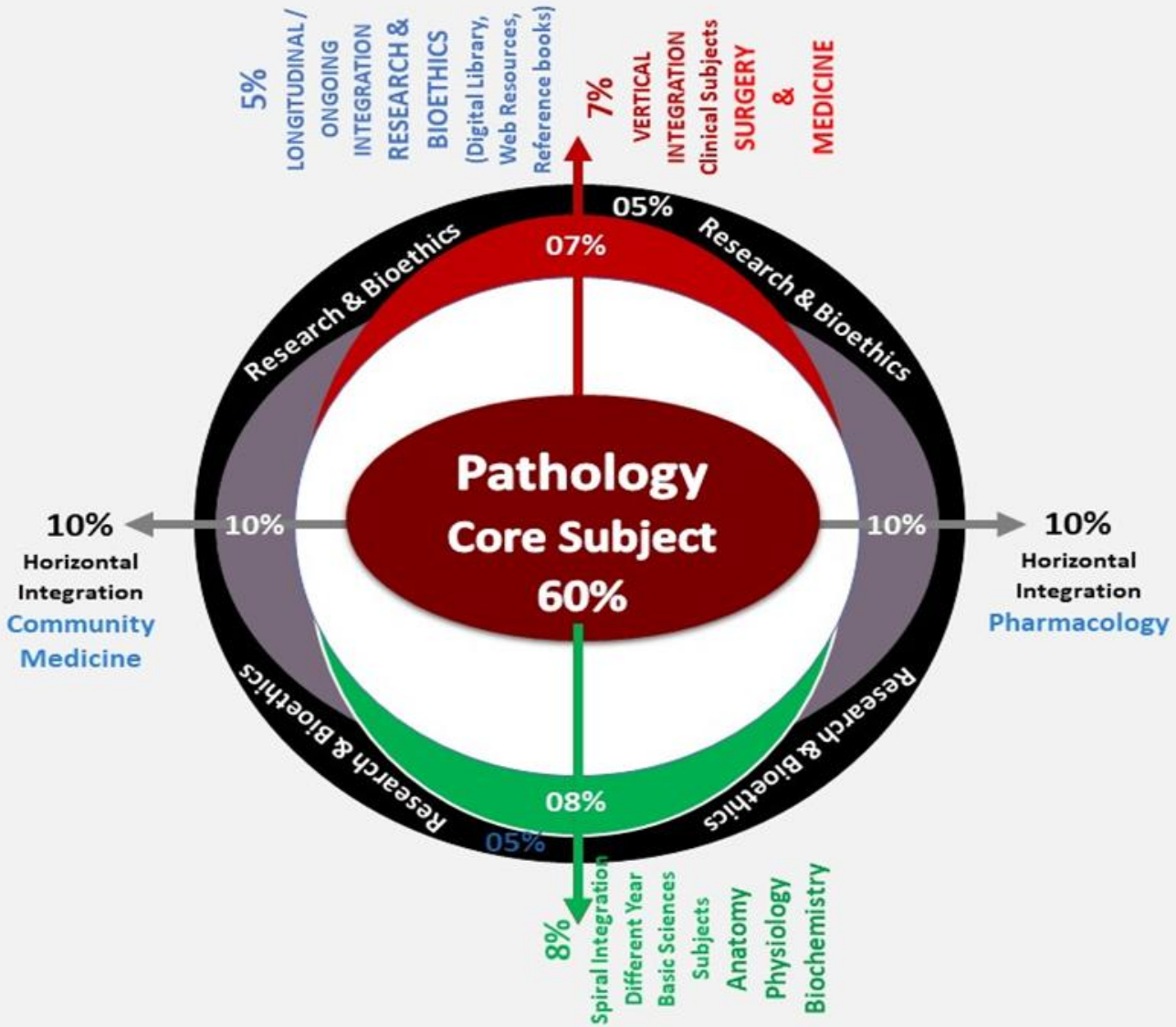

WORLD
AIDS
DAY

HUMAN IMMUNODEFICIENCY VIRUS (HIV)

Dr. NIDA ANJUM, SR, MU II, HFH

Prof. Umar's Clinically Oriented Integration Model
For Basic Sciences Interactive Lectures



