nerve injury: less common than bruises (less than 1%); usually resolve on their own

### **C. Apheresis procedures**

1. Separation of blood into components using several technologies
  - a. Centrifugation
    - 1) Most common method
    - 2) Separation based on varying density of blood components
    - 3) Blood drawn into a spinning bowl or chamber, separated, desired component harvested (all else returned).
  - b. Adsorption
    - 1) Blood passed over/through a column of material that attracts desired substance.
    - 2) Staphylococcal protein A (SPA) and monoclonal antibodies are examples.
    - 3) Used for ITP and removal of LDLs in hypercholesterolemia; has been tried in TTP
  - c. Membrane filtration
    - 1) Used to separate plasma from cellular components (not to separate cellular components themselves)
    - 2) Can use to remove abnormal plasma components
2. Targets
  - a. Platelets
    - 1) Volunteer donation
    - 2) Essential thrombocythemia
  - b. Plasma
    - 1) Volunteer donation
    - 2) TTP/HUS
    - 3) Waldenstrom's macroglobulinemia/myeloma
    - 4) Myasthenia gravis or Guillain-Barre
    - 5) Goodpasture's syndrome
    - 6) Familial hypercholesterolemia

## *Pathology Review Course*

- c. White blood cells
  - 1) Donation
  - 2) Therapeutic in blast crisis
- d. Red blood cells
  - 1) Volunteer donation
  - 2) Sickle cell disease complications
3. Advanced technologies available
  - a. Equipment licensed to collect more than one product at the same time:
    - One RBC unit and one platelet unit
    - One RBC unit and one plasma unit
    - One RBC unit, one platelet unit, and one plasma unit
    - Two RBC units
4. Donor requirements
  - a. Platelet donors
    - 1) Same hemoglobin/hematocrit requirements as regular donors
    - 2) Donation interval at least 2 days
      - a) No more than 2 procedures per week
      - b) No more than 24 procedures per year
      - c) At least 8 weeks after whole blood donation or if procedure results in loss of greater than 100 mL blood
      - d) MD may waive above if for a particular patient need (requires written certification).
    - 3) No aspirin/aspirin-effect products in last 48 hrs
    - 4) Platelet count  $\geq 150,000/\mu\text{L}$  if less than 4 weeks from previous donation
    - 5) Plasma volume loss less than 500 mL (600 mL if donor weight is greater than 175 lbs)
  - b. Plasma donors
    - 1) “Occasional” (donating less often than every 4 weeks): same as whole blood
    - 2) “Serial” (donating more often than every 4 weeks):
      - a) Total protein and SPEP check every 4 months
      - b) Donation interval at least 2 days; no more than 2 collections per 7 days
      - c) Red cell loss less than 25 mL/week
  - c. Double red cell donors
    - 1) FDA Guidance 2/13/2001: no specific hemoglobin or height/weight guidelines, just “assure donor safety”
    - 2) Double red cell donors are deferred for 16 weeks
5. Apheresis donor reactions
  - a. “Citrate effect”
    - 1) Citrate anticoagulant binds free calcium
    - 2) Perioral tingling
    - 3) Tetany and arrhythmias uncommon

- 4) Slow rate of infusion, give oral calcium
- b. Hypersensitivity reactions
  - 1) Classic: Hydroxyethyl starch in WBC donors
    - a) Given to facilitate better separation of WBCs from RBCs by inducing RBC aggregation
    - b) Occasional hypersensitivity reactions seen

## II. Autologous Blood Collection

### A. Preoperative autologous blood donation (PAD)

- 1. Less screening stringency than allogeneic collections
- 2. *AABB Standards*: Don't cross over units into regular inventory unless exceptional circumstances.
- 3. More lenient physical criteria (see table below)

Parameter	Allogeneic	Autologous
Donation Interval	8 weeks	72 hours
HB/HCT	≥ 12.5 or 38%	≥ 11 or 33%
Weight	≥ 110 lbs (50 Kg)	None
Age	≥ 16 or 17 (varies)	None
Infectious Disease Screening	Required	Not required unless shipped
History of Disease or Positive Test	Not eligible	Potentially eligible

- 4. Testing regulations
  - a. Infectious disease screening not required unless units are to be shipped to another facility
    - 1) If not tested, units must be labeled "NOT TESTED"
  - b. Only first donation in a 30-day period **MUST** be tested.
    - 1) All others after that are labeled "DONOR TESTED WITHIN THE LAST 30 DAYS"
- 5. Potential issues with autologous donations
  - a. Donor reactions
    - 1) In general, more complex donors with more health problems, so more likelihood of donor complications.
    - 2) Safety of donor during donation is responsibility of **donor center medical director!**
  - b. Clerical errors/transfusion errors
    - 1) Risk of wrong unit going to wrong patient still present with autologous donations.
    - 2) CAP survey (1992): about 1% of hospitals admitted making transfusion errors with autologous blood.
    - 3) Systems must be in place to prevent allogeneic units from being transfused before autologous units.

