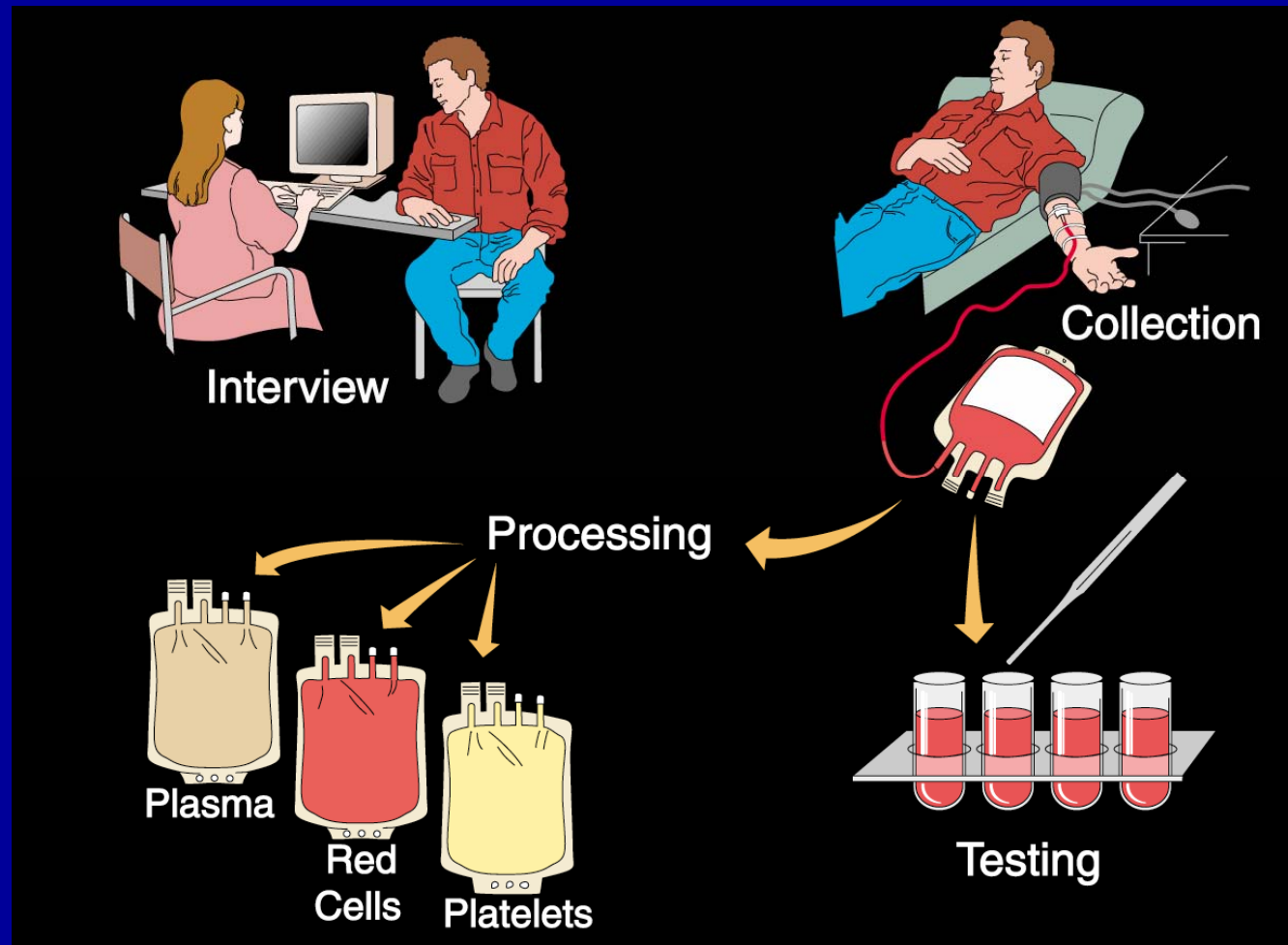


Standard Blood Bank Practices United States - 2007

S. Gerald Sandler, MD
Director, Transfusion Medicine
Professor of Medicine and Pathology
March 26, 2004

Transfusion Safety United States - 2007



Blood Donors (Healthy Volunteers) versus Transfusion Recipients (Patients)