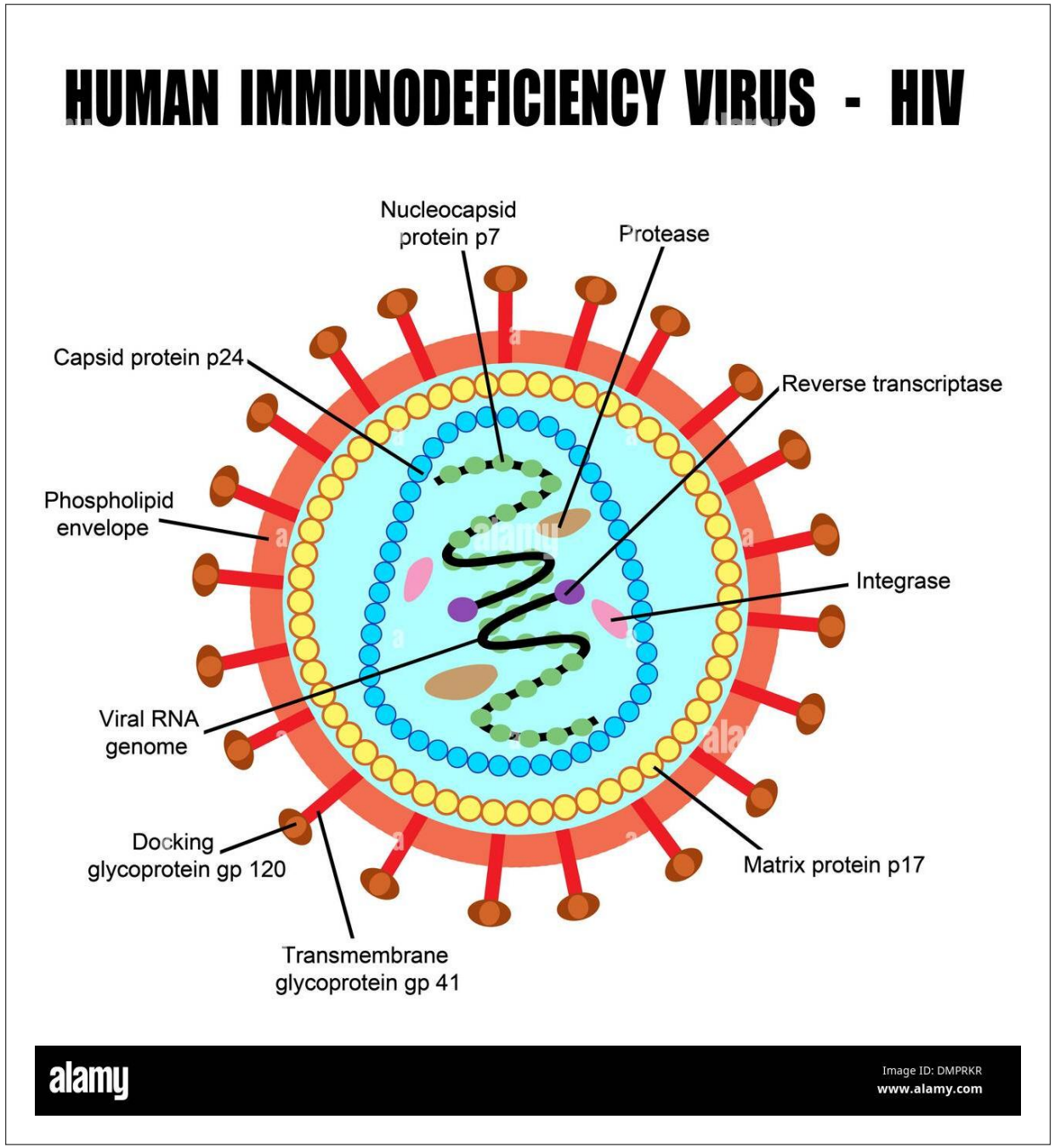
Model 3rd Year Pathology LGIS (≈30 slides)	
Core Subject – 60% (≈ 18-20 slides)	
Pathology (≈ 18-20 slides)	
Horizontal Integration – 20% (≈ 5-6 slides)	
Same Year Subjects	• Pharmacology (10%) (≈ 2-3 slides) • Community Medicine (10%) (≈ 2-3 slides)
Vertical Integration – 07% (≈ 2-3 slides)	
Clinical Subjects	• Medicine (3-5%) (≈ 1-2 slides) • Surgery (3-5%) (≈ 1-2 slides)
Spiral Integration – 08% (≈ 2-3 slides)	
Different Year Basic Sciences Subjects	• Anatomy (1-3%) (≈ 1-2 slides) • Physiology (1-3%) (≈ 1-2 slides) • Biochemistry (1-3%) (≈ 1-2 slides)
Longitudinal / Ongoing Integration – 05% (≈ 1-2 slides)	
Research & Bioethics (≈ 1-2 slides)	

LECTURE CONTENT ANALYSIS	
CORE CONTENT	60%
HORIZONTAL INTEGRATION	20%
VERTICAL INTEGRATION	15%
RESEARCH & ETHICS	5%

CONTENTS

INTRODUCTION

- HIV (human immunodeficiency virus) is a virus that attacks the body's immune system. If HIV is not treated, it can lead to AIDS (acquired immunodeficiency syndrome).
- There is currently no effective cure. Once people get HIV, they have it for life.
- But with proper medical care, HIV can be controlled. People with HIV who get effective HIV treatment can live long, healthy lives and protect their partners.



WHAT IS HIV?

