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HIV/AIDS:


Catalyst for Change in Infection Control

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Learning Outcomes

- **As a result of this Continuing Education Activity, participants will be able to**
- **Identify at least two ways that HIV is transmitted**
- **Describe how HIV disables immune function**
- **Differentiate HIV-infection from AIDS based on accepted disease classification systems**



HIV AIDS


- human immunodeficiency virus
- acquired immunodeficiency syndrome




Person with HIV

=



- severely compromised
- opportunistic infection



HIV-1



HIV-2

Group M

Group O

Group N

k b g

a c

d f

h i

OBJECTIVES

- Milestone & Basic Statistics
- HIV Transmission, Prevention & Risk Factors
- HIV Mechanism & Disease Classification
- HIV's Influence on Patient Care

Initial Historical Milestones

- **MMWR June 5, 1981**

– 5 cases of *Pneumocystis carinii* pneumonia (PCP)

– Kaposi's sarcoma

– Peritonitis

- **Increased mortality**

- **Gay Related Immune Deficiency (GRID)**

- **Hemophilia involvement**

- **Acquired Immuno-Deficiency Syndrome (AIDS)**

coined (July 1982)

**International Committee of
Viral Taxonomy names virus**

Human Immunodeficiency Virus

1986

Basic Statistics

- **Worldwide**

- ~40 million living with HIV
- ~2.3 million newly infected/yr



- **United States**

- ~1 million living with HIV
- ~50,000 newly infected/year with 16% unaware of status



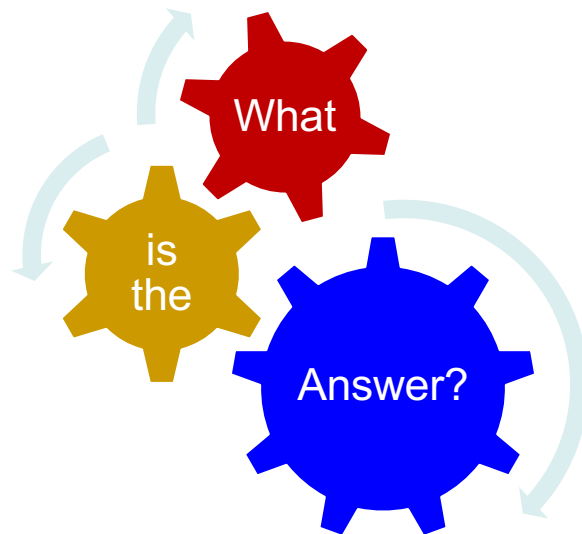
Joint United Nations Programme on HIV/AIDS (UNAIDS), 2014

CDC, 2014

OBJECTIVES

- **Milestone & Basic Statistics**
- **HIV Transmission, Prevention & Risk Factors**
- **HIV Mechanism & Disease Classification**
- **HIV's Influence on Patient Care**

Test Our Current Knowledge



HIV is mainly spread by having unprotected sex and/or sharing needles/syringes for injecting drugs with an infected person

- a. True**
- b. False**
- c. Not sure**



Hispanics/Latinos are more affected by HIV/AIDS than any other racial/ethnic group

- a. True**
- b. False**
- c. Not sure**



Every HIV+ mother will give birth to an HIV+ newborn

- a. True**
- b. False**
- c. Not sure**



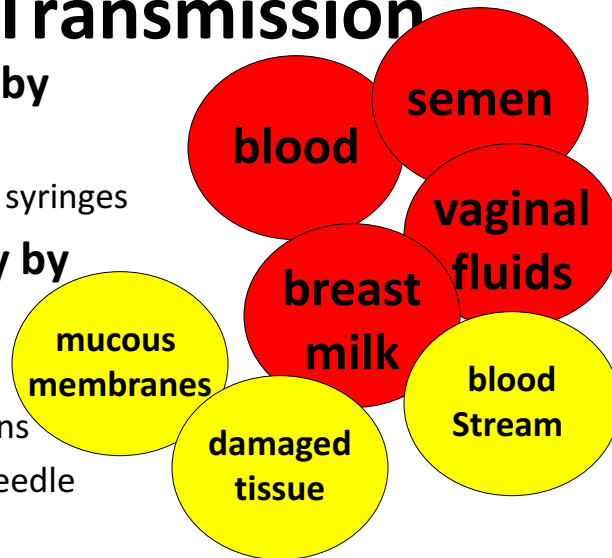
HIV Transmission

- **Mainly spread by**

- Unprotected sex
- Sharing needles, syringes

- **Less commonly by**

- Birth
- Breast Feeding
- Blood transfusions
- Contaminated needle
- Bite
- Contact between broken skin or mucous membranes with HIV-infected blood or bodily fluids