- ◆ Blood Donors – Community Blood Center
- ◆ Patients – Hospital Transfusion Services

Blood Donations - Overview United States 2007

- 12 Million Donors Annually
- 40 Thousand Donors Daily
 - ABO/D
 - Infectious Diseases
 - Prepare Blood Components

Therefore, blood donor testing is no longer performed in most hospitals

Testing Blood Donations in the United States - 2007

- The selection of infectious disease tests is based on epidemiological evidence of risk to recipients (for example, HIV, HCV)
- Some testing is not done because the geographical risk is low (for example, malaria)
- Some testing is not done because tests have not been developed (for example, vCJD)

Tests For Infectious Diseases United States - 2007

- Syphilis serology
- HBsAg
- Anti-HIV-1 and -2
- Anti-HBc
- Anti-HTLV-I/II
- Anti-HCV
- HIV NAT
- HCV NAT
- Anti-CMV (Selected)
- Bacteria (Platelets)
- WNV NAT

Not Tested

United States - 2007

- vCJD (Spongiform encephalitis)
- Chagas Disease (*Trypanosoma cruzi*)
- Lyme Disease (*Borrelia burgdorferi*)
- *Babesia* species
- Bacteria (RBCs)
- Malaria

Bacterial Contamination (Platelets) United States - 2007

- Incidence approximately 1:1000/units
- Most, but not all contaminants are from venipuncture sites
- Effective March 1, 2004, all apheresis platelets are being cultured

Human Immunodeficiency Virus Types 1/2 United States - 2007

- Risk = 1:2,135,000/unit (27 million units = 13 cases/year)
- Donor tests: EIA, Nucleic Acid Testing (NAT) for HIV RNA
- Current risk due to (new) window period infections