- Enveloped ribonucleic acid (RNA) retrovirus.
- Lentivirus family.
- HIV genome: 3 retroviral genes (gag, pol, and env) and 6 regulatory genes.
- Species: HIV 1, HIV 2

EPIDEMIOLOGY:

- The acquired immunodeficiency syndrome (AIDS) was first recognized in **1981.**
- Earliest documented case of HIV infection: Democratic Republic of Congo in **1959.**
- HIV is a zoonotic infection with simian immunodeficiency viruses (SIV) from African primates, probably first infecting local hunters.
- HIV-1 was transmitted from Chimpanzees and HIV-2 from Sooty Mangabey monkeys.

EPIDEMIOLOGY:

- HIV-1 is the cause of the global HIV pandemic.
- There are three groups of HIV-1, representing three separate transmission events from chimpanzees: **M** ('major', worldwide distribution), **O** ('outlier') and **N** ('non-major and non-outlier').
- Group M consists of nine subtypes: A–D, F–H, J and K.
- Subtype C (which predominates in sub-Saharan Africa and India) accounts for half of infections and appears to be more readily transmitted.

PREVALENCE

- HIV continues to be a major global public health issue, having claimed **36.3 million** [27.2–47.8 million] lives so far.
- There were an estimated **37.7 million** [30.2–45.1 million] people living with HIV at the end of 2020, over two thirds of whom (25.4 million) are in the WHO African Region.
- In 2020, 680 000 [480 000–1.0 million] people died from HIV-related causes and 1.5 million [1.0–2.0 million] people acquired HIV.

TRANSMISSION OF HIV

Fluids that transmit HIV

- Blood
- Semen
- Vaginal Secretions
- Breast Milk
- Internal Fluids
- Cerebro-Spinal Fluid
- Amniotic Fluid

Fluids that do not transmit HIV (unless blood is present)