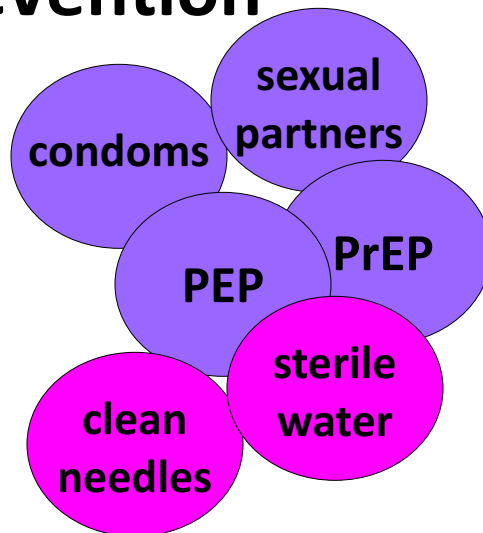
HIV Prevention

- **Mainly spread by**

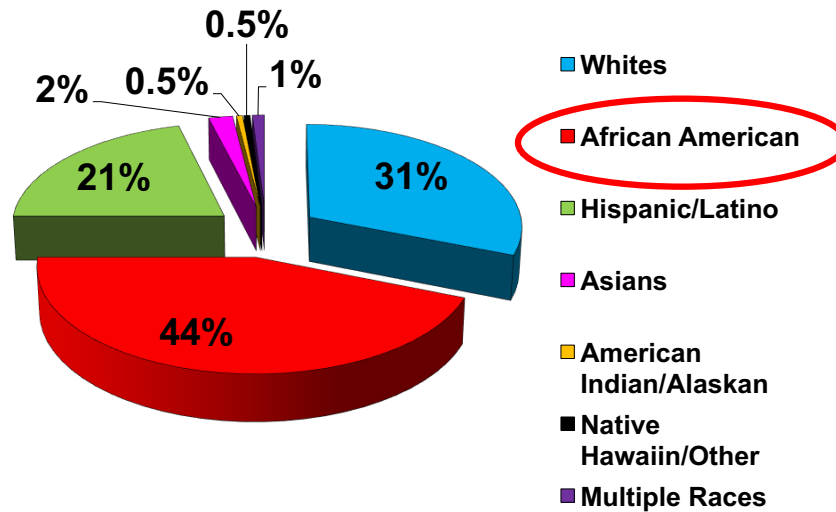
- Unprotected sex
- Sharing needles, syringes

- **Less commonly by**

- Birth
- Breast Feeding
- Blood transfusions
- Contaminated needle
- Bite
- Contact between broken skin or mucous membranes with HIV-infected blood or bodily fluids



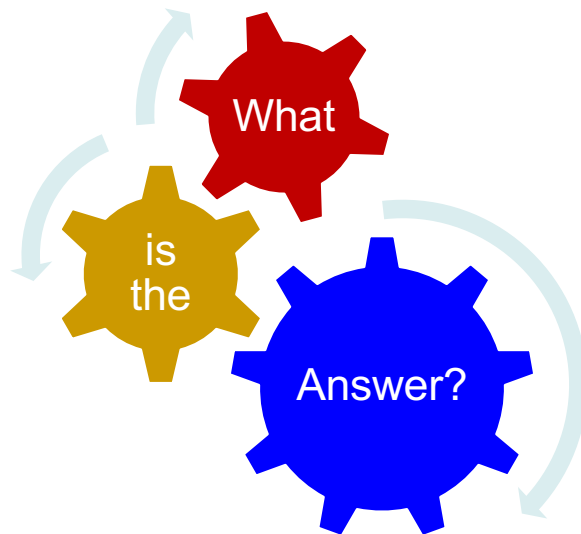
Who is at Risk for HIV?



OBJECTIVES

- Milestone & Basic Statistics
- HIV Transmission, Prevention & Risk Factors
- HIV Mechanism & Disease Classification
- HIV's Influence on Patient Care

Test Our Current Knowledge



In some cases, having AIDS & being HIV+ mean the same thing

- a. True**
- b. False**
- c. Not sure**



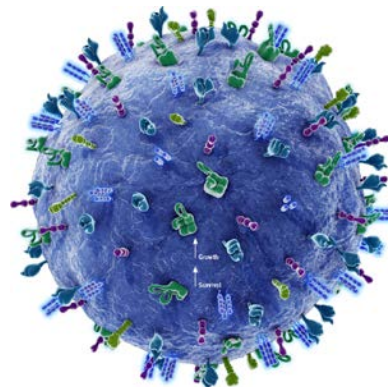
Using established disease classification criteria, I can explain the difference between AIDS vs HIV in adults