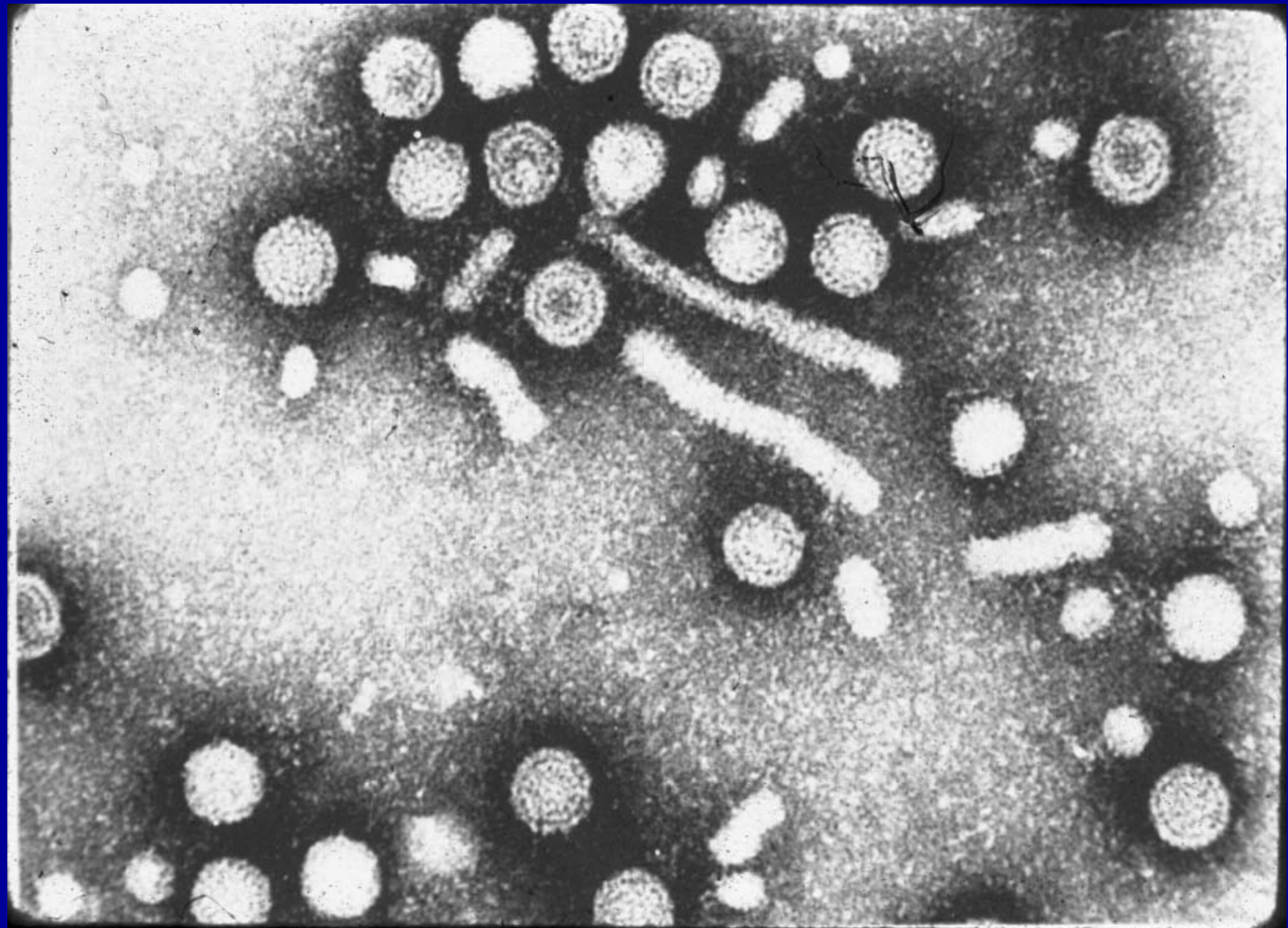
HIV WINDOW PERIOD EFFECT OF TEST METHOD



Hepatitis B Virus

United States - 2007

- Most frequent TTV in US
- Donor tests: HBsAg, anti-HBc
- Current risk due to (old) low-level viremia (< PCR) in migrants from endemic areas



Human T-Lymphotropic Virus Type I

United States - 2007

- Risk = 1:514,000 – 2,993,000/unit
- Endemic in SW Japan, Caribbean regions, Africa
- Etiologic agent for adult T-cell lymphoma/leukemia and tropical spastic paraparesis (TSP)