- Saliva
- Urine
- Tears
- Sweat
- Feces

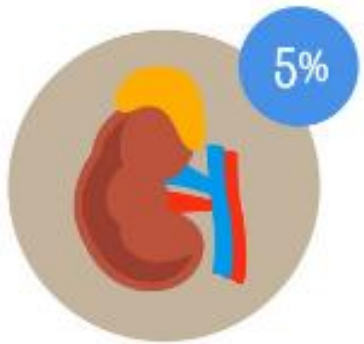
HIV/AIDS

HIV is transmitted

use of non-sterile syringes and tools

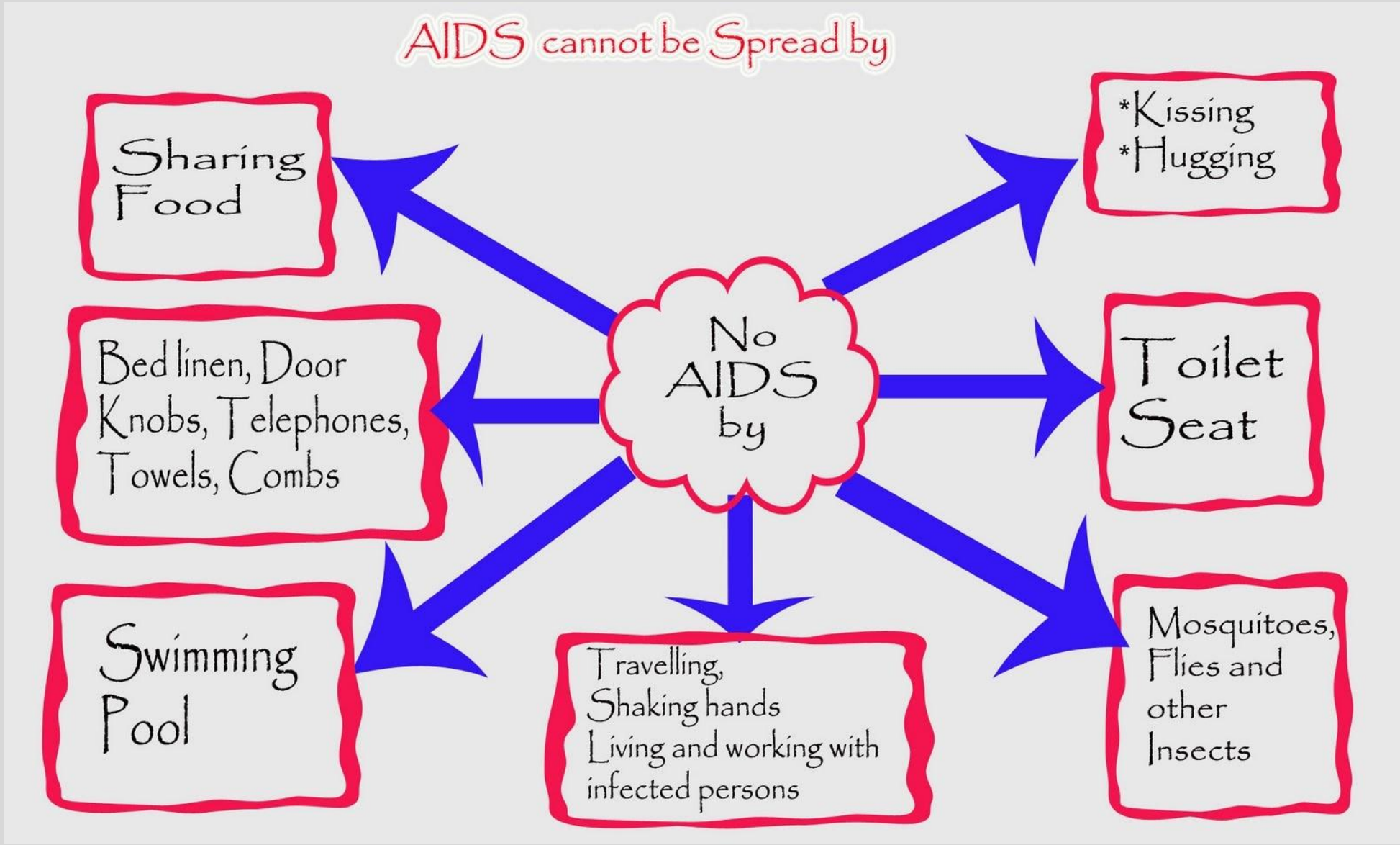
pregnancy breastfeeding

blood transfusion



organ transplant

unprotected sex


AIDS cannot be Spread by
Sharing Food
*Kissing
*Hugging
Bed linen, Door Knobs, Telephones, Towels, Combs
No AIDS by
Toilet Seat
Swimming Pool
Travelling, Shaking hands Living and working with infected persons
Mosquitoes, Flies and other Insects