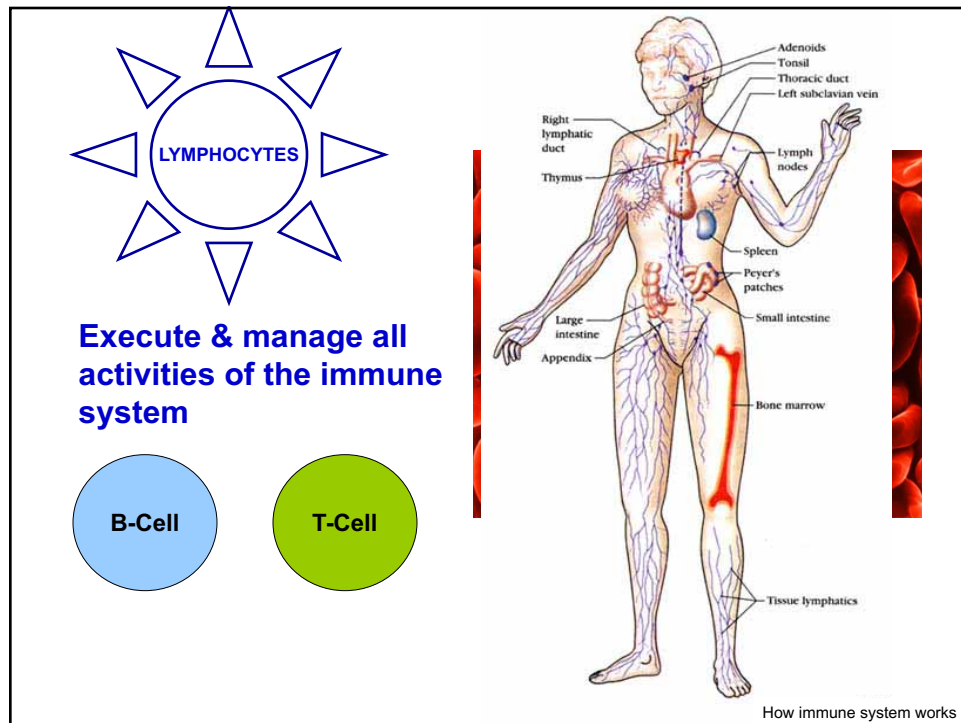
- a. True**
- b. False**
- c. Not sure**



The main target of HIV is the B-cell lymphocyte

- a. True**
- b. False**
- c. Not sure**





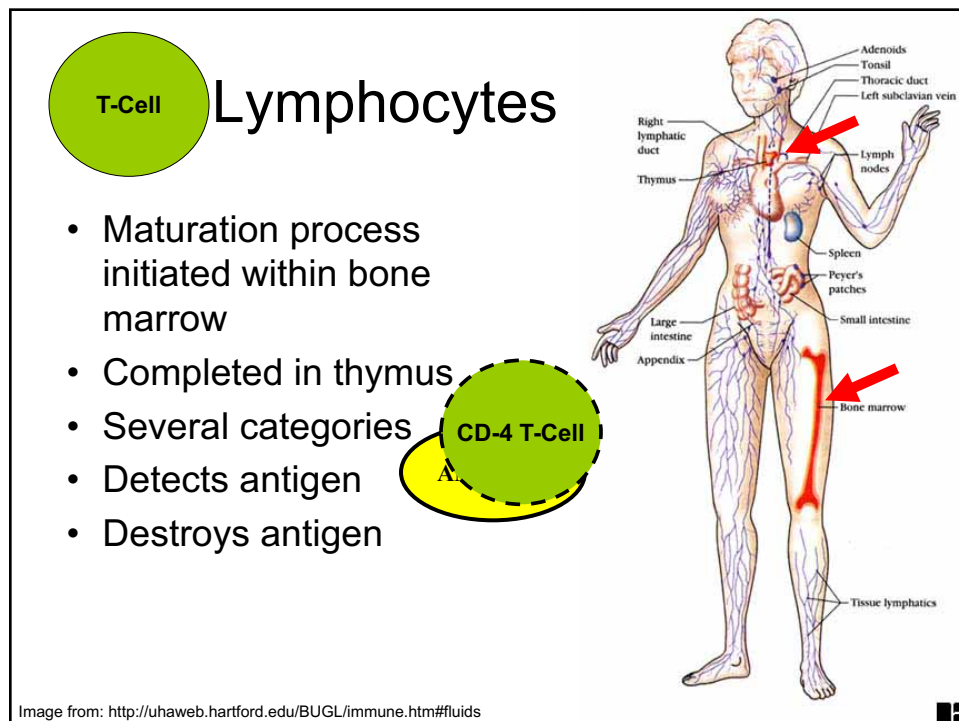
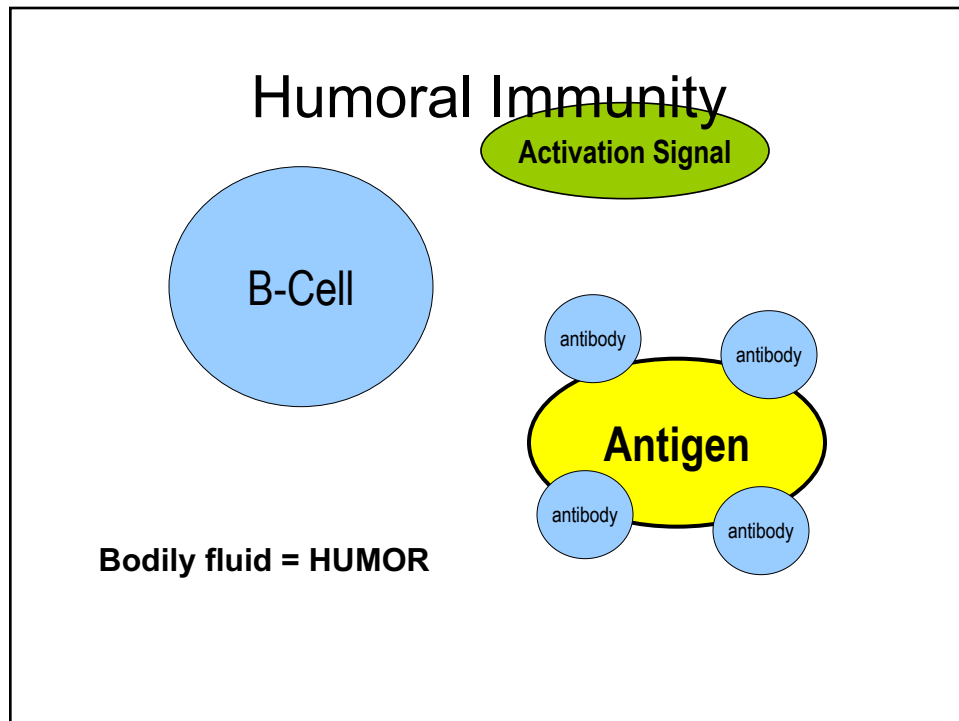
B-Cell