- c. Bacterial contamination
  - 1) Currently a greater risk than HIV or HCV
  - 2) Risk of undetected infection leading to contamination of unit is not changed by PAD.
- d. Cost
  - 1) More costly to patients if transfused and hospitals if not transfused (wastage).
- e. Timing
  - 1) Collections should be completed at least 72 hours before surgery (preferably sooner).
  - 2) Surgery cancellations, etc, can lead to problems (freeze units? Let them expire?)
- f. Positive infectious disease testing
  - 1) If donor has a reactive test, both he and the requesting physician must be notified.
  - 2) *Autologous* collections with reactive testing can lead to deferral from future *allogeneic* donations.

**B. Normovolemic (“isovolemic”) hemodilution**

- 1. Primary goal: reduce RBC volume during surgery.
- 2. Removal of up to one liter of blood immediately before surgery
  - a. Collection is done into multiple standard blood bags and each bag should be monitored for overfill.
  - b. Standard formulae exist for collection amount; typically take patients down to HCT 28% or so.
  - c. Shelf life:
    - 1) **8 hours** at room temperature
    - 2) **24 hours** in monitored refrigerator
- 3. Volume replacement with saline or other crystalloid (3 ml per 1 ml of blood removed) or colloid (1 ml per ml of blood removed)
  - a. Replace the volume unit by unit; ie, when a unit is withdrawn, immediately give the appropriate volume (don't remove a bunch of blood and THEN correct the volume).
- 4. Re-infuse blood near end of surgery.
  - a. Units usually re-infused in reverse order to how drawn (i.e., last drawn is first re-infused).
- 5. Indications (per AABB Technical Manual)
  - a. Greater than 10% likelihood of transfusion
  - b. Hemoglobin at least 12 g/dL
  - c. No serious medical disease
  - d. No infection or bacteremia
- 6. Potential advantages
  - a. Better monitoring than in PAD; some use for higher risk patients.
  - b. Bleeding more dilute blood leads to less overall blood loss (maybe).

- c. Decreased blood viscosity increases cardiac output and may improve oxygenation.
  - d. Coag factors and platelets survive well for short periods and help hemostasis.
  - e. May be used in future with blood supplements (“substitutes”): “augmented hemodilution”
7. Potential disadvantages
- a. Requires training of phlebotomist (most commonly done by anesthesiologist)
  - b. Units should be labeled with full name, date/time, medical record number, and “FOR AUTOLOGOUS USE ONLY.”

### **C. Intraoperative blood salvage**

1. Semi automated process (most often using cell washing equipment); usually involves processing and concentrating shed blood
2. Shelf life:
  - a. **4 hours** at room temperature
  - b. **24 hours** in monitored refrigerator
3. Potential problems
  - a. Air embolus risk
  - b. Hemolysis of processed blood from excessive suction in the operative field
  - c. Coagulation factor activation
4. Historical contraindications
  - a. Bacterial contamination of field
  - b. Malignant cells in field

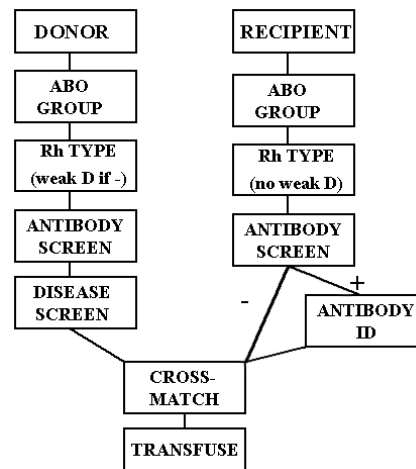
### **D. Postoperative blood salvage**

1. Blood reinfused from operative drains with or without processing (that is just nasty!)
  - a. Microaggregate filters used during re-infusion
2. Shelf life: **6 hours** at room temperature

## **III. Pretransfusion Testing**

### **A. Basic outline**

1. Two-armed process, each side designed for maximum safety.
2. Crossmatch is final check of both arms.
  - a. Purpose of crossmatch: ABO compatibility!