LIFECYCLE OF HIV

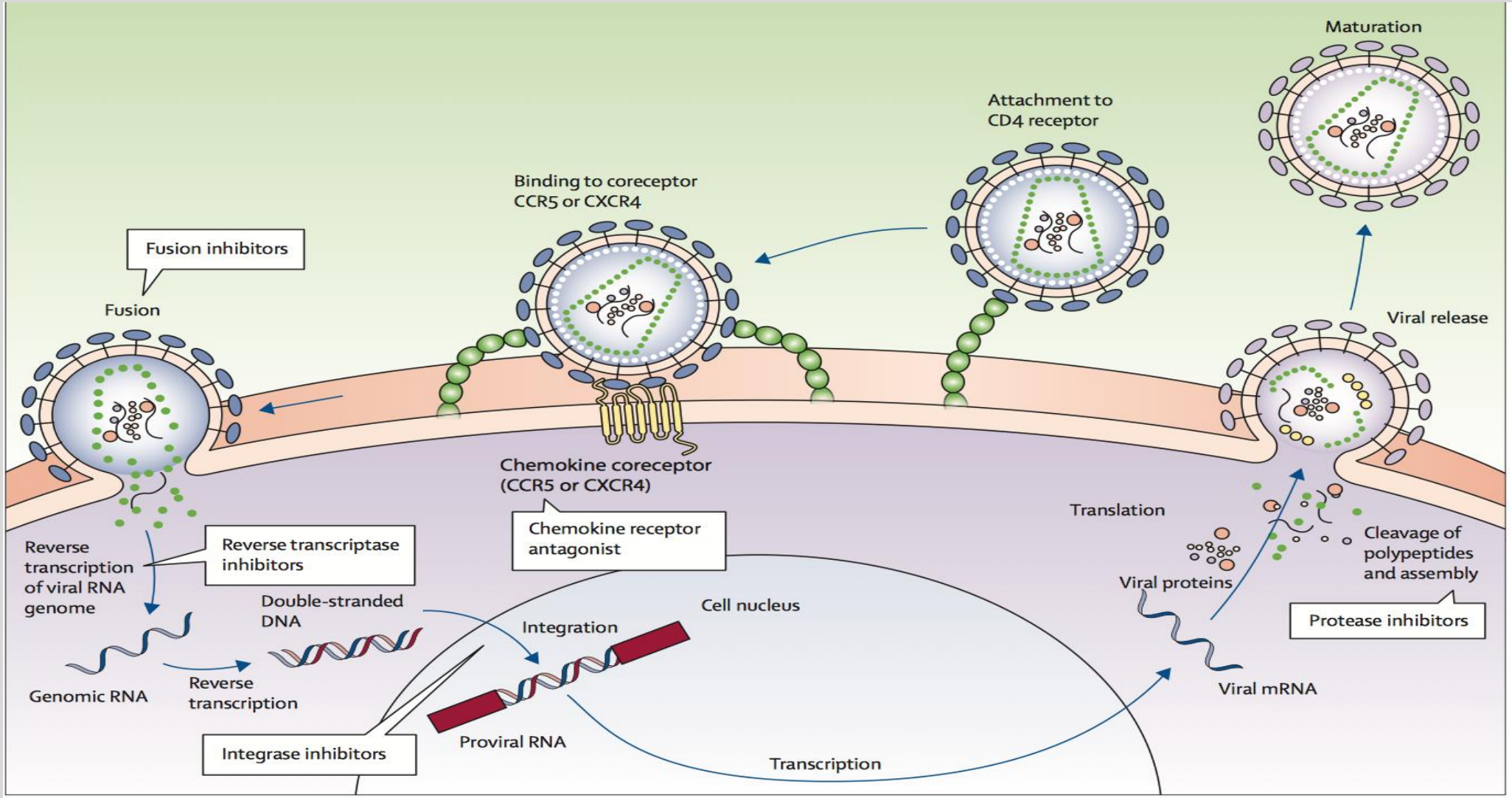
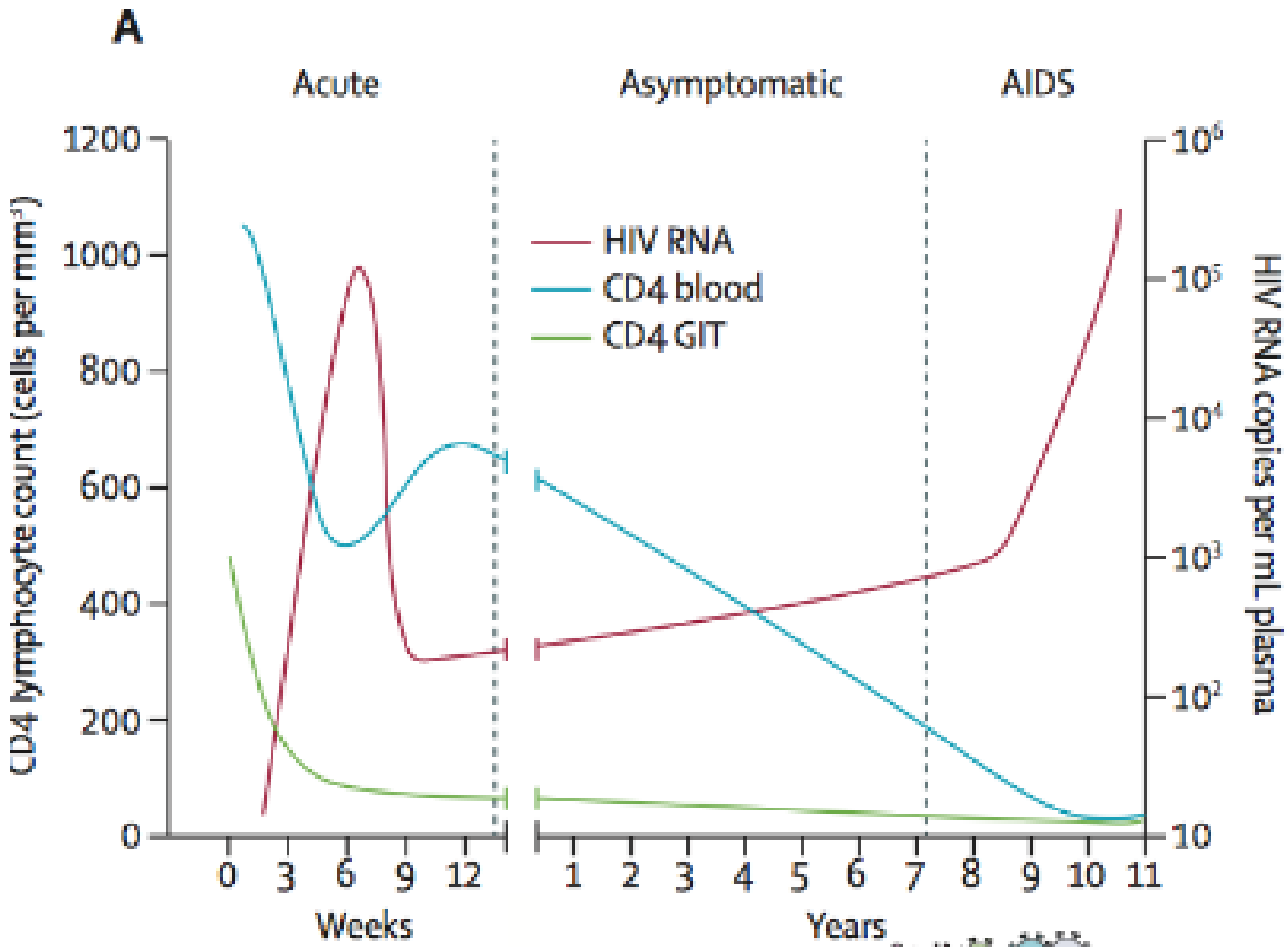


Figure 2: **HIV life cycle showing the sites of action of different classes of antiretroviral drugs**
Adapted from Walker and colleagues,[36] by permission of Elsevier.

CLINICAL FEATRES OF HIV:

- **Seroconversion illness -** seen in 10% of individuals a few (2 to 4) weeks after exposure and coincides with seroconversion. Presents with an infectious mononucleosis like illness.(fever, malaise, myalgias, pharyngitis, mucopapular rash, meningoencephalitis rare)
- **Latent period** - This is the period when the patient is completely asymptomatic and may vary from a few months to a more than 10 years. The median incubation period is 8-10 years.
- **AIDS-related complex or persistent generalized lymphadenopathy**. Defined as a prodrome to AIDS. May exhibit enlarged lymph nodes, fatigue, fever, night sweats, weight loss, and unexplained diarrhea, but do not have any of the more serious complications of AIDS.
- **Full-blown AIDS**. Characterized by the development of opportunistic infections.


A
Acute
Asymptomatic
AIDS
HIV RNA
CD4 blood
CD4 GIT
CD4 lymphocyte count (cells per mm³)
HIV RNA copies per mL plasma
1200
1000
800
600
400
200
0
10⁶
10⁵
10⁴
10³
10²
10
0 3 6 9 12
Weeks
1 2 3 4 5 6 7 8 9 10 11
Years

HIV infection/AIDS

Epidemiology
Incidence (US) ~ 38,000;
worldwide ~ 1.7 million (2018)
Peak incidence between ages 20 and 30
AIDS peak incidence approx. age 45

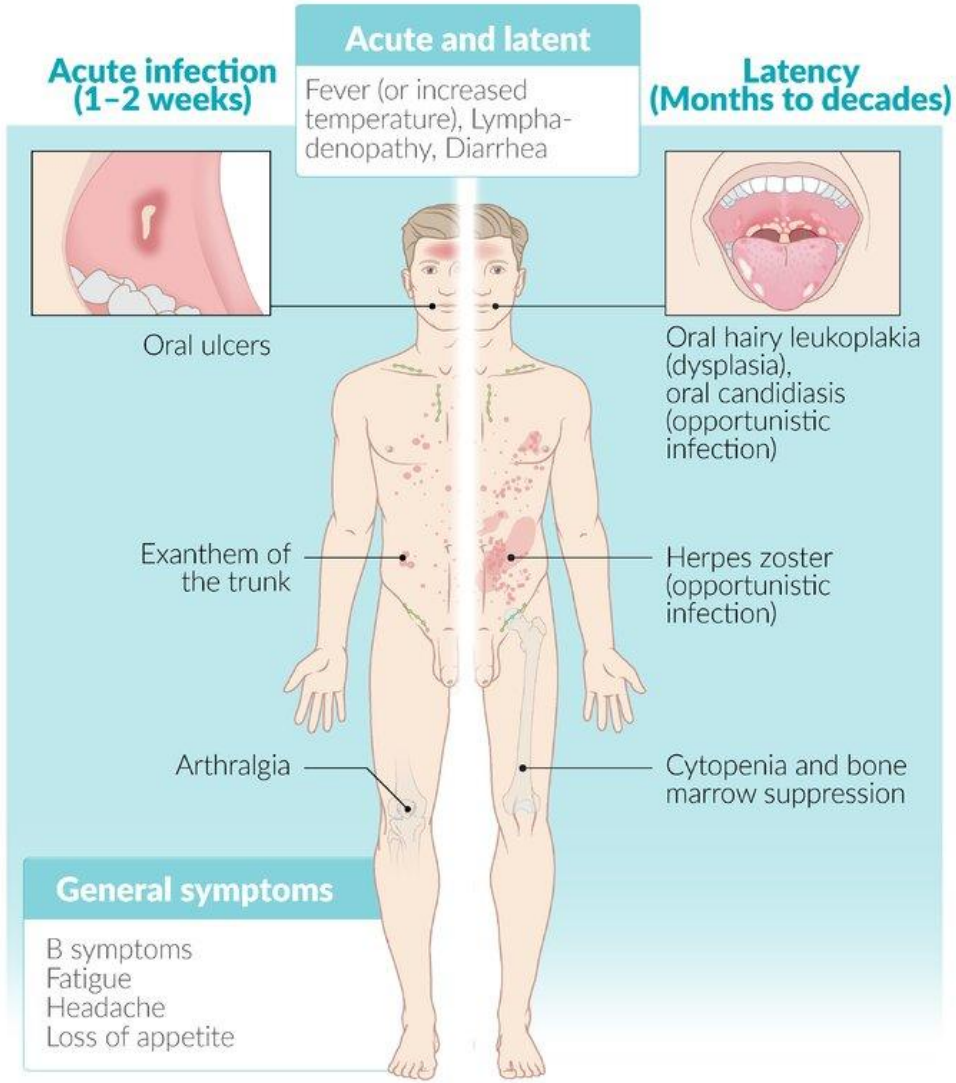
Prevalence (US) ~1.1 million;
worldwide ~ 38 million (2018)