Lymphocytes

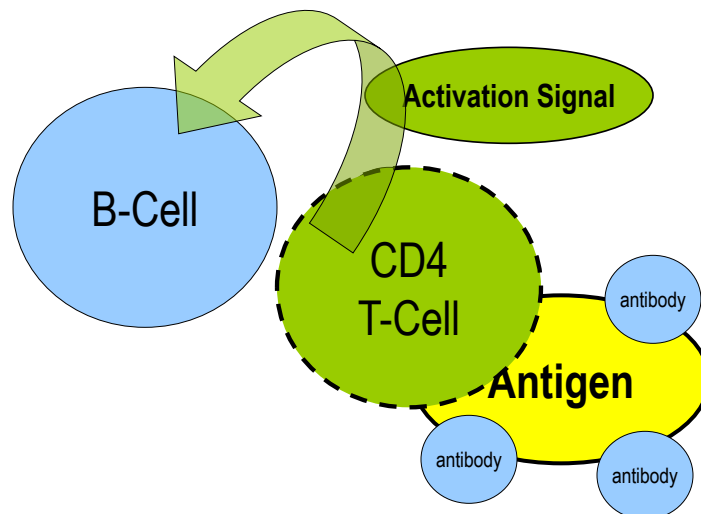
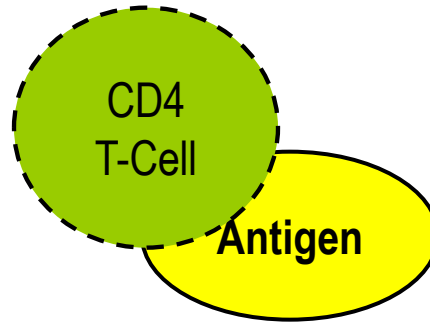
- Maturation process occurs within bone marrow
- Identify antigen ANTIGEN
- Triggered to produce antigen-specific antibody proteins

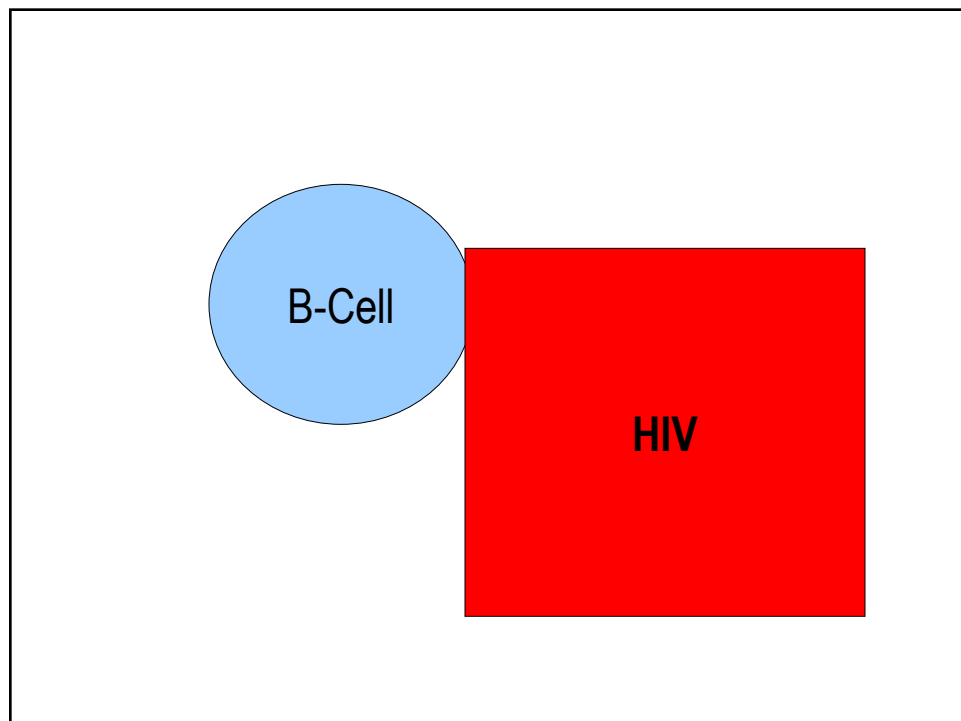
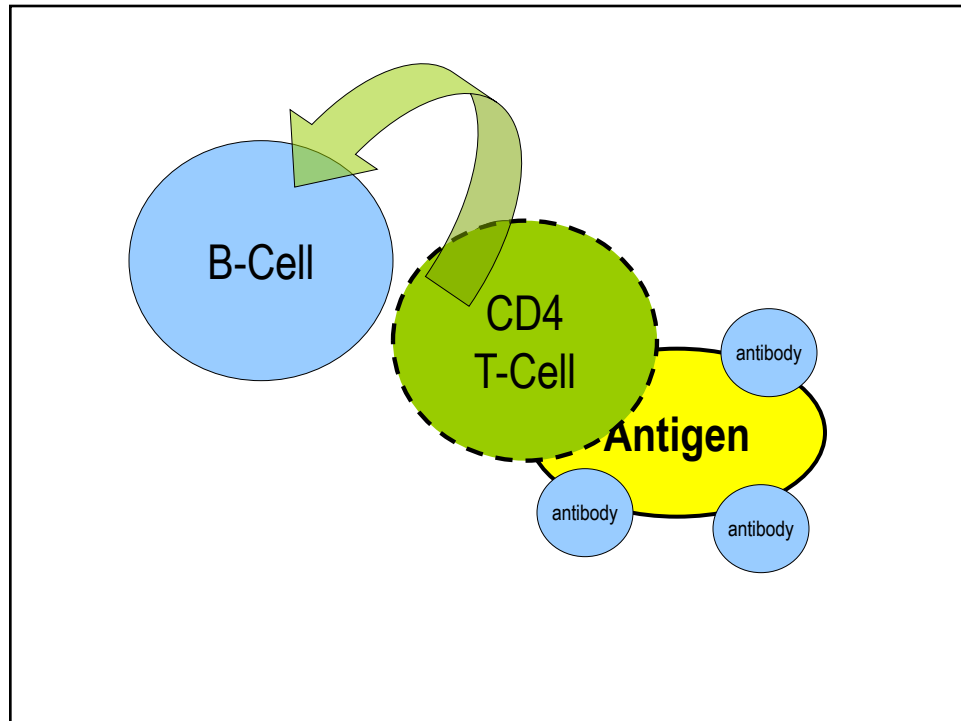
The diagram shows a human figure with the lymphatic system highlighted. A red arrow points to the bone marrow in the femur, indicating the site of B-cell maturation. Labels include: Adenoids, Tonsil, Thoracic duct, Left subclavian vein, Lymph nodes, Spleen, Peyer's patches, Small intestine, Bone marrow, Tissue lymphatics, Appendix, Large intestine, Thymus, and Right lymphatic duct.

Image from: <http://uhaweb.hartford.edu/BUGL/immune.htm#fluids>



Cell-Mediated Immunity





Classification System-HIV/AIDS

Adolescents & Adults

CD4 T-CELL COUNTS CATEGORY	CLINICAL CATEGORY A (asymptomatic)	CLINICAL CATEGORY B (not A or B category)	CLINICAL CATEGORY C (AIDS indicator condition)
1 ≥500/(mm ³)	CATEGORY B: ❖ Candidiasis (oropharyngeal; thrush) ❖ Fever (38.5°C) ❖ Diarrhea >1 month ❖ Herpes zoster (shingles) ❖ etc.		
2 200-499/(mm ³)			
3 <200/(mm ³)			

CDC, 1993

Classification System-HIV/AIDS

Adolescents & Adults

CD4 T-CELL COUNTS CATEGORY	CLINICAL CATEGORY A (asymptomatic)	CLINICAL CATEGORY B (not A or B category)	CLINICAL CATEGORY C (AIDS indicator condition)
1 ≥500/(mm ³)	A1	B1	C1
2 200-499/(mm ³)	A2	B2	C2
3 <200/(mm ³)	A3	B3	C3

CDC, 1993

Classification System-HIV/AIDS

Children

- Maternal HIV antibodies cross placenta
- Falsely HIV+ 9 to 18 months
- CD4+ t-cell count higher in infants

Immune category	<12 mths	1-5 yrs	6-12 yrs
1	>1500_{μL}	>1000_{μL}	>500_{μL}
2	750-1499_{μL}	500-999_{μL}	200-499_{μL}
3	<750_{μL}	<500_{μL}	<200_{μL}

Classification System-HIV/AIDS

Children

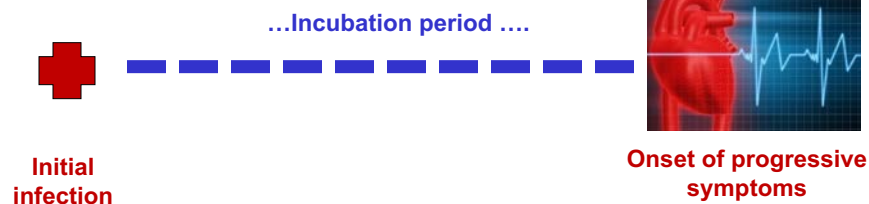
Absolute CD4+ T-cell Category

Clinical Category	Absolute CD4+ T-cell Category			
	N	A	B	C
	NO SIGNS/SYMPTOMS			
1	N1	A1	B1	C1
2	N2	A2	B2	C2
3	N3	A3	B3	C3

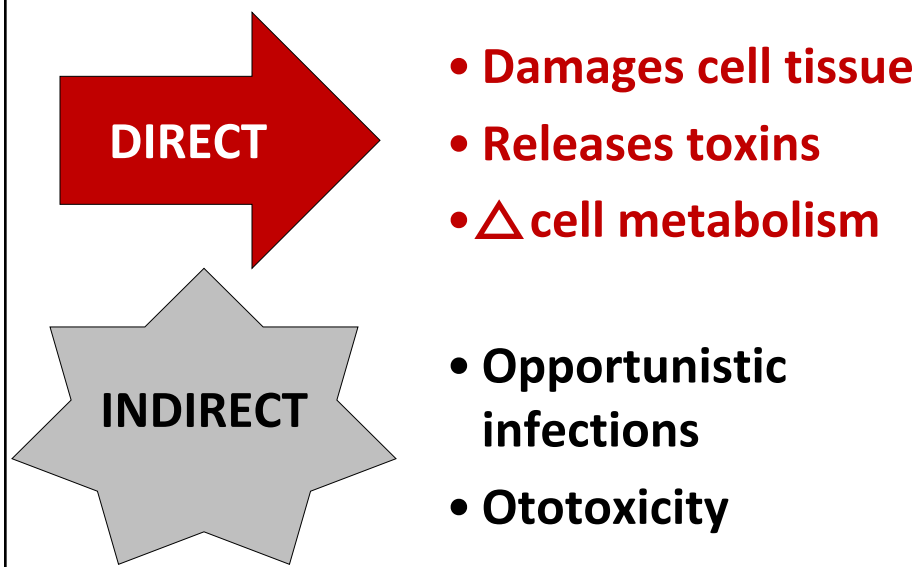
CDC, 1994

Course of Disease

- Initially, flu-like symptoms
- Incubation period 8 to 10 years
- Associated with peripheral & central nervous system symptoms that manifest as communication disorders



HIV/AIDS & Related Audiological Disorders



Indirect Effects

OPPORTUNISTIC INFECTION	EFFECT ON HEARING
Candidiasis	
Pneumocystic/Streptococcal Pneumonia	SNHL from Bacterial Meningitis Conductive HL from OM
Cytomegalovirus	SNHL
Cryptococcus infection	SNHL from Bacterial Meningitis
Toxoplasmosis	SNHL
Mycobacterium infections	Conductive HL from OM
Syphilis	SNHL
Staphylococcus aureus	Conductive HL from OM
Kaposi's sarcoma	
Herpes zoster	SNHL

Bankaitis, 1996

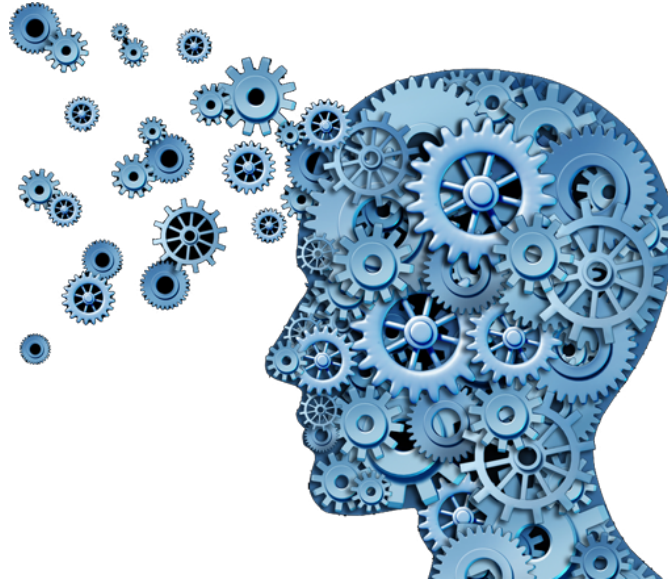
INDIRECT

Ototoxicity



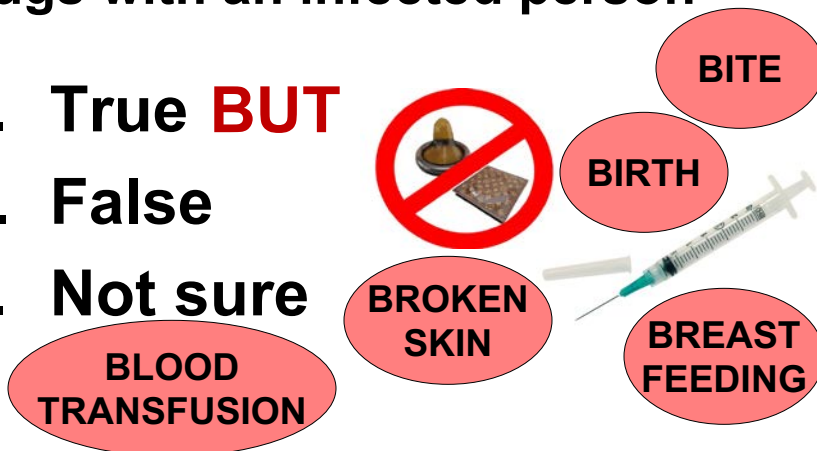
- FDA-approved and/or experimental anti-retrovirals
- Medications for opportunistic infections
- SNHL, tinnitus, vestibular/balance issues

What did we learn....



HIV is mainly spread by having unprotected sex and/or sharing needles/syringes for injecting drugs with an infected person

- a. True **BUT**
- b. False
- c. Not sure



Hispanics/Latinos are more affected by HIV/AIDS than any other racial/ethnic group

- a. True**
- b. False**
- c. Not sure**



Every HIV+ mother will give birth to an HIV+ newborn

- a. True BUT**
- b. False**
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**15 -25%
seroconvert**

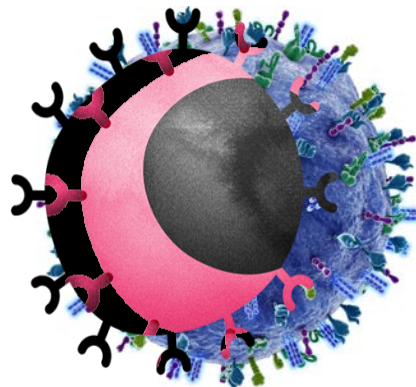
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CD4 T-cell

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- a. True
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Classification System-HIV/AIDS

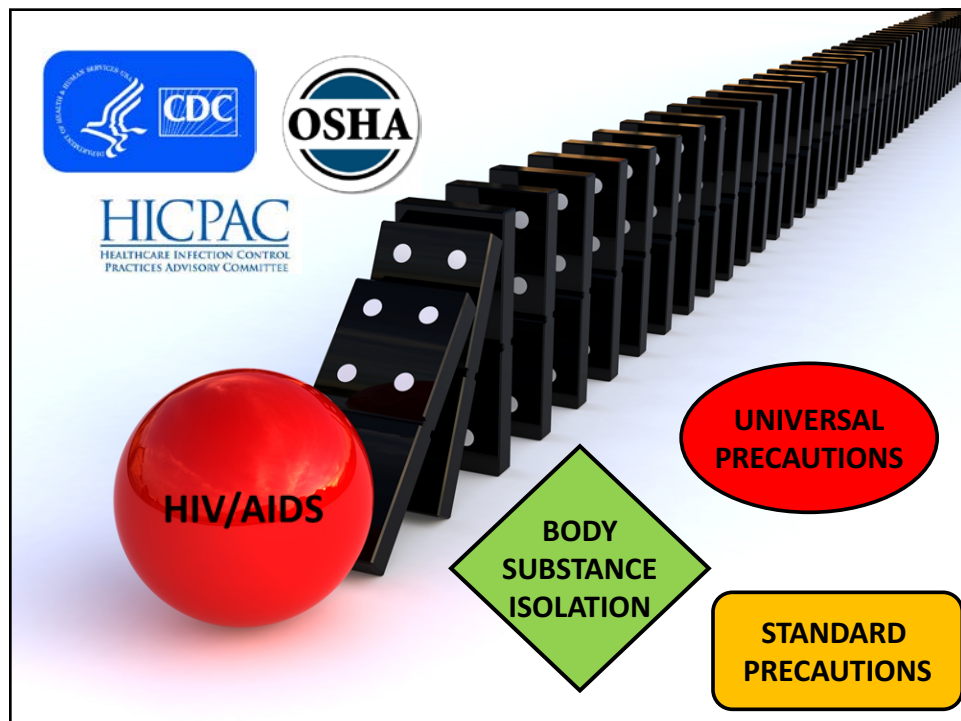
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2 200-499/ (mm^3)	A2	B2	C2
3 $< 200/(\text{mm}^3)$	A3	B3	C3

CDC, 1993

OBJECTIVES

- Milestone & Basic Statistics
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CDC's Response to HIV/AIDS

1983

- CDC Guideline for Isolation Precautions in Hospitals

1985

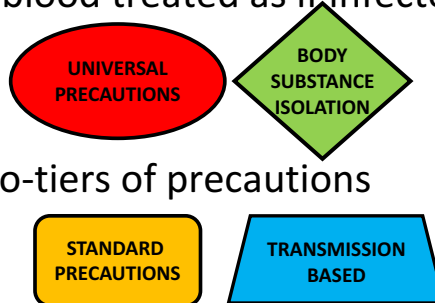
- CDC expanded blood & bodily fluid precautions to prevent HIV transmission

1987

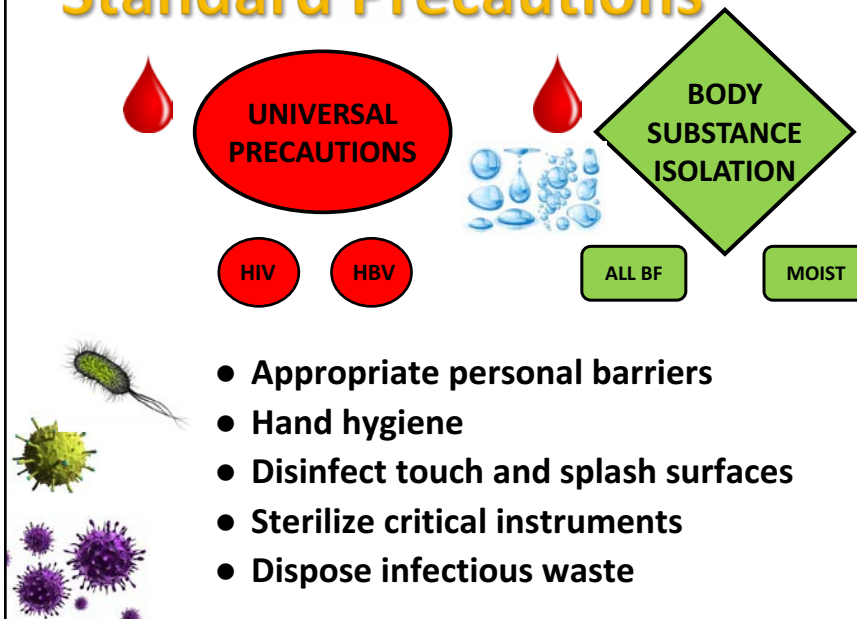
- All blood treated as if infected with HIV

1991

- Two-tiers of precautions

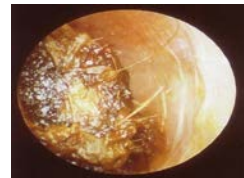
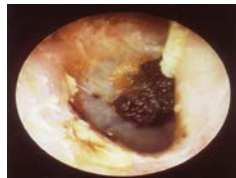
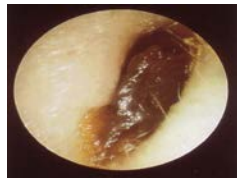


Standard Precautions

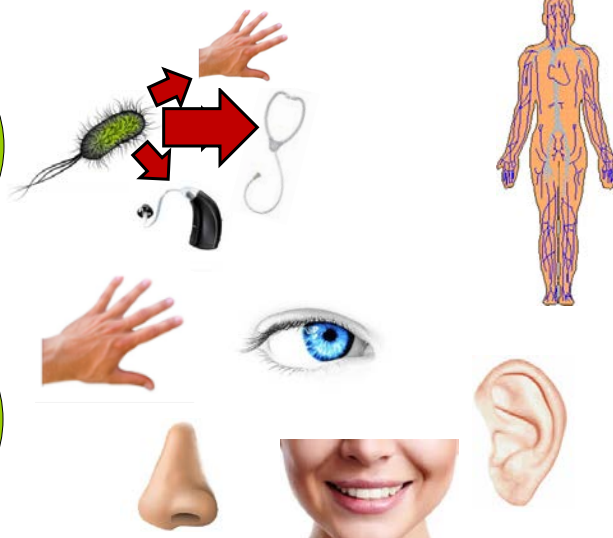
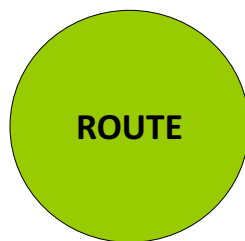
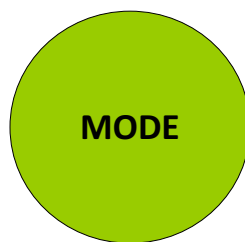


What Does This Have to do with Me?

- Contact with bodily fluids
- Multiple Contact with Multiple objects & patients
- Cross-contamination & Infections
Increases potential for disease transmission!



HOW TO CONTROL FOR DISEASE TRANSMISSION



What Do We Need to Do?

Control Mode and **Written Infection**
Route of Microbes **Control Plan for Clinic**



HIV Take Home Points

- Mainly spread through unprotected sex and/or intravenous drug use
- Attacks CD4 T-Cells which compromises humoral and cell-mediated immunities
- Associated with audiological disorders
- Catalyst of change of infection control