## B. Testing recipient blood

1. Request forms
  - a. Identification critical
    - 1) Number one cause of fatal HTR's: clerical error!
  - b. No identification labeling errors are acceptable.
    - 1) *Transfusion* 1997 37; 1169-72: Mislabeled specimens 40X more likely to have a blood grouping discrepancy!
  - c. Should tell what's needed and when needed
2. Specimen
  - a. Serum or plasma (red top vs lavender top)
    - 1) Either acceptable, but non-tube technologies prefer plasma.
  - b. Required **q 3 days** with transfusion or pregnancy in the last three months
  - c. Retained **7 days after transfusion** in the blood bank.
3. Type and hold (T&H)
  - a. ABO/Rh check only
  - b. "Hold" means to hold *sample*, not units.
  - c. Uncommonly used or even offered now
4. **Type and screen (T&S)**
  - a. Includes:
    - 1) Records check
      - a) Previous antibodies or compatibility problems
      - b) Not to be used to *determine* current ABO/Rh, but should be *compared* to current results.
    - 2) ABO testing
      - a) Forward and reverse grouping
      - b) Resolve any discrepancies
    - 3) Rh typing
      - a) No weak D test required if D negative.
        - Common exception: obstetric patients
    - 4) Antibody screen
      - a) "Unexpected" (non-ABO) antibody check
      - b) Panel of two, three, or four donors with known red cell phenotypes

- i) Always group O
  - ii) Most common combination:
    - Cell I: R<sup>1</sup>R<sup>1</sup>
    - Cell II: R<sup>2</sup>R<sup>2</sup>
    - Cell III: rr
  - c) Clinically significant antigens represented
  - d) IAT is required, IS/37 C are not required.
  - e) If positive, move on to antibody ID
5. **Type and cross (T&C)**
- a. Everything in T&S + crossmatch
  - b. Crossmatch types
    - 1) **Major crossmatch** (or just “crossmatch”)
      - a) Recipient serum vs donor RBCs
      - b) Final check of ABO compatibility
      - c) IAT/AHG phase (“full crossmatch”) not required if antibody screen is negative
      - d) **Required if ≥ 2 ml of RBCs in product.**
    - 2) **Minor crossmatch**
      - a) Donor serum vs. recipient RBCs
      - b) Not required
    - 3) Units go back into inventory if not used.
6. Converting a T&S to a T&C
- a. Only an ABO check is required (if antibody screen is negative)
    - 1) Immediate spin crossmatch
    - 2) Computer crossmatch (see below)
7. Variations to the above
- a. Infants less than four months of age
    - 1) At this age, baby’s antibodies are considered the same as mom’s antibodies.
    - 2) Infant’s ABO/Rh checked initially, and antibody screen may be done on either mom’s or baby’s blood.
    - 3) Serum grouping (reverse grouping) not required unless baby receives non-group O blood
    - 4) If antibody screen negative, no crossmatches required
  - b. Electronic (computer) crossmatch
    - 1) Uses computer system to verify lack of ABO incompatibility between donor and recipient (rather than doing immediate spin crossmatch)
    - 2) Requires a patient with a negative antibody screen currently and in the past
    - 3) Requires two separate ABO determinations of the patient (either on different specimens or repeated on the same specimen)
    - 4) Requires a properly validated computer system
8. Reasons for positive major crossmatch
- a. With positive antibody screen

## *Pathology Review Course*

- 1) Alloantibodies
- 2) Autoantibodies
- 3) Reagent antibodies
- 4) Rouleaux and other false positives
- b. With negative antibody screen
  - 1) ABO incompatibility
  - 2) Antibodies vs low-incidence antigens
  - 3) Positive donor DAT
9. Routine blood order templates
  - a. **Maximum Surgical Blood Ordering Schedule (MSBOS)**, or just called “routine surgical blood orders”
  - b. Multidisciplinary and institution-specific
  - c. Gives surgeons and blood bankers an idea of how many RBC units to crossmatch for a given procedure