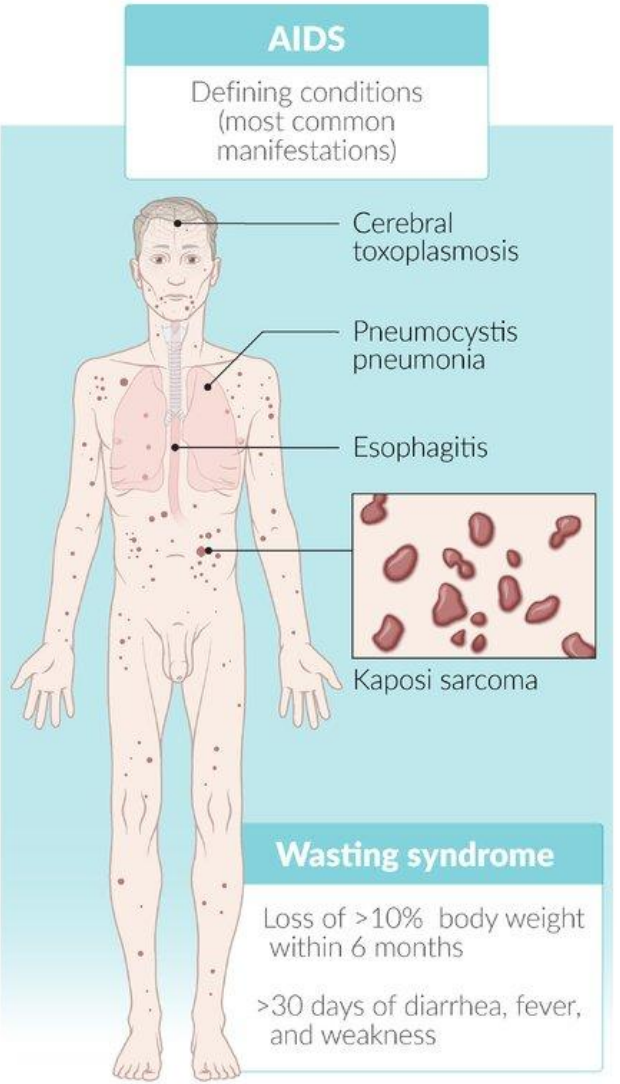
Etiology
Human immunodeficiency virus
Transmission: sexual, parenteral, vertical

Clinical stages
Acute infection - fever, fatigue, lymphadenopathy
Latent period - asymptomatic or non-AIDS-defining conditions
AIDS-defining conditions

Diagnosis
Screening test (e.g. combination antigen/antibody immunoassay)
Confirmatory test (e.g. antibody differentiation immunoassay)

Complications include
wasting syndrome, HIV encephalopathy, HIV-associated risk of cardiovascular disease, opportunistic infections, malignancies





KAPOSI SARCOMA

HAIRY LEUCOPLAKIA

ESOPHAGEAL CANDIASIS

DIAGNOSIS

TABLE 68-6 Interpretation of laboratory tests in diagnosis of HIV

Test	Purpose
Serology	
Antibody demonstration	
ELISA	Screening test
Rapid tests: dot blot assay, latex agglutination, HIV spot, and comb test	Screening test
Western blot	Confirmation test
Indirect immunofluorescence test	Confirmation test
Antigen detection	
p24 antigen	Early marker of infection
Molecular diagnosis	
Branched-chain DNA	Detection of virus in blood
Viral RNA RT-PCR	Detection of virus in blood
Isolation of virus	Test not readily available
CD4: CD8 T-cell ratio	Correlates of human immunodeficiency virus disea

LABORATORY INVESTIGATIONS FOR THE DIAGNOSIS OF HIV

Antibody Tests

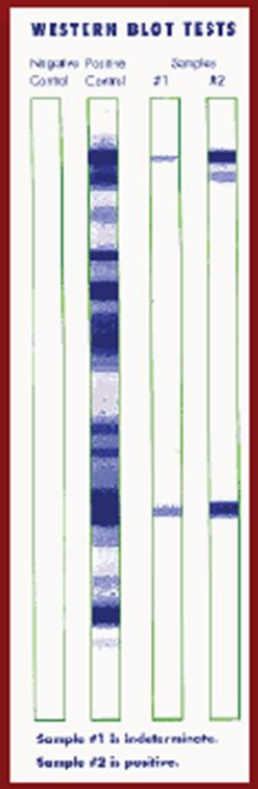
ELISA: Enzyme-Linked Immunosorbent Assay

- Screening test for antibodies (blood test)
- If result is positive, the test is performed again to rule out a false-positive.
- If result is positive again, the sample is sent for a Western Blot test.

Western Blot

- A Western blot test is typically used to confirm a positive HIV diagnosis. During the test, a small sample of blood is taken, and it is used to detect HIV antibodies, not the HIV virus itself.
- The Western blot test separates the blood proteins and detects the specific proteins (called HIV antibodies) that indicate an HIV infection. The Western blot is used to confirm a positive ELISA, and the combined tests are 99.9% accurate.

Picture of Western Blot



Need atleast three bands to confirm sample is positive. So sample no. 2 is positive

TREATMENT

ANTIRETROVIRAL DRUG THERAPY (ART)

ART has transformed HIV from a progressive illness with a fatal outcome into a chronic manageable disease with a near-normal life expectancy.

The goals of ART are to:

- Reduce the viral load to an undetectable level for as long as possible
- Improve the CD4 count to over 200 cells/mm3 so that severe HIV-related disease is unlikely.
- Improve the quantity and quality of life without unacceptable drug toxicity
- Reduce HIV transmission.