Chagas Disease (*T. cruzi*) United States - 2007

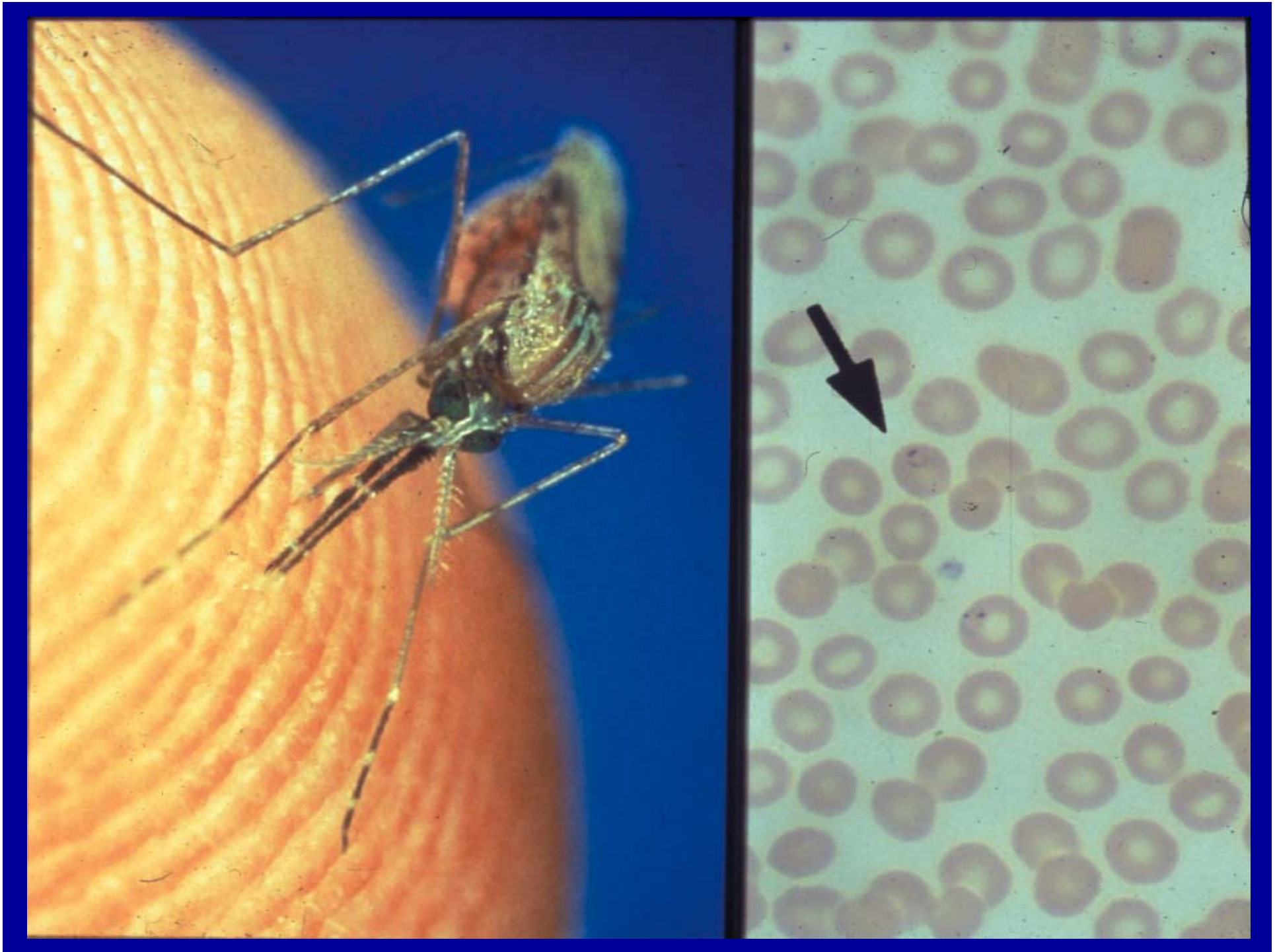
- Lifelong multi-organ infection
- 7 cases in North America
- 12 million people in Latin America are infected
- Donor testing to start when feasible



Transfusion-Transmitted Malaria

United States - 2007

- A few cases in US per year
- Nearly all cases from foreign-born donors
- Risk increasing with global warming