**APPENDIX**  
**Blood Donor Infectious Disease Screening Tests**

<b>Infectious Agent</b>	<b>Screening Test(s)</b>	<b>Confirmatory Test(s) (most common)</b>	<b>Discussion</b>
HIV	<ul style="list-style-type: none"> <li>• Anti-HIV 1/2 (EIA)</li> <li>• HIV-1 NAT (PCR)</li> </ul>	<ul style="list-style-type: none"> <li>• Western blot (WB) or IFA for HIV-1</li> <li>• HIV-2 EIA</li> <li>• Individual donor NAT (if not done)</li> </ul>	<ul style="list-style-type: none"> <li>• Reactive NAT = permanent deferral</li> <li>• Reactive EIA + positive WB = permanent deferral</li> <li>• Reactive EIA + negative or indeterminate WB = “permanent deferral” but possibility for re-entry after 6 months</li> </ul>
HCV	<ul style="list-style-type: none"> <li>• Anti-HCV (EIA)</li> <li>• HCV NAT (PCR)</li> </ul>	<ul style="list-style-type: none"> <li>• RIBA</li> <li>• Individual donor NAT (if not done)</li> </ul>	<ul style="list-style-type: none"> <li>• Reactive NAT = Permanent deferral</li> <li>• Reactive EIA + positive or indeterminate RIBA = permanent deferral</li> <li>• Reactive EIA + negative RIBA = “permanent deferral” but possibility for re-entry after 6 months</li> </ul>
HBV	<ul style="list-style-type: none"> <li>• HBsAg (EIA)</li> <li>• Anti-HBc (EIA)</li> </ul>	<ul style="list-style-type: none"> <li>• Neutralization</li> <li>• None for anti-HBc</li> </ul>	<ul style="list-style-type: none"> <li>• Reactive HBsAg + confirmed neutralization = permanent deferral</li> <li>• Reactive HBsAg + nonconfirmed neutralization = retest in <math>\geq 8</math> weeks</li> <li>• Reactive HBsAg + nonconfirmed neutralization + reactive anti-HBc = permanent deferral</li> <li>• Reactive anti-HBc x 1 = no deferral</li> <li>• Reactive anti-HBc x 2 = permanent deferral</li> </ul>
HTLV-I/II	<ul style="list-style-type: none"> <li>• Anti-HTLV-I/II (EIA)</li> </ul>	<ul style="list-style-type: none"> <li>• None licensed</li> </ul>	<ul style="list-style-type: none"> <li>• Reactive anti-HTLV-I/II x 1 = no deferral</li> <li>• Reactive anti-HTLV-I/II x 2 = permanent deferral</li> </ul>
Syphilis ( <i>T. pallidum</i> )	<ul style="list-style-type: none"> <li>• Many (EIA, RPR, FTA-Abs)</li> </ul>	<ul style="list-style-type: none"> <li>• Usually FTA</li> </ul>	<ul style="list-style-type: none"> <li>• Reactive screen + negative confirm = no definite deferral (though many will defer)</li> <li>• Reactive screen + reactive confirm = at least 1 year deferral (after treatment)</li> </ul>
West Nile Virus	<ul style="list-style-type: none"> <li>• WNV NAT (PCR)</li> </ul>	<ul style="list-style-type: none"> <li>• Individual donor NAT (if not done)</li> </ul>	<ul style="list-style-type: none"> <li>• Reactive NAT = 120 day deferral (if asymptomatic)</li> </ul>
Chagas Disease ( <i>T. cruzi</i> )	<ul style="list-style-type: none"> <li>• <i>T. cruzi</i> EIA</li> </ul>	<ul style="list-style-type: none"> <li>• None licensed (many use RIPA)</li> </ul>	<ul style="list-style-type: none"> <li>• Reactive EIA = permanent deferral</li> <li>• RIPA only for counseling</li> <li>• No re-entry currently</li> </ul>

EIA: Enzyme immunoassay (may also use chemiluminescence assay)

PCR: Polymerase chain reaction

IFA: Immunofluorescence assay

RIBA: Recombinant immunoblot assay

FTA: Fluorescent treponemal antibody

Sources: *AABB Technical Manual, 16<sup>th</sup> ed*, [www.fda.gov](http://www.fda.gov)

APPENDIX

AABB Uniform Donor History Questionnaire (V 1.1, AABB 2005)

