Infectious diseases

	4/5th Semester Classes on Infectious Diseases, 8-9AM, Tuesdays (LT-1)
	Topics
1	Approach to Infectious Diseases and their prevention
2	Antibiotic stewardship practices
3	Community-Acquired Infections
4	Health Care–Associated Infections
5	Gram-Positive Bacteria (part-1)
6	Gram-Positive Bacteria (part-2)
7	Gram-Negative Bacteria (part-1)
8	Gram-Negative Bacteria (part-2)
9	Spirochetal Diseases
10	Diseases Caused by Atypical/Miscellaneous Bacterial Infections
11	**Revision-cum-exam on bacteria (Must to know type)**
12	Infections Due to DNA Viruses
13	Infections Due to RNA Viruses (part 1)
14	Infections Due to RNA Viruses (part 2)
15	HIV/AIDS – part 1
16	HIV/AIDS – part 2
17	Fungal Infections
18	Parasitic Infections (part 1)
19	Parasitic Infections (part 2)
20	**Revision-cum-exam on Virus, Fungal, and Parasite (Must to know type)**

1

Clinical Manifestations

The center for disease control (CDC) has classified the clinical course of HIV infection under various groups.

1. **Acute HIV infection**
2. **Asymptomatic or Latent infection**
3. **Persistent generalized lymphadenopathy (PGL)**
4. **AIDS related complex**
5. **Full blown AIDS (Last stage)**

WHO clinical staging of HIV/AIDS for adults & adolescents 2010

Clinical Stage 1

Asymptomatic
Persistent generalized lumphadenopathy

Clinical Stage 2

Unexplained moderate weight loss (<10% of presumed or measured body weight)' Recurrent respiratory tract infections (sinusitis, tonsillitis, otitis media, pharyngitis) Herpes zoster Angular Cheilitis Recurrent oral ulceration Papular pruritic eruptions Seborrhoeic dermatitis Fungal nail infections

Clinical Stage 3

Unexplained 2 servere weight loss (>10% of presumed or measured body weight)
Unexplained chronic diarrhoea for longer than oneonth
Unexplained persistent fever (above 37.5OC intermittent or constant for longer than one month)
Persistent oral candidiais
Oral hairy leukoplakia Pulmonary tuberculosis
Severe bacterial infections (e.g. pneumonia, empyema, pyomyositis, bone or joint infection, meningitis, bacteraemia)
Acute necrotizing ulcerative stomatitis, gingivitis or periodontitis
Unexplained anaemia (<8 g/dl), neutropenia (<0.5 x 109/litre) and or chronic thrombocytopenia (<50 x 109/litre3)

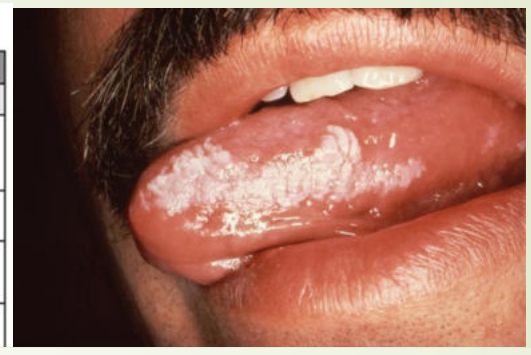
Clinical stage 4[3]

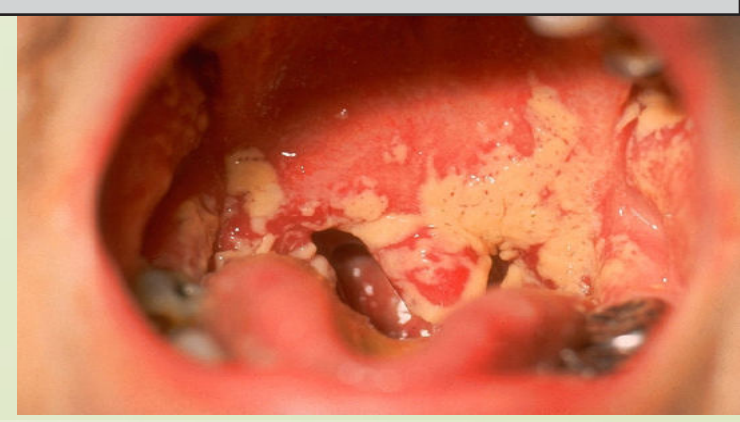
HIV wasting syndrome Pneumocystis pneumonia
Recurrent severe bacterial pneumonia
Chronic herpes simplex infection (orolabial, genital or anorectal ofmore than one month's dura- tion or visceral at anysite)
Oesophageal candidiasis (or candidiasis of trachea, bronchi or lungs) Extrapulmonary tuberculosis
Kaposi sarcoma
Cytomegalovirus infection (retinitis or infection of other organs) Central nervous system toxoplasmosis
HIV encephalopathy
Extrapulmonary cryptococcosis including menigitis
Disseminated mycosis (extrapulmonary histoplasmosis, coccidiomycosis) Recurrent septicaemia (including non-typhoidal salmonella)
Lymphoma (cerebral or Bcell non Hodgkin) Invasive cervical carcinoma
Atypical disseminated leishmaniasis
Symptomatic HIV-associated nephropathy or symptomatic HIV – associated cardiomyopathy