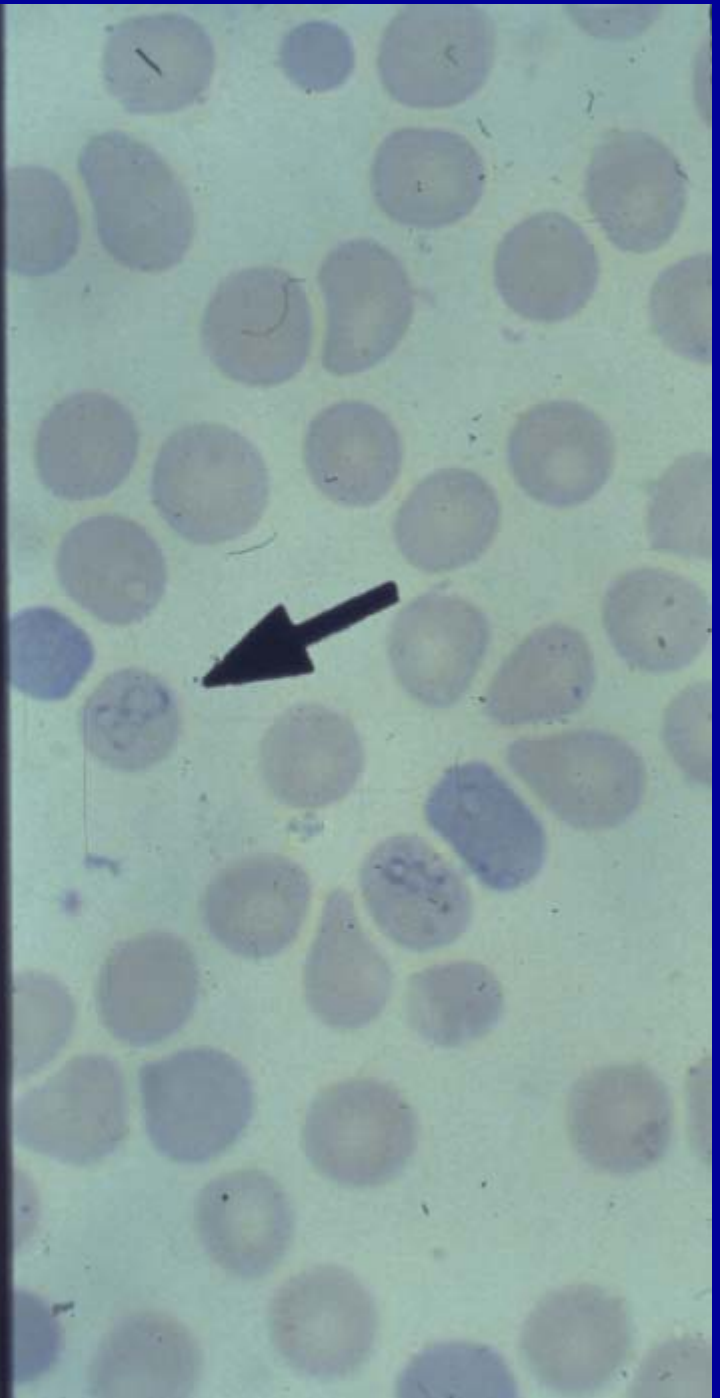
Babesiosis (*Babesia microti*)

United States - 2007

Malaria-like tick-borne disease

More than 40 transfusion transmitted cases

5% fatality rate in splenectomized persons



West Nile Virus (WNV)

United States - 2007

- All blood components are tested for WNV (NAT)
- Year-round testing permits Red Cross to continue resource sharing
- Why now? Mutant *Culex pipiens* or non-immune population

Variant Creutzfeldt-Jacob Disease (vCJD)

First possible case in 2003

32 transfusion recipients at risk in UK

“Classic” CJD has been spread via contaminated dura, cornea, human pituitary growth hormone, and EEG electrodes

CJD, scrapie, and BSE have been spread via blood

Risks of Blood Transfusion (risk/unit) United States - 2007

- **Acute hemolytic reactions**
 - Receiving someone else's blood 1:14,000
 - Fatal ABO-related 1:600,000
- **Bacterial sepsis**
 - Platelets 1:50,000
 - Red Blood Cells 1:500,000
- **Viral**
 - HIV 1:2,135,000
 - HBV 1:205,000
 - HCV 1:1,935,000

Functions of Hospital Transfusion Services

United States - 2007

- Match donors' RBCs to patients' plasma
- Match ABO/Rh(D)
- Screen patients' plasma for alloantibodies
- Crossmatch donors' RBCs x patients' plasma

Compatibility Testing United States - 2007

- Patient's ABO/Rh (D)
- Patient's Antibody Screen
- Crossmatch Donor's RBCs x Patient's Plasma (Transfusion in a Test Tube)