Question	Comment
Are you:	
1. Feeling healthy and well today?	
2. Currently taking an antibiotic?	<i>Medical director discretion</i>
3. Currently taking any other medication for an infection?	<i>Same</i>
Please read the Medication Deferral List	
4. Are you now taking or have you ever taken any medications on the Medication Deferral List?	<i>See deferrals listed previously in notes</i>
5. Have you read the educational materials?	<i>Includes HIV risk info</i>
In the past <b>48 hours</b>	
6. Have you taken aspirin or anything that has aspirin in it?	<i>48 hour deferral as sole source of platelets per FDA</i>
In the past <b>6 weeks</b>	
7. Female donors: Have you been pregnant or are you pregnant now? (Males: check "I am male.")	<i>This question (as well as #24 and #34) also serves as a "check" to make sure donors are paying attention</i>
In the past <b>8 weeks</b> have you	
8. Donated blood, platelets or plasma?	<i>See details in notes</i>
9. Had any vaccinations or other shots?	<i>See notes</i>
10. Had contact with someone who had a smallpox vaccination?	<i>No deferral unless symptomatic. If so, defer at least 14 days.</i>
In the past <b>16 weeks</b>	
11. Have you donated a double unit of red cells using an apheresis machine?	<i>16 week donation interval</i>
In the past <b>12 months</b> have you	
12. Had a blood transfusion?	<i>1-year deferral</i>
13. Had a transplant such as organ, tissue, or bone marrow?	<i>1-year deferral</i>
14. Had a graft such as bone or skin?	<i>1-year deferral (unless dura mater, then permanent)</i>
15. Come into contact with someone else's blood?	<i>1-year deferral</i>
16. Had an accidental needle-stick?	<i>1-year deferral</i>
17. Had sexual contact with anyone who has HIV/AIDS or has had a positive test for the HIV/AIDS virus?	<i>17-23 are all 1-year deferrals <u>from the time of last contact</u></i>
18. Had sexual contact with a prostitute or anyone else who takes money or drugs or other payment for sex?	
19. Had sexual contact with anyone who has ever used needles to take drugs or steroids, or anything <u>not</u> prescribed by their doctor?	
20. Had sexual contact with anyone who has hemophilia or has used clotting factor concentrates?	

21. Female donors: Had sexual contact with a male who has ever had sexual contact with another male? (Males: check "I am male.")	
22. Had sexual contact with a person who has hepatitis?	
23. Lived with a person who has hepatitis?	
24. Had a tattoo?	<i>For 24-25, these can be allowed if certified that procedure was done by state-certified entity using sterile, one-time use needles</i>
25. Had ear or body piercing?	
26. Had or been treated for syphilis or gonorrhea?	<i>1 year following treatment completion (or from time of positive test if no symptoms)</i>
27. Been in juvenile detention, lockup, jail, or prison for more than 72 hours?	<i>72 hours is <u>consecutive</u></i>
<b>In the past three years</b> have you	
28. Been outside the United States or Canada?	<i>Primarily for malaria exposure</i>
<b>From 1980 through 1996,</b>	
29. Did you spend time that adds up to three (3) months or more in the United Kingdom? (Review list of countries in the UK)	<i>For 29-32, see vCJD discussion in notes above; permanent deferral</i>
30. Were you a member of the U.S. military, a civilian military employee, or a dependent of a member of the U.S. military?	
<b>From 1980 to the present,</b> did you	
31. Spend time that adds up to five (5) years or more in Europe? (Review list of countries in Europe.)	
32. Receive a blood transfusion in the United Kingdom ? (Review list of countries in the UK.)	
<b>From 1977 to the present,</b> have you	
33. Received money, drugs, or other payment for sex?	<i>Permanent deferral</i>
34. Male donors: had sexual contact with another male, even once? (Females: check "I am female.")	<i>Currently controversial, but permanent deferral</i>
<b>Have you EVER</b>	
35. Had a positive test for the HIV/AIDS virus?	<i>May require investigation to determine if test was truly positive. If so, permanent deferral</i>
36. Used needles to take drugs, steroids, or anything <u>not</u> prescribed by your doctor?	<i>Permanent deferral. Includes obvious physical stigmata of IVDA (needle tracks)</i>
37. Used clotting factor concentrates?	<i>Permanent if for hemophilia, otherwise 1 year deferral</i>

38. Had hepatitis?	<i>Permanent deferral after 11<sup>th</sup> birthday</i>
39. Had malaria?	<i>3 year deferral</i>
40. Had Chagas' disease?	<i>Permanent deferral</i>
41. Had babesiosis?	<i>Permanent deferral</i>
42. Received a dura mater (or brain covering) graft?	<i>Permanent deferral for vCJD possibility</i>
43. Had any type of cancer, including leukemia?	<i>Medical director discretion (see discussion in notes)</i>
44. Had any problems with your heart or lungs?	<i>Medical director discretion (see discussion in notes)</i>
45. Had a bleeding condition or a blood disease?	<i>If hemophilia, permanent deferral. Otherwise, medical director discretion.</i>
46. Had sexual contact with anyone who was born in or lived in Africa?	<i>See HIV group O discussion in notes. Can be omitted if anti-HIV test used detects group O.</i>
47. Been in Africa?	<i>HIV group O discusssion</i>
48. Have any of your relatives had Creutzfeldt-Jakob disease?	<i>Permanent deferral</i>