

# HIV and Oral Health 101

## Part 1: HIV Basics

**Mark Schweizer, DDS MPH**

Director of Development and Special Projects

Nova Southeastern University College of Dental Medicine

Dental Director South Florida Southeast AIDS Education and Training Center



# Disclosures

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  - The speakers will not discuss any off-label use or investigational product during the program.
  - This slide set has been peer-reviewed to ensure that there are no conflicts of interest represented in the presentation
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- Special thanks to Dr. Jennifer Jenelle from the North Florida AETC for her contributions to this presentation

# Objectives



- Identify the current demographics of HIV/AIDS and infections rates
- Understand the disease course of HIV/AIDS
- Understand the Current Diagnostic Test of HIV/AIDS

# HIV in the United States

- In 2016, an estimated 41,900 people were diagnosed with HIV infection in the United States.
- More than 1.2 million people in the US are living with HIV, and 1 in 7 or 15% of them don't know it.
- Over the last decade, the annual number of new HIV diagnoses declined 19%.
- Gay and bisexual men accounted for an estimated 83% (29,418) of HIV diagnoses among males and 67% of all diagnoses.
- Black/African American gay and bisexual men accounted for the largest number of estimated HIV diagnoses (11,201), followed by white gay and bisexual men (9,008).

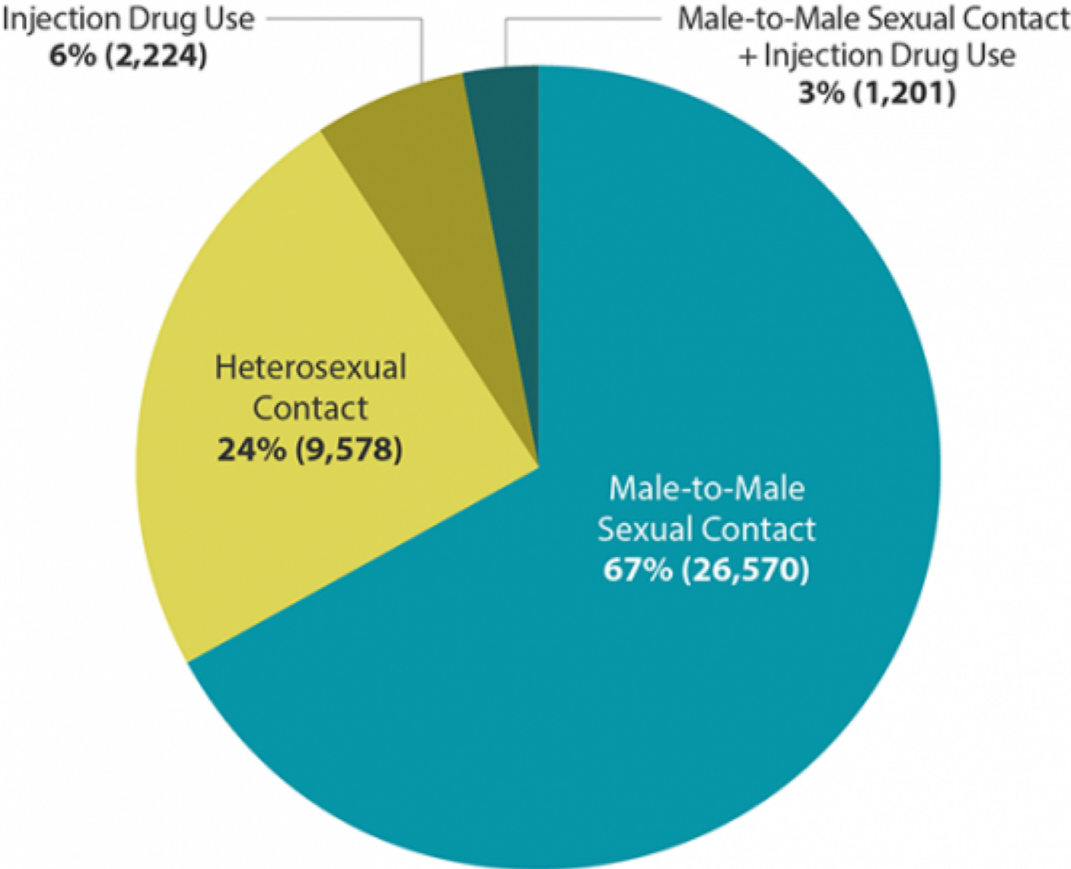
<http://www.cdc.gov/hiv/statistics/overview/ata glance.html>

# HIV in the United States

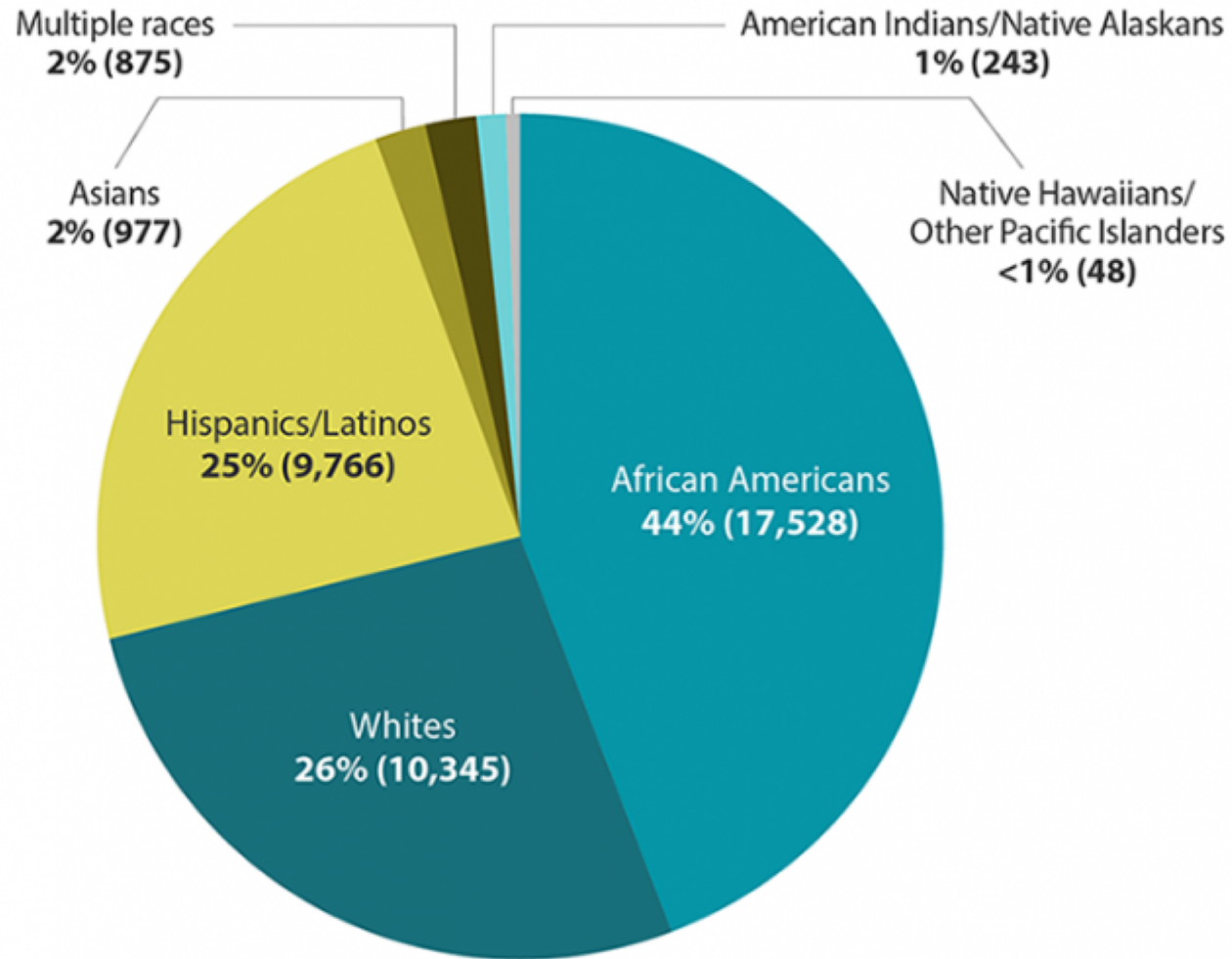
- Heterosexuals and people who inject drugs also continue to be affected by HIV.
- Heterosexual contact accounted for 24% (10,527) of estimated HIV diagnoses.
- Women accounted for 19% (8,328) of estimated HIV diagnoses. Diagnoses among women are primarily attributed to heterosexual contact or injection drug use.
- An estimated 7% (2,635) of HIV diagnoses were attributed to injection drug use.

<http://www.cdc.gov/hiv/statistics/overview/ataglance.html>

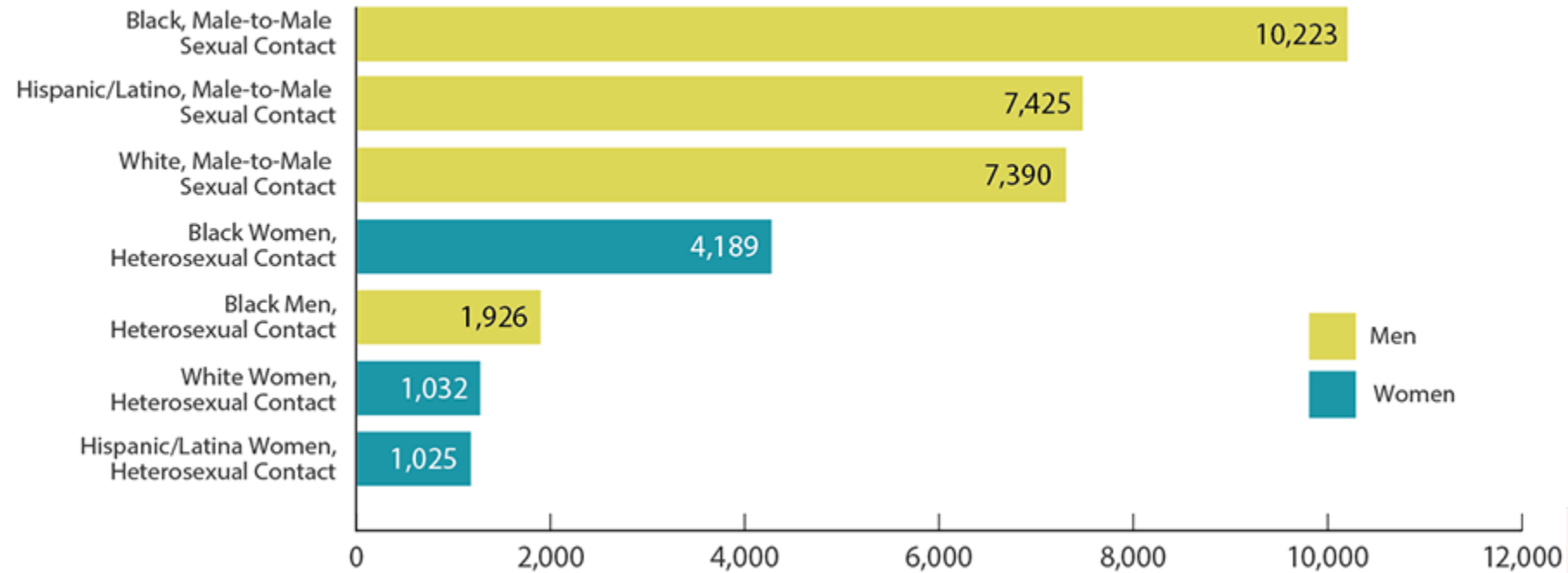
# New HIV Diagnoses by Transmission Category (2016, n=39,782)



## New HIV Diagnoses by Race/Ethnicity (2016, n=39,782)



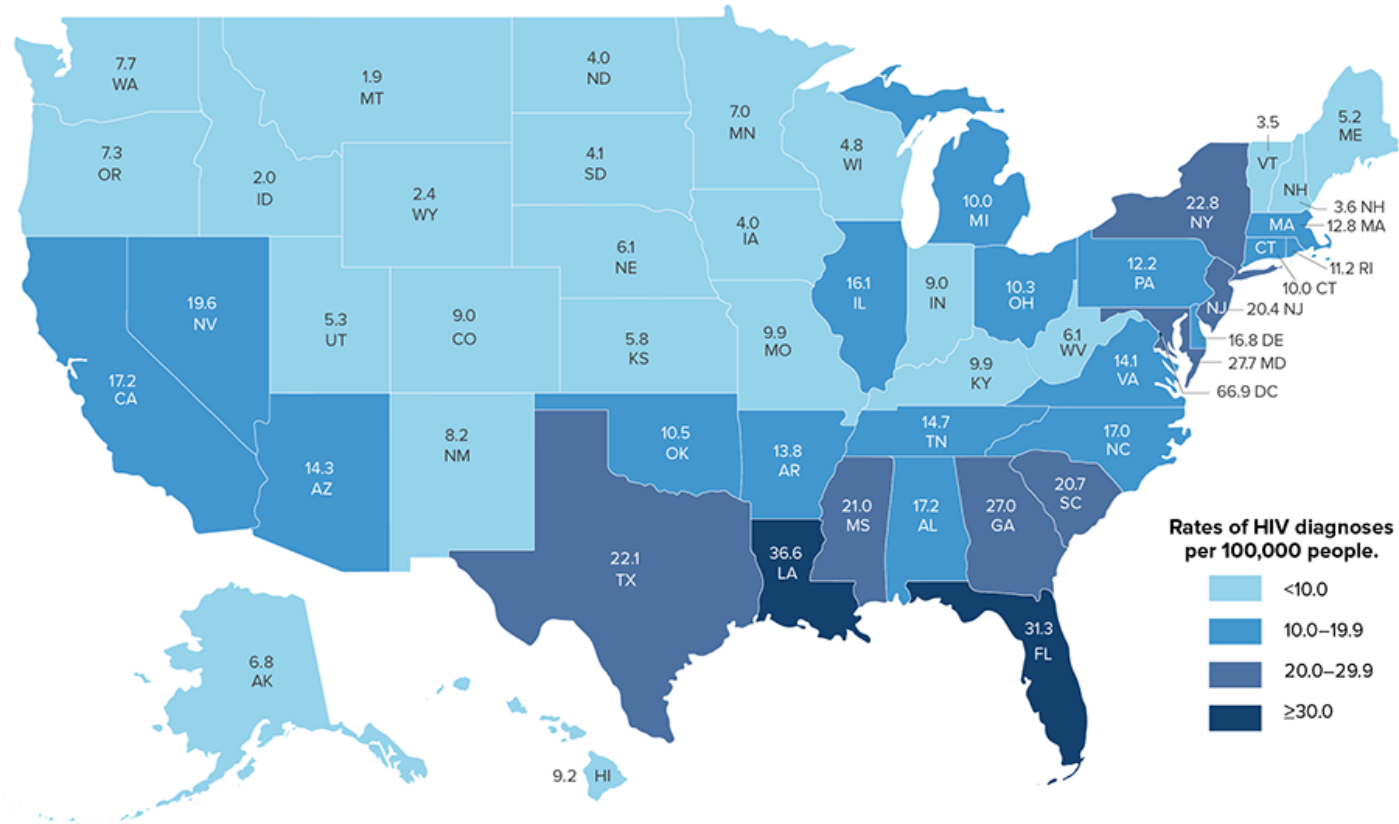
## New HIV Diagnoses in the United States for the Most-Affected Subpopulations, 2016



6,721 people died from HIV and AIDS in 2014. HIV remains a significant cause of death for certain populations. In 2014, it was the 8th leading cause of death for those aged 25-34 and 9th for those aged 35-44.



HIV is largely an urban disease, with most cases occurring in metropolitan areas with 500,000 or more people. The South has the highest *number* of people living with HIV, but if population size is taken into account, the Northeast has the highest rate of people living with HIV.



45% of all people with diagnosed HIV live in the South and accounted for 53% of all new diagnosis

# What is HIV?

HIV stands for 'human immunodeficiency virus'. There are two types of HIV, HIV-1 and HIV-2. In the United States, unless otherwise noted, the term “HIV” primarily refers to HIV-1. HIV is a virus (of the type called retrovirus) that infects cells of the human immune system (mainly CD4 positive T cells).

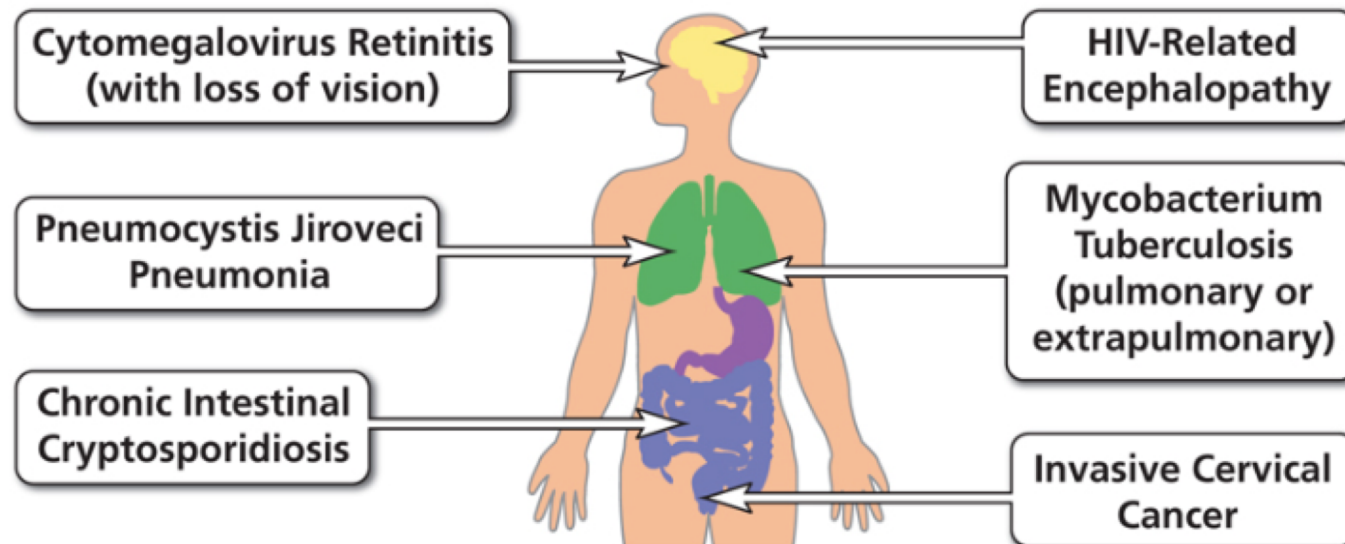
Immunodeficient people are more susceptible to a wide range of infections, most of which are rare among people without immune deficiency.

Infections associated with severe immunodeficiency are known as 'opportunistic infections', because they take advantage of a weakened immune system.

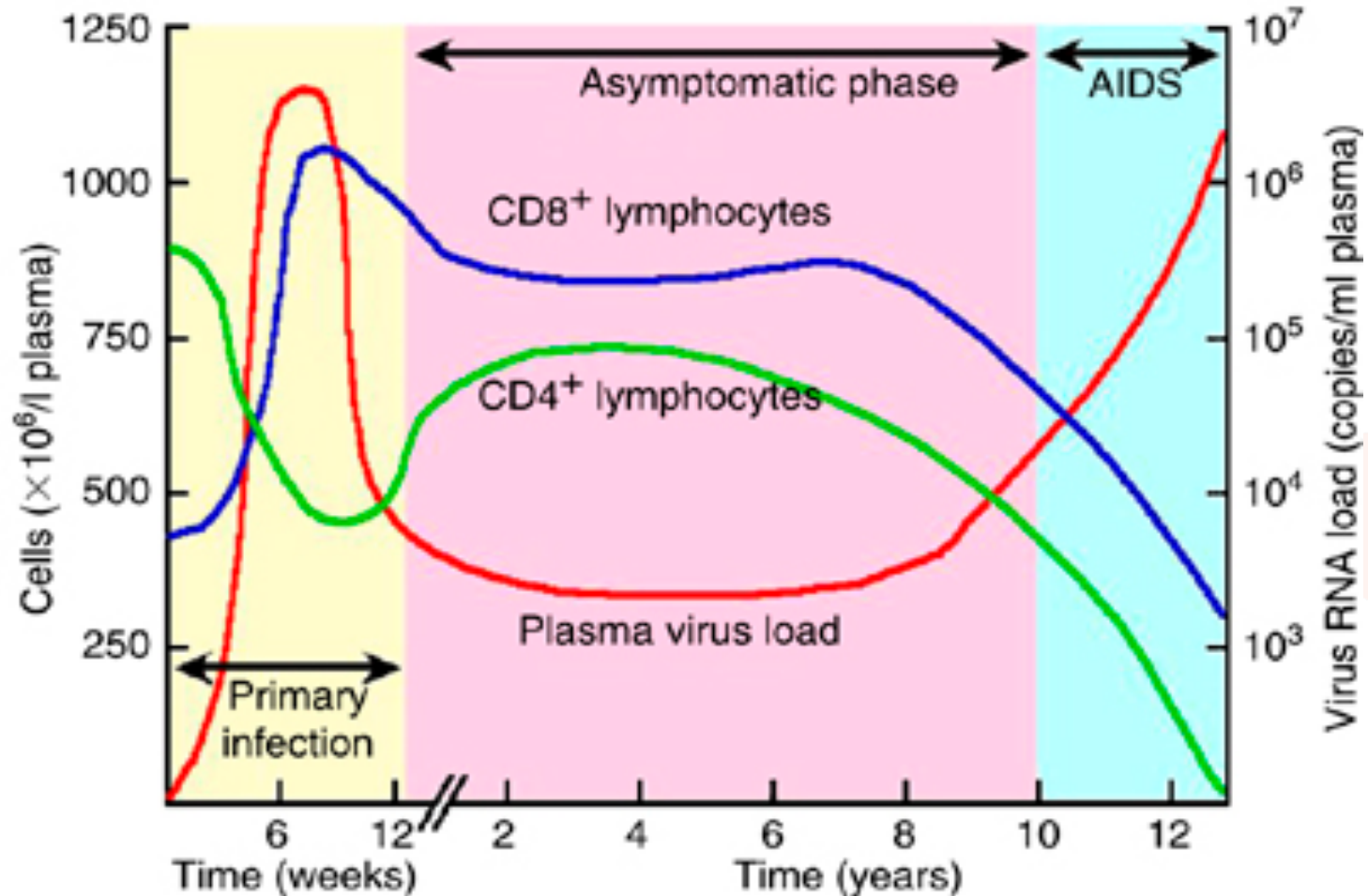
# HIV vs. AIDS

- Anyone infected with the HIV virus has HIV
- People with HIV have AIDS if:
  - CD4 count  $< 200$  or CD4 %  $< 14$

## Examples of AIDS-Defining Conditions



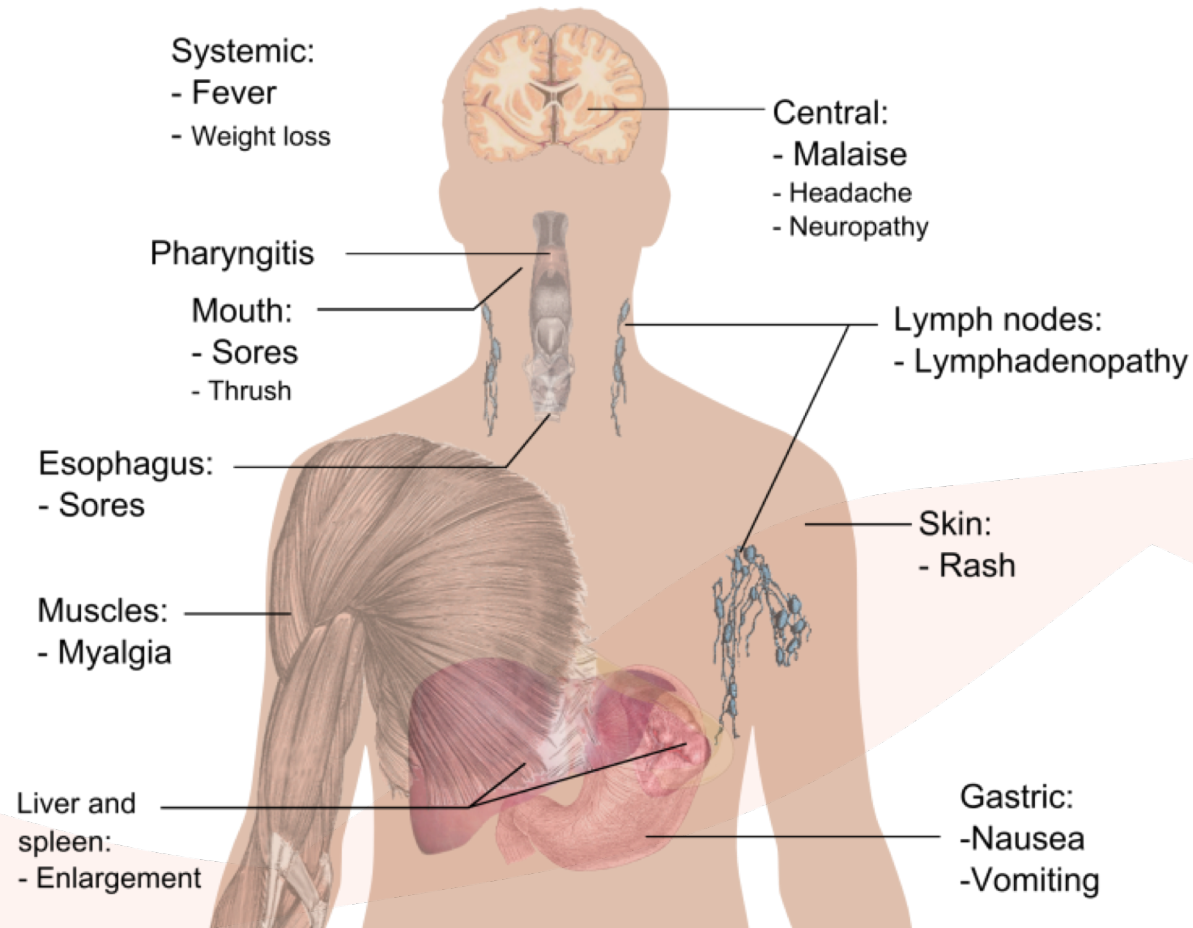
# Typical Course of an HIV Infected Individual - Untreated



# CDC Stages of HIV Infection

- Stage 1
  - No AIDS-defining condition and either a CD4 cell count at or above 500 cells/mm<sup>3</sup> or CD4 cell percentage at or above 29%.
- Stage 2
  - No AIDS-defining condition and either a CD4 cell count of 200 to 400 cells/mm<sup>3</sup> or CD4 cell percentage in the range 14 to 28%.
- Stage 3 (AIDS)
  - A documented AIDS-defining condition or a CD4 cell count less than 200 cells/mm<sup>3</sup> or a CD4 cell percentage under 14%.

# Symptoms of Acute HIV



# Opportunistic Infections in AIDS

- Bacterial
- Fungal
- Viral
- Protozoal

Some of these occur denovo, but most are reactivations of latent infections.

# Etiology

- HIV is a retrovirus, depends upon a unique enzyme, reverse transcriptase, to replicate within host cell
- The HIV genomes contain genes for three basic structural proteins and at least 5 other regulatory proteins
- The greatest variability in strains of HIV occurs in the viral envelope



# Secondary Infections with HIV

- Bacterial
  - Fungal
  - Viral
  - Protozoal
- Some of these occur denovo, but most are reactivations of latent infections.

# Bacterial Infections in HIV/AIDS

## ACUTE

- Staphylococcal
- Pseudomonas
- Pneumococcal
- Rhodococcus equi
- Salmonella

## CHRONIC

- Syphilis
- Tuberculosis
- MAI
- Nocardia

# Viral Infections in HIV/AIDS

Herpes simplex

Varicella-Zoster

Cytomegalovirus

JC virus (PML)

Molluscum contagiosum

Human papillomavirus

Epstein Barr Virus

# Protozoal Infections in HIV/AIDS

*Pneumocystis jirovecii* (PCP or PJP)

*Toxoplasma gondii*

*Cryptosporidium parvum*

*Isospora belli*

*Enterocytozoon*

*Cyclospora*

*Giardia*

# Malignancies in HIV

## AIDS defining

- Kaposi's sarcoma
- Primary brain lymphoma
- High grade non-Hodgkin's lymphoma
- Invasive carcinoma of the cervix

## Other

- Anorectal squamous carcinoma
- Hodgkin's disease

# Modes of Transmission

Only certain body fluids—blood, semen (*cum*), pre-seminal fluid (*pre-cum*), rectal fluids, vaginal fluids, and breast milk—from a person who has HIV can transmit HIV. These fluids must come in contact with a mucous membrane or damaged tissue or be directly injected into the bloodstream (from a needle or syringe) for transmission to occur. Mucous membranes are found inside the rectum, vagina, penis, and mouth.

In the United States, HIV is spread mainly by

- **Having anal or vaginal sex with someone who has HIV without using a condom or taking medicines to prevent or treat HIV.**
  - For the HIV-negative partner, receptive anal sex (bottoming) is the highest-risk sexual behavior, but you can also get HIV from insertive anal sex (topping).
  - Either partner can get HIV through vaginal sex, though it is less risky for getting HIV than receptive anal sex.

# Modes of Transmission

- Sharing needles or syringes, rinse water, or other equipment (works) used to prepare drugs for injection with someone who has HIV.

**Less commonly, HIV may be spread**

- From mother to child during **pregnancy, birth, or breastfeeding**. Although the risk can be high if a mother is living with HIV and not taking medicine, recommendations to test all pregnant women for HIV and start HIV treatment immediately have lowered the number of babies who are born with HIV.

- By being stuck with an HIV-contaminated needle or other sharp object. This is a risk mainly for health care workers.

- **Having another sexually transmitted disease (STD) can increase the risk of getting or transmitting HIV.**

# Modes of Transmission/Health Care Workers

The average risk of HIV infection after a needle stick or cut exposure to HIV-infected blood is **0.3%** (i.e., three-tenths of one percent, or about 1 in 300). Stated another way, **99.7%** of needle stick/cut exposures do not lead to infection.

The risk after exposure of the eye, nose, or mouth to HIV-infected blood is estimated to be, on average, **0.1%** (1 in 1,000).

The risk after exposure of non-intact skin to HIV-infected blood is estimated to be **less than 0.1%**. A small amount of blood on intact skin probably poses no risk at all. There have been no documented cases of HIV transmission due to an exposure involving a small amount of blood on intact skin (a few drops of blood on skin for a short period of time).

**There is only a single documented risk of occupational exposure since 1999 and no reported dental exposure since 1998.**



In the  
community

# HIV Can Be Transmitted By



Sexual Contact



Sharing Needles  
to Inject Drugs



Mother to Baby  
during pregnancy, birth,  
or breastfeeding

# HIV Is **NOT** Transmitted By



Air or Water



Saliva, Sweat, Tears, or  
Closed-Mouth Kissing



Insects or Pets



Sharing Toilets,  
Food, or Drinks

# Estimated Per-Act Probability of Acquiring HIV from an Infected Source

Type of Exposure	Risk per 10,000 Exposures
<b>Parenteral<sup>3</sup></b>	
Blood Transfusion	9,250
Needle-sharing during injection drug use	63
Percutaneous (needle-stick)	23
<b>Sexual<sup>3</sup></b>	
Receptive anal intercourse	138
Insertive anal intercourse	11
Receptive penile-vaginal intercourse	8
Insertive penile-vaginal intercourse	4
Receptive oral intercourse	low
Insertive oral intercourse	low
<b>Other<sup>^</sup></b>	
Biting	negligible <sup>4</sup>
Spitting	negligible
Throwing body fluids (including semen or saliva)	negligible
Sharing sex toys	negligible

# Prevention of Transmission of HIV/AIDS

- **Sexual**

- Abstinence
- Barriers: condoms etc.
- HIV treatment

- **Blood products**

- Testing for HIV
- Discriminating use
- Standard precautions
- Needle exchange

- **Mother to Child**

- Anti-HIV treatment of mother
- Preventative treatment of newborn
- Avoidance of breastfeeding





# U=U

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**UNDETECTABLE  
=  
UNTRANSMITTABLE**

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A PERSON LIVING WITH HIV  
WHO HAS AN UNDETECTABLE  
VIRAL LOAD DOES NOT  
TRANSMIT THE VIRUS TO THEIR  
PARTNERS.

The International AIDS Society is proud to endorse the U=U consensus statement of the Prevention Access Campaign.

# HOW DO WE DIAGNOSE HIV?

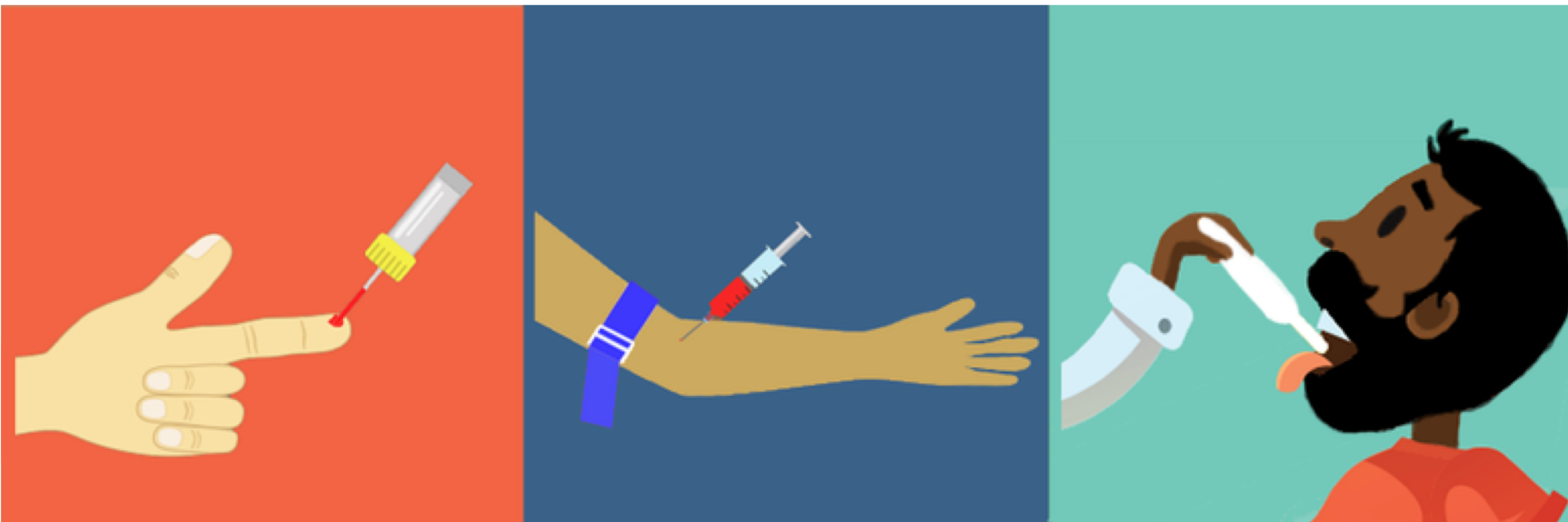
# Confidential vs Anonymous Testing

## Confidential testing

- Result entered into medical records
- Effective releases
- Results released to public health authorities with identifiers

## Anonymous testing

- Clients identifying information not linked to test result
- Unless client returns/calls for results, no way to track and inform client of results



An HIV test is done by taking blood from the finger or arm, or by an oral swab.

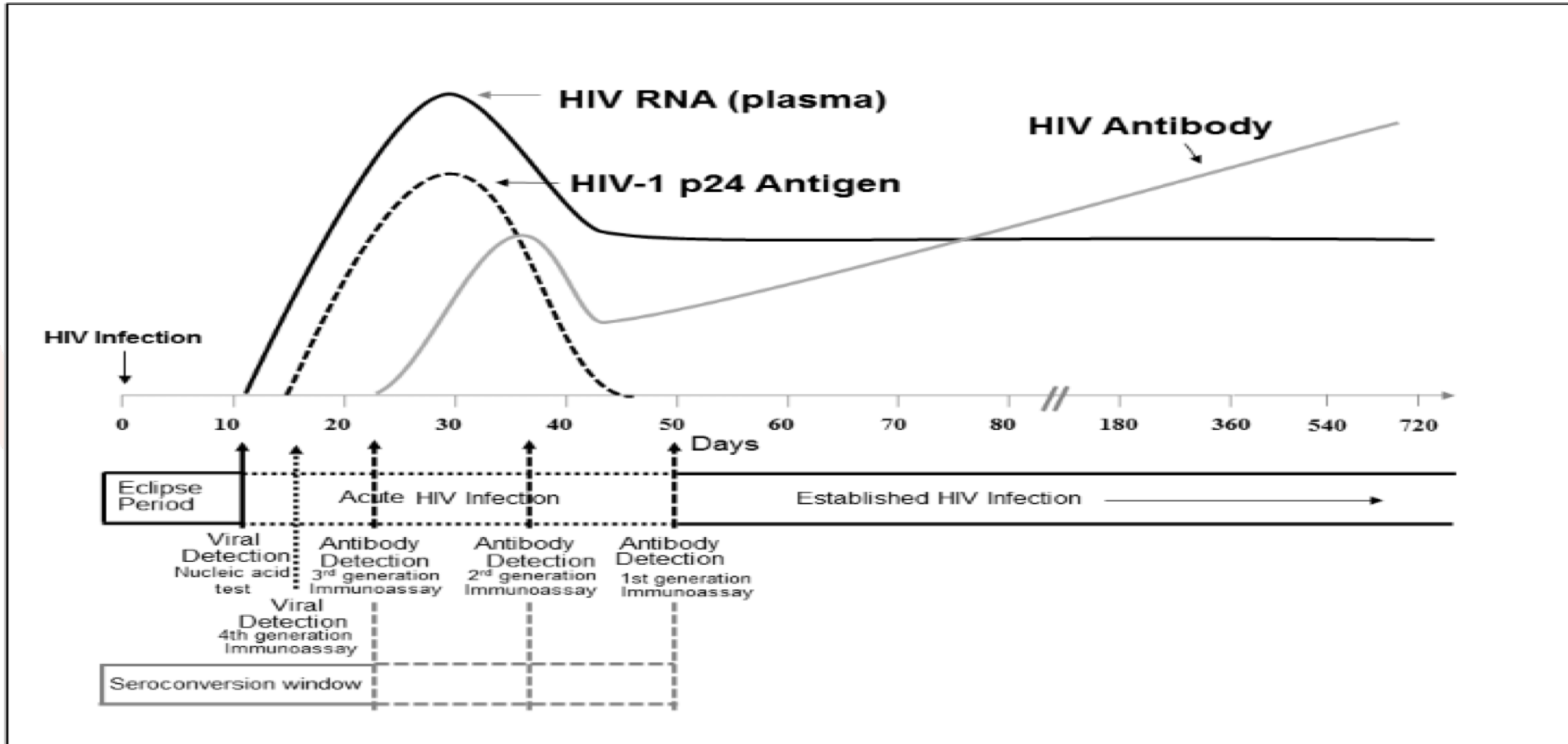
# How Do We Test For HIV Infection?

- HIV Antigen/Antibody Test (4<sup>th</sup> generation testing)
  - Can detect acute HIV infection
- HIV Antibody Test (3<sup>rd</sup> generation)
- Rapid HIV Test
  - Blood or sputum
  - Requires confirmation
- HIV viral load
  - Can detect acute HIV infection





# Sequence of Appearance of Lab Markers of HIV-1 Infection



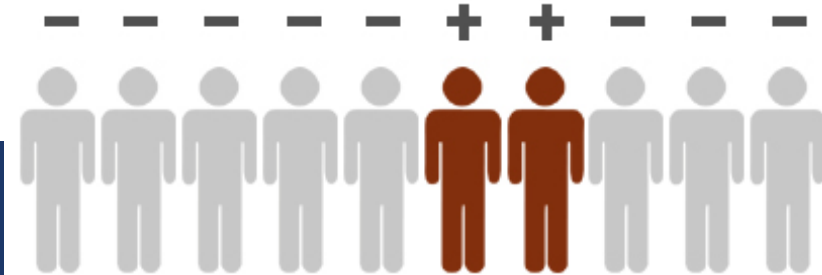
# Who Should We Screen? CDC 2006

- Routinely screen all patients aged 13-64 for HIV infection after notifying them that testing will be performed unless declined
  - Opt-out testing
- Prevention counseling should not be required with HIV diagnostic testing or as part of HIV screening programs in health-care settings



# Routine Screening for HIV Infection: CDC

- Screen at least annually
  - Intravenous drug users and their sex partners
  - People who exchange sex for money or drugs
  - Sex partners of people with HIV infection
  - Men who have sex with men or heterosexuals who have or who their sex partners have had more than one sex partner since their most recent HIV test



# HIV Testing in the Oral Health Setting

## Medical Model of Care

### Importance of Early Diagnosis and Treatment

To facilitate early diagnosis and treatment, the Centers for Disease Control and Prevention (CDC) issued revised recommendations for widespread HIV testing<sup>1</sup>. The new recommendations proposed that HIV testing be offered to all individuals, ages 13 to 64, in all healthcare settings on an “opt-out” basis, rather than waiting for patients to request testing. These revisions brought HIV testing in line with other STI protocols and helped reduce what had been referred to as “HIV exceptionalism

Participants were very positive about being offered rapid oral HIV testing in the dental clinic setting and thought it consistent with their view of dental practice.<sup>2</sup>

1. B. M. Branson, H. H. Handsfield, M. A. Lampe et al., “Revised recommendations for HIV testing of adults, adolescents, and pregnant women in health-care settings,” *Morbidity and Mortality Weekly Report*, vol. 55, no. RR14, pp. 1–17, 2006.

2. *Nursing Research and Practice*. Volume 2012 (2012), Article ID 803169, 6 pages <http://dx.doi.org/10.1155/2012/803169>

# What happens if the test is positive?

- Positive rapid tests require confirmation
- Results should be communicated confidentially through personal contact
- Provide counseling
  - HIV is a manageable disease
  - Discuss HIV risk reduction
  - Discuss ways to handle the emotional consequences of a positive result
- Inform the patient that they might be contacted by health department staff

# Clinical Course

- The complications of HIV-related infections affect virtually every organ
- The CD4 lymphocyte count provides very important prognostic information
- Many individuals with HIV infection remain asymptomatic for years, even without anti-retroviral therapy.
- The mean time between the exposure and the development of AIDS is approximately 10 years.
- Physical examination may be entirely normal.
- Abnormal finding range from non-specific to highly specific for HIV infection

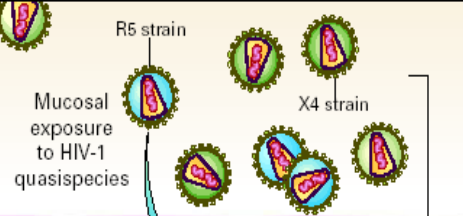
# Diagnosis/Lab Findings

Nonspecific findings with HIV infection may include anemia, leukopenia, thrombocytopenia, elevation of ESR and hypocholesterolemia

Laboratories to provide prognostic information and guide therapy

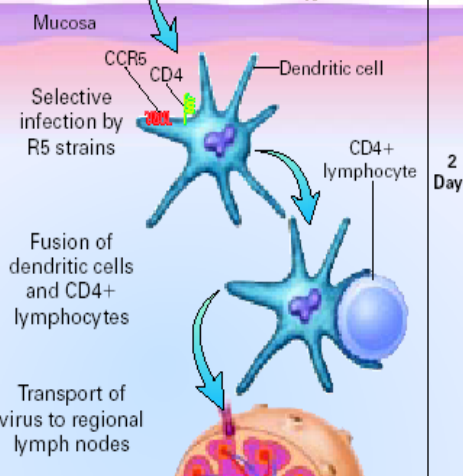
- **Absolute CD4 lymphocyte count** → most widely used predictor of HIV progression.
- **HIV viral load test**: measure the amount of actively replicating HIV virus, correlates with disease progression and response to medications.
- **ANC** (Absolute Neutrophil Count): measure the level of immunosuppression, correlates with the risk of opportunistic infections.

Day 0



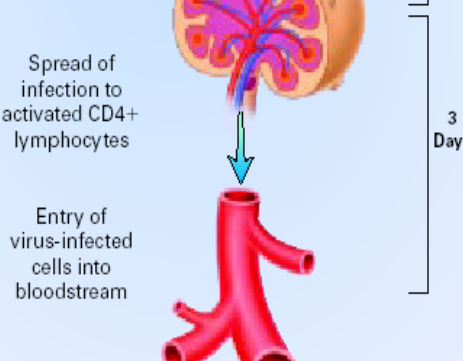
Exposure to HIV at mucosal surface (sex)

Day 0-2



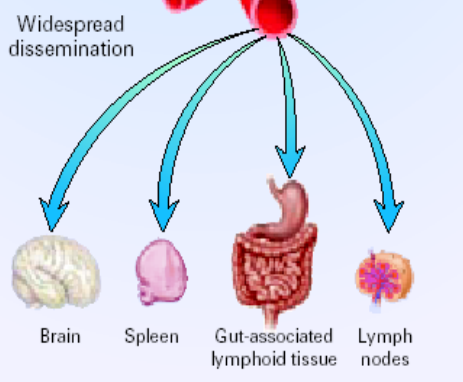
Virus collected by dendritic cells, carried to lymph node

Day 4-11



HIV replicates in CD4 cells, released into blood

Day 11 on



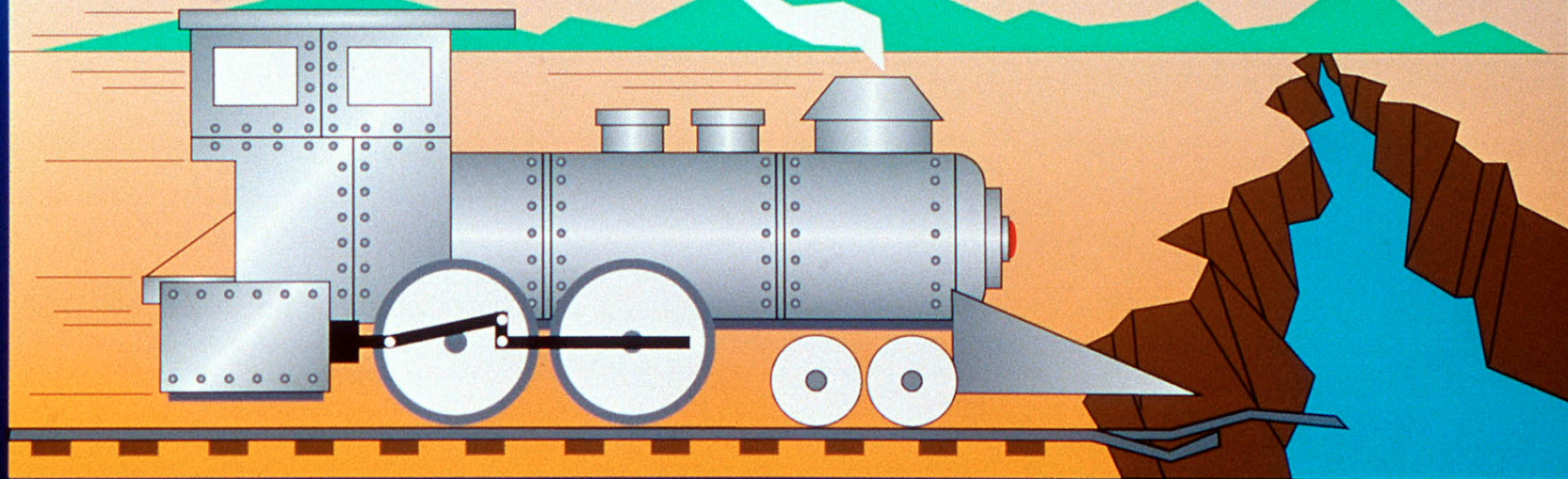
Virus spreads to other organs

Kahn JO, Walker BD. N Engl J Med. 1998;339:33-39.



# Development of AIDS: Like an Impending Train Wreck

*Viral load = Speed of the train*  
*CD4 count = Distance from site of crash*



Courtesy of Douglas D. Richman, MD.





Thank you

- ▶ We are available for clinical consultations and trainings