1 Assessment of body weight in pregnant women needs to consider expected weight gain of pregnancy. 2 Unexplained refers to where the condition is not explained by other conditions.
3 Some additional specific conditions can also be included in regional classifications (e.g. reactivation of American trypanosomiasis (meningoencephalitis and / or myocarditis) in Americas region, Penicillionsis in Aisa)

I. CDC AIDS surveillance case definition for adolescents and adults

	Clinical Categories		
CD4 Cell Categories	**A**	**B**	**C***
mm³(%)	**Asymptomatic, PGL or Acute HIV Infection**	**Symptomatic** (not A or C)**	**AIDS Indicator Condition (1987)**
1 >500/mm³ (≥29%)	A1	B1	C1
2 200 – 499/mm³ (14–28%)	A2	B2	C2
3 <200/mm³ (<14%)	A3	B3	C3





Acute HIV infection (window period or phase of Sero conversion)

-50–70% experience this, 3–6 weeks after primary infection

TABLE 226-10 CLINICAL FINDINGS IN THE ACUTE HIV SYNDROME

General	Neurologic
Fever	Meningitis
Pharyngitis	Encephalitis
Lymphadenopathy	Peripheral neuropathy
Headache/retroorbital pain	Myelopathy
Arthralgias/myalgias	Dermatologic
Lethargy/malaise	Erythematous maculopapular rash
Anorexia/weight loss	Mucocutaneous ulceration
Nausea/vomiting/diarrhea	

Asymptomatic or Latent infection

- **Clinical latency** may last from a few months to more than 10 years.
- During this period, the virus continues to multiply actively and infects and kills the cells of the immune system.

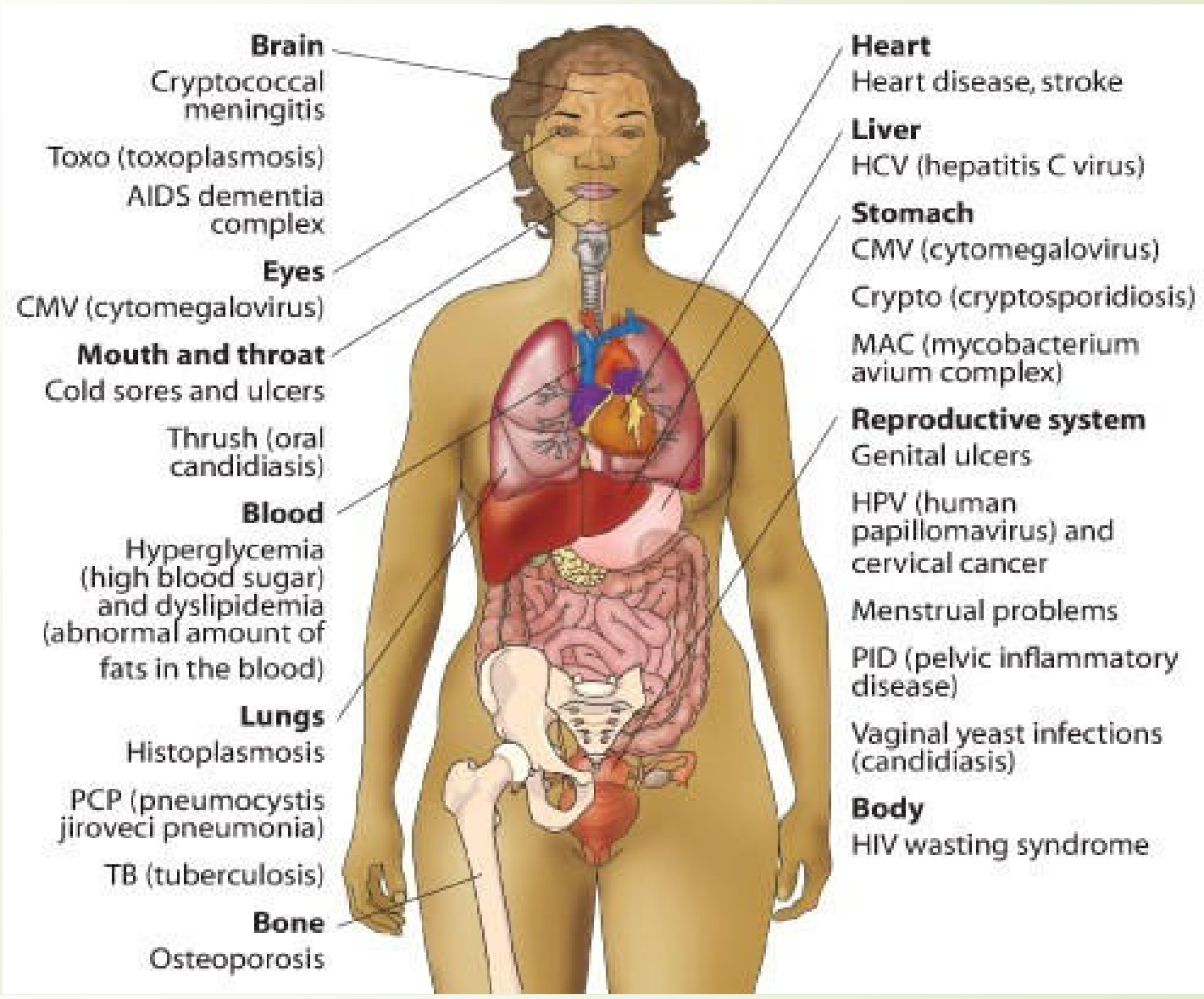
Persistent generalized lymphadenopathy (PGL)

- This has been defined by presence of enlarged lymph nodes, at least I cm in diameter, in two or more non contiguous extra inguinal sites, that persist for at least three months, in the absence of any current illness or medication that may cause lymphadenopathy.

AIDS related complex / Full blown AIDS

- A diagnosis of AIDS is made in individuals age 6 years and older with HIV infection and a CD4+ T cell count <200/μL and in anyone with HIV infection who develops one of the HIV-associated diseases.
- While AIDS-related illnesses are the leading cause of death in patients with HIV infection (<50% of deaths) Non-AIDS-defining malignancies, liver disease, and cardiovascular disease each account for 10–15% of deaths

Manifestations in AIDS



Treatment of HIV/AIDS as per NACO/ART Centre

Clinical Assessment

At the beginning of HIV care and prior to starting ART:

1. Determine the clinical stage of HIV infection
2. Identify history of past illnesses (especially those related to HIV)
3. Identify current HIV-related illnesses that require treatment
4. Determine the need for ART and OI prophylaxis
5. Identify coexisting medical conditions and treatments that may influence the choice of therapy

Medical History

HIV Testing

- Ever tested for HIV in the past?
- Date and place of first HIV test
- Reason for the test
- Documentation of the result
- Date of last negative HIV test result
- Previous CD4 cell counts (if available)
- Previous viral load (if available)

HIV risks (can have multiple factors)

- Unprotected sexual contact
- Injection drug use
- Men having sex with men
- Occupational exposure
- Perinatal transmission
- Recipient of blood products
- Unknown
- Partner's HIV status being positive

System Review

- Unexplained weight loss
- Swollen lymph nodes
- Night sweats and fever
- Unusual headaches or poor concentration
- Changes in appetite
- Skin rashes
- Sores or white spots in mouth
- Painful swallowing
- Chest pain, cough or shortness or breath
- Stomach pain, vomiting or diarrhea
- Numbness or tingling in hand or feet
- Muscular weakness and changes in vision

Past history of HIV related illnesses

- Oral candidiasis or candidaoesophagitis
- Persistent diarrhoea
- Tuberculosis
- Varicella zoster (Shingles)
- Oral hairy leukoplakia
- Pneumocystis juroveci pneumonia (PCP)
- Recurrent bacterial pneumonia
- Cyptococcal meningitis
- Toxoplasmosis
- Kaposi sarcoma
- Disseminated Mycobacteriumvium complex Cytomegalovirus (CMV) infection
- Invasive cervical cancer

Tuberculosis history

- Last chest X-ray
- History of past TB
- Treatment given (drugs and duration)
- History of exposure to TB

Sexually transmitted infections (STIs)

- Genital ulcer or other lesion
- Genital discharge (abnormal vaginal discharge in women)
- Lower abdominal pain

Gynaecological history

- Last PAP smear
- Menstrual irregularities
- Pelvic pain or discharge

General medical history

- Any other past medical condition, such as diabetes, hypertension, coronary artery disease, hepatitis B, heptatis C, hyperlipidaemia
- Mental health issues, e.g. depression

Pregnancy and contraception history

- Previous pregnancies and terminations
- Children and HIV status of children (living and dead)
- Exposure to ARVs during pregnancy
- Drugs and duration of ART
- Contraception used
- Last menstrual period

Vaccination history

- BCG
- Hepatitis A vaccine
- Hepatitis B vaccine

Medication

- Past use of drugs and reasons for taking them
- Current use of drugs and reasons for taking them
- Current use of traditional / herbal remedies
- Opioid substitution therapy (OST)

Allergies

- Known allergies to drugs or other substances or materials

ART history

- Current and past exposure to ARVs
- ARV use during pregnancy of PMTCT
- Which drugs taken and for how long

Psychosocial history

- Family history, e.g. other immediate family members with known HIV infection
- Social history e.g. maritial status, education, occupation, source of income

Substance use

- Understanding of and readiness to commence ART
- Partner's ART history (if HIV-positive)
- Alcohol, stimulant, opiate and other drug use
- Smoking history

Functional status

- Financial and family support status
- Disclosure status, readiness to disclose
- Availability of care and treatment supporter
- Able to work, go to school, do housework
- Ambulatory but not able to work
- Bed ridden
- Amount of day-to-day care needed

Physical examination

Record vital signs, body weight, height and body mass index (BMI), temperature, blood pressure, pulse rate, respiratory rate

Appearance	• Unexplained moderate or severe weight loss, HIV wasting • Rapid weight loss in suggestive of active OI, especially if associated with fever • Gradual weight loss (not caused by malnutrition or other obvious illness) is suggestive of HIV infection • "Track marks" and soft tissue infections which are common among IDUs
Consider conditions other than HIV	• Malaria, tuberculosis, syphilis, gastrointestinal infections, bacterial pneumonia, pelvic inflammatory disease, viral hepatitis
Skin	• Look for signs of HIV-related and other skin problems. These include diffuse dry skin, typical lesions of PPE, especially on the legs, seborrhoetic dermatitis on face and scalp • Look for herpes simplex and herpes zoster or scarring of previous herpes zoster (especially multi-dermatome)
Lymph nodes	• Start with posterior cervical nodes • PGL (persistent glandular lymphadenopathy) typically presents as multiple bilateral, soft, non-tender, mobile cervical nodes, Similar nodes may be found in the armpits and groins • Tuberculous lymph nodes typically present as unilateral, painful, hard enlarging nodes, with constitutional symptoms such as fever, night sweats and weight loss
Mouth	• Look for signs suggestive of HIV infection including white plaques on tongue, cheeks and roof of mouth (oral candida), white stripped lesions on the side of the tongue (OHL) and craking at the corners of the mouth (angular cheilitis) • Difficulty in swallowing is commonly caused by oesophageal candida
Chest	• The most common problems will be PCP and TB • Signs and symptoms are cough, shortness of breath, haemoptysis, weight loss, fever, congestion or consolidation • Perform a chest X-ray, if symptomatic
Abdomen	• Hepatosplenomegaly, masses and local tenderness • Jaundice may indicative viral hepatitis
Ano-genital	• Herpes simplex and other genital sores / lesions, vaginal or penile discharge • Perform PAP smear, if possible
Neurological examination	• Focus on visual fields and the signs of neuropathy (bilateral peripheral or localized mono-neuropathies) • Assess focal neurological deficit

Note : During each consultation, patient is to be clinically screened for TB (history and physical examination)

Laboratory Monitoring for patients at ART centres

Essential tests	Additional tests
• Haemogram/CBC, • Urine for routine and microscopic examination, • fasting blood sugar, • blood urea, • ALT (SGPT), • VDRL, • Serum creatinine (when considering TDF) • CD4 count, • X-ray Chest PA view. • Pregnancy test (if required) • Symptoms and signs directed investigations for ruling out OIs.	For all patients to be started on ART (as per the physician's decision depending on clinical presentation) • USG abdomen, • sputum for AFB, • CSF analysis etc. Efforts to be made to fast track these investigations so that ART initiation is not delayed. PAP smear & Fundus examination also to be done but ART initiation not to be delayed for these tests.
Tests for Special Situation	**Tests for monitoring purpose**
• HBsAg: for all patients if facility is available but mandatorily for those with history of IDU, multiple blood & blood products transfusion, ALT > 2 times of ULN, on strong clinical suspicion. But ART not to be withheld if HBsAg testing is not available. • Anti - HCV antibody: only for those with history of IDU, multiple blood & blood products transfusion, ALT>2 times of ULN, on strong clinical suspicion. • For patients with Hepatitis B or C co-infection: further tests may be required to assess for chronic active hepatitis • For patients to be switched to a PI based regimen: Blood Sugar, LFT and Lipid profile to be done at baseline.	**Essential:** CD4, Hb, TLC, DLC, ALT (SGPT). **TDF based regimen:** Creatinine/ creatinine clearance, every 6 months or earlier if required. **AZT based regimen:** Hb at 15 days, then every month for initial 3 months, 6 months and then every 6 months/ as & when indicated. **NVP based regimen:** ALT (SGPT) at 15 days, 1 month and then every 6 months. **EFV based regimen:** lipid profile should also be done yearly. **ATV based regimen:** LFT to be done at 15 days, 1 month, 3 month, 6 months and then every 6 months. Blood sugar and Lipid profile every 6 months for patients on PI based regimen. All the above tests can be done earlier based on clinicians assessment/discretion Other investigations during follow up as per requirement /availability.

Note: All above investigations other than C04 and viral load estimations (when required), shall be done from the health facility where the centre is located, with support from State Health Department

Goals of ARV therapy

- Clinical goals : Prolongation of life and improvement in quality of life
- Virological goals : Greatest possible reduction in viral load for as long as possible
- Immunological goals : Immune reconstitution that is both quantitative and qualitative
- Therapeutic goals : Rational sequencing of drugs in a fashion that achieves clinical, virological and immunological goals while maintaining treatment options, limiting drug toxicity and facilitating adherence
- Reduction of HIV transmission in individuals : Reduction of HIV transmission by suppression of viral load

When to start ART in Adults and Adolescents

WHO Clinical Stage	Recommendations
HIV infected Adults & Adolescents (Including pregnant women)	
Clinical Stage I and II	Start ART if CD4 < 500 cells/mm3
Clinical Stage III and IV	Start ART irrespective of CD4 count
For HIV and TB/Kalaazar co-infected patients	
Patients with HIV and TB co-infection (Pulmonary/ Extra-Pulmonary)	Start ART irrespective of CD4 count and type of tuberculosis (Start ATT first, initiate ART as early as possible between 2 weeks to 2 months when TB treatment is tolerated)
For HIV and Hepatitis B and C co-infected patients	
HIV and any co-infection – without any evidence of chronic active Hepatitis	Start ART if CD4 < 500 cells/mm3
HIV and any co-infection – With documented evidence of chronic active Hepatitis	Start ART irrespective of CD4 count

Managing OIs before starting ART	
Clinical Picture	**Action**
Any undiagnosed active infection with fever	Diagnose and treat first; start ART when stable
TB	Treat TB first; start ART as recommended in TB section (within 2 weeks to 2 months)
PCP	Treat PCP first; start ART when PCP treatment is completed
Invasive fungal diseases: oesophageal candidiasis, cryptococcal meningitis, penicilliosis, histoplasmosis	Treat esophageal candidiasis first; start ART as soon as the patient can swallow comfortably Treat cryptococcal meningitis, penicilliosis, histoplasmosis first; start ART when patient is stabilized or OI treatment is completed
Bacterial pneumonia	Treat pneumonia first; start ART when treatment is completed
Malaria	Treat malaria first; start ART when treatment is completed

Drug reaction	Do not start ART during an acute reaction
Acute diarrhoea which may reduce absorption of ART	Diagnose and treat first; start ART when diarrhoea is stabilized or controlled
Non-severe anaemia (Hb < 8 g/litre)	Start ART if no other causes for anaemia are found (HIV is often the cause of anaemia); avoid AZT
Skin conditions such as PPE and seborrhoeic dermatitis, psoriasis, HIV-related exfoliative dermatitis	Start ART (ART may resolve these problems)
Suspected MAC, cryptosporidiosis and microsporidiosis	Start ART (ART may resolve these problems)
Cytomegalovirus infection	Treat if drugs available; if not, start ART
Toxoplasmosis	Treat; start ART after 6 weeks of treatment and when patient is stabilized

CPT Prophylaxis

Co-trimoxazole prophylaxis recommendations		
Commencing primary CPT	**CD4 awaited**	**CD4 available**
	WHO clinical stage 3 or 4 (This includes all patients with TB)	Any WHO clinical stage and CD4 <250 cells/mm3 or Any WHO clinical stage, CD4 <350 cells/mm3 and if patient is symptomatic or WHO stage 3 or 4 irrespective of CD4 count
Commencing secondary CPT	For all patients who have completed successful treatment for PCP until CD4 is >200 (at least on two occasions, done 6 months apart)	
Timing the initiation of co-trimoxazole in relation to initiating ART	Start co-trimoxazole prophylaxis first. Start ART about two weeks later if the patient can tolerate co-trimoxazole and has no symptoms of allergy (rash, hepatotoxicity) Meanwhile, make use of the time for adherence and treatment preparation	
Dosage of cotrimoxazole	One double-strength tablet or two single-strength tablets once daily– total daily dose of 960 mg (800 mg SMZ + 160 mg TMP)	
Cotrimoxazole for pregnant women	Women who fulfill the criteria for CPT should continue on it throughout pregnancy. If a woman requires CPT during pregnancy, it should be started regardless of the stage of pregnancy Breastfeeding women should continue CPT where indicated	
Patients allergic to sulpha-based medications	Dapsone 100 mg per day, if available Co-trimoxazole desensitization may be attempted but not in patients with a previous severe reaction to CTX or other sulpha-containing drugs	
Monitoring	No specific laboratory monitoring is required in patients receiving co-trimoxazole	

When to stop Cotrimoxazole Prophylaxis	
When to stop prophylaxis (cotrimoxazole or Dapsone) in patients on ART	If CD4 count >250 for at least 6 months and If patient is on ART for at least 6 months, is asymptomatic and well

Notes:
* If CPT is started at CD4 levels between 250–350 cells/mm^3: CD4 counts should have increased, patient is on ART for at least 6 months, is asymptomatic and well; before CPT is stopped.

ART in Adults and Adolescents

Nucleoside reverse transcriptase inhibitors (NRTI)	**Non-nucleoside reverse transcriptase inhibitors (NNRTI)**	**Protease inhibitors (PI)**
Zidovudine (AZT/ZDV)*	Nevirapine* (NVP)	Saquinavir* (SQV)
Stavudine (d4T)*	Efavirenz*(EFV)	Ritonavir* (RTV)
Lamivudine (3TC)*	Delavirdine (DLV)	Nelfinavir* (NFV)
Didanosine (ddI)*	**Fusion inhibitors (FI)**	Amprenavir (APV)
Zalcitabine (ddC)*	Enfuviritide (T-20)	Indinavir* (INV)
Abacavir (ABC)*	**Integrase Inhibitors**	Lopinavir/Ritonavir (LPV)*
Emtricitabine (FTC)	Raltegravir	Foseamprenavir (FPV)
(NtRTI)	**CCR5 Entry Inhibitor**	Atazanavir (ATV)*
Tenofavir (TDF)*	Maraviroc	Tipranavir (TPV)

** Available in India*

Revised NACO ART Regimen 2012		
Regimen I	Zidovudine + Lamivudine + Nevirapine	First line Regimen for patients with Hb ≥9 gm/dl and not on concomitant ATT
Regimen I (a)	Tenofovir + Lamivudine + Nevirapine	First line Regimen for patients with Hb <9 gm/dl and not on concomitant ATT
Regimen II	Zidovudine + Lamivudine + Efavirenz	First line Regimen for patients with Hb ≥9 gm/dl and on concomitant ATT
Regimen II (a)	Tenofovir + Lamivudine + Efavirenz	First line Regimen for patients with Hb <9 gm/dl and on concomitant ATT First line for all patients with Hepatitis B and/or Hepatitis C co-infection First line Regimen for pregnant women, with no exposure to sd-NVP in the past
Regimen III	Zidovudine + Lamivudine + Atazanavir/ Ritonavir	Regimen for patients on AZT Containing first line regimen, who develop toxicity to both NVP and EFV Also Second line regimen for those who are on TDF containing first line regimen if Hb ≥ 9 gm/dl
Regimen III(a)	Zidovudine + Lamivudine + Lopinavir / Ritonavir	For patients of Regimen III who develop severe Atazanavir toxicity First line regimen for patients with HIV-2 infection with Hb ≥ 9 gm/dl
Regimen IV	Tenofovir + Lamivudine+ Atazanavir/ Ritonavir	Second line regimen for those who are on AZT/d4T containing regimen in the first line. Also for patients on TDF containing first line regimen who develop toxicity to both NVP and EFV
Regimen IV (a)	Tenofovir + Lamivudine+ Lopinavir/ Ritonavir	For patients on Regimen IV who develop severe Atazanavir toxicity First line Regimen for patient with HIV 2 infection with Hb < 9 gm/dl First line Regimen for all women exposed to sd-NVP in the past
Regimen V	Stavudine+ Lamivudine+ Atazanavir/ Ritonavir	Second line for those who are on TDF containing regimen in the first line if Hb < 9 gm/dl
Regimen V(a)	Stavudine+ Lamivudine+ Lopinavir/ Ritonavir	For patients on Regimen V who develop severe Atazanavir toxicity

Choice of NRTIs		
NRTI	**Advantages**	**Disadvantages**
3TC	Good safety profile, non-teratogenic Once daily Effective against hepatitis B Widely available, including In FDCs	Low genetic barrier to resistance
FTC**	An alternative to 3TC Good safety profile Same efficacy as 3TC against HIV and hepatitis B and the same resistance profile	No added advantage over 3TC except as daily dose Can be used as once-a-day dose in combination with TDF and EFV.(i.e. reduced pill burden and dosing schedule)
TDF*	Good efficacy, safety profile Once daily regimens Metabolic complications, such as lactic acidosis and lipoatrophy, are less common than with d4T	Renal dysfunction has been reported Safety in pregnancy not established Adverse effects on foetal growth and bone density reported Limited availability at SACS on case-to-case basis
AZT	Generally well tolerated Widely available, including in FDCs Metabolic complications less common than with d4T	Initial headache and nausea Severe anaemia and neutropenia Haemoglobin monitoring recommended
ABC**	Good efficacy profile Once daily Causes the least lipodystrophy and lactic acidosis	Severe hypersensitivity reaction in 2-5% of adults
D4T	Good efficacy profile and cheap No or limited laboratory monitoring Widely available in FDCs	Most associated with lactic acidosis, lipoatrophy and peripheral neuropathy

** Shall be available on case to case basis*
*** Not supplied by NACO at present*

Routine Monitoring of Patients on ART

Tests	Day 0 (baseline)	At 15days	At 1 month	At 2 month	At 3 month	At 6month &
Hb/CBC	✓	✓ (if on AZT)	✓ (if on AZT)	✓ (if on AZT)	✓	✓
Urea	✓					✓
LFT	✓	✓ (if on ATV)	✓ (if on ATV)		✓ (if on ATV)	✓
ALT @	✓	✓ (if on NVP)	✓ (if on NVP)			✓ *
Urinalysis	✓					✓ (if on TDF)
Creatinine	✓ (If planning for TDF)					✓ (if on TDF)
Lipid profile	✓ (if on EFV and PI)					✓ (if on d4T, EFV or PI)
Random Blood sugar	✓					✓ (if on PI)
CD4	✓					✓
Pregnancy testing	✓ (if planning for EFV)					
XrayChest & Mx	✓					
CD4 %or counts ^						✓
Plasma Viral Load#	✓	Not recommended under national programme				

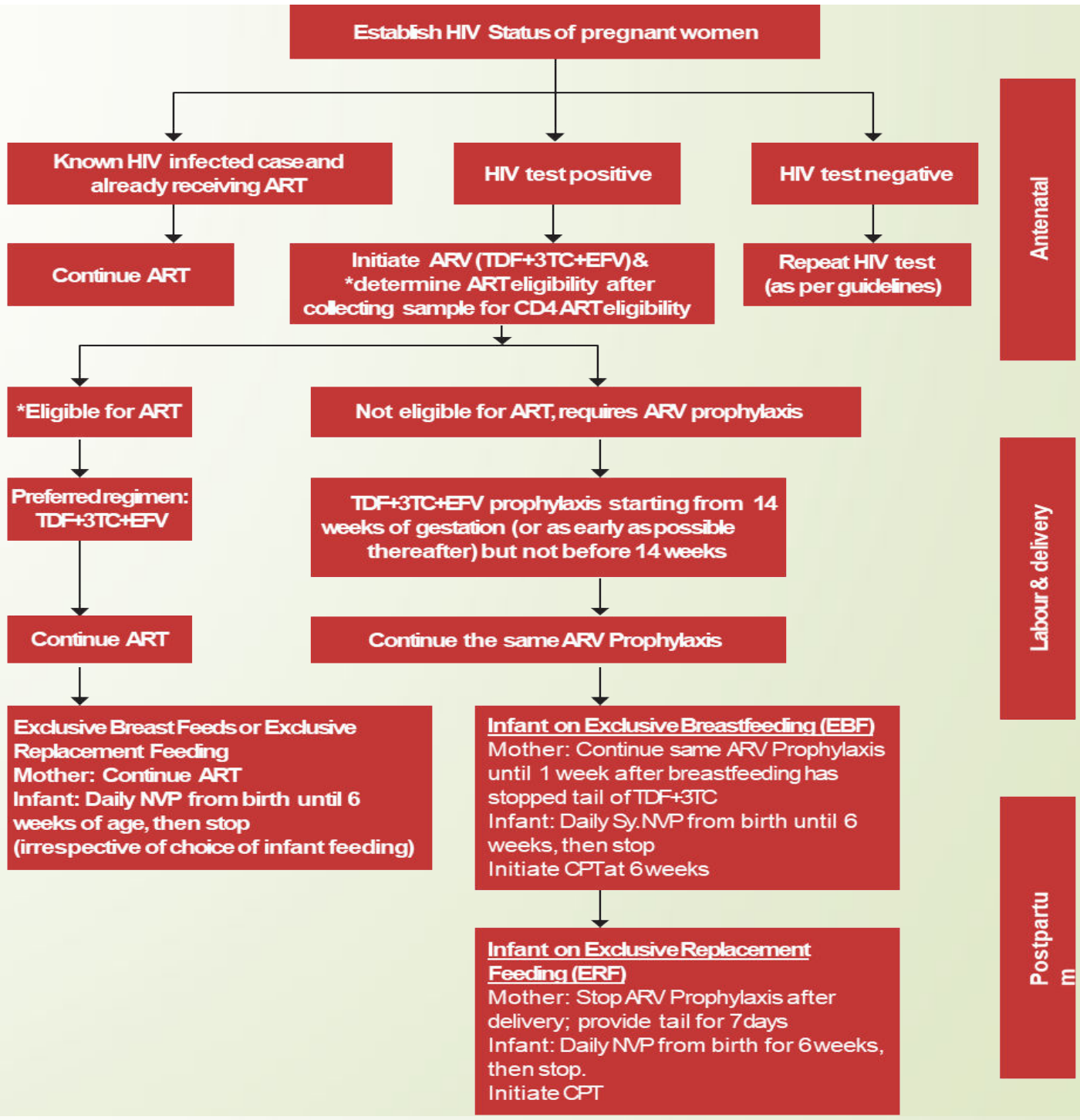
PPTCT Services

Prong 1: Primary prevention of HIV, especially among women of childbearing age

Prong 2: Prevention of unintended pregnancies among women living with HIV