Six months after using antiretroviral therapy

TYPES OF ANTIRETROVIRAL DRUGS

CLASSES	DRUGS
Nucleoside reverse transcriptase inhibitors (NRTIs)	Abacavir, Emtricitabine, Lamivudine, Tenofovir
Non-nucleoside reverse transcriptase inhibitors (NNRTIs)	Efavirenz, Rilpivirine (only if viral load < 100 000)
Protease inhibitors (PIs)	Atazanavir, darunavir, lopinavir
Integrase inhibitors	Dolutegravir, bictegravir

Preferred agents for first-line ART globally are a second-generation integrase inhibitor (bictegravir or dolutegravir) combined with the NRTIs tenofovir plus emtricitabine or lamivudine

WHO AIDS STAGING

STAGE I	STAGE 2	STAGE 3	STAGE 4
Asymptomatic	Moderate unexpected weight loss	Unexpected severe weight loss	HIV wasting syndrome
Persistent generalized lymphadenopathy	Recurrent respiratory tract infection	Persistent oral candidisis	Pneumocystic pneumonia
	Herpes Zoster	Pulmonary tuberculosis	Karposi sarcoma
	Angular Cheilitis		Extra pulmonary tuberculosis
	Fungal nail infection		

WHEN TO START ANTIRETROVIRAL THERAPY?

- ART should be initiated in all adults living with HIV, regardless of WHO clinical stage and at any CD4 cell count (strong recommendation, moderate-quality evidence).
- As a priority, ART should be initiated in all adults with severe or advanced HIV clinical disease (WHO clinical stage 3 or 4) and adults with CD4 count ≤350 cells/mm3 (strong recommendation, moderate-quality evidence).
- ART should be initiated in all pregnant and breastfeeding women living with HIV regardless of WHO clinical stage and at any CD4 cell count and continued lifelong (strong recommendation, moderate-quality evidence).

PREVENTION

PREVENTIVE MEASURES:

- Avoidance of used syringes, or practice of sharing needles
- Protected sex
- Post-exposure Prophylaxis - a preventative treatment that uses antiretroviral drugs to treat individuals within 72 hours of high-risk exposure (ex. needle stick injury, unprotected sex, needle sharing)
- HIV positive pregnant woman is prescribed HIV medicines throughout pregnancy and childbirth, and HIV medicine is given to the baby for 4 to 6 weeks after giving birth, reducing risk of transmitting HIV to the baby to 1% or less.
- After delivery, avoidance of breast feeding to the child.

World Health Organization

Reduce your risk of getting HIV by:

Using condoms

Ensuring that your partners who are living with HIV are taking treatment

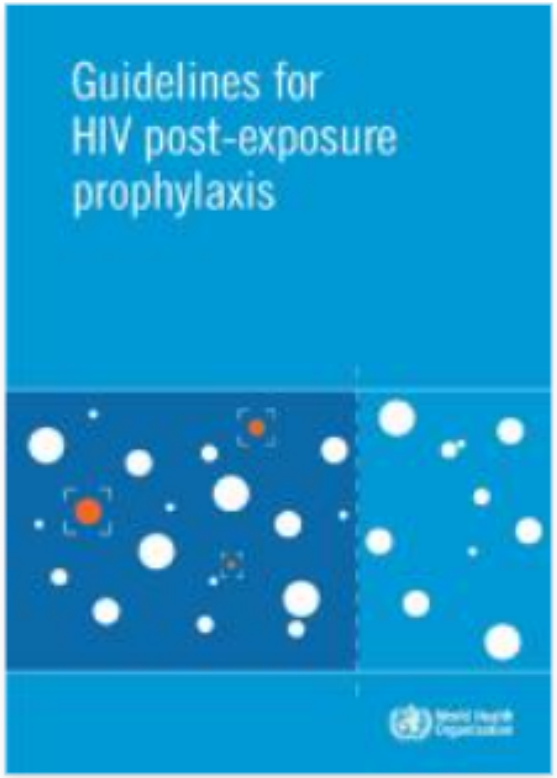
Using PrEP to prevent getting HIV if you have ongoing risk, including during pregnancy

Using sterile needles and syringes for all injections

Getting tested and treated for sexually transmitted infections

PREVENTION IS BETTER THAN CURE

THANKYOU



22 JULY 2024

Guidelines for HIV post-exposure prophylaxis

WHO's updated PEP guidelines prioritize broader access to PEP, including community-based delivery and task sharing to mitigate barriers such as stigma...

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ETHICAL ISSUES RELATED TO HIV

1. **Informed Consent Principle:** Patients must be fully informed about the HIV test, its implications, and the need for consent before testing.
2. **Confidentiality and Privacy Principle:** HIV status is highly sensitive information that must be protected.
3. **Duty to Warn vs. Patient Confidentiality Principle:** Balancing patient confidentiality with protecting others from harm.
4. **Stigma and Discrimination Principle:** Every patient deserves unbiased, non-discriminatory healthcare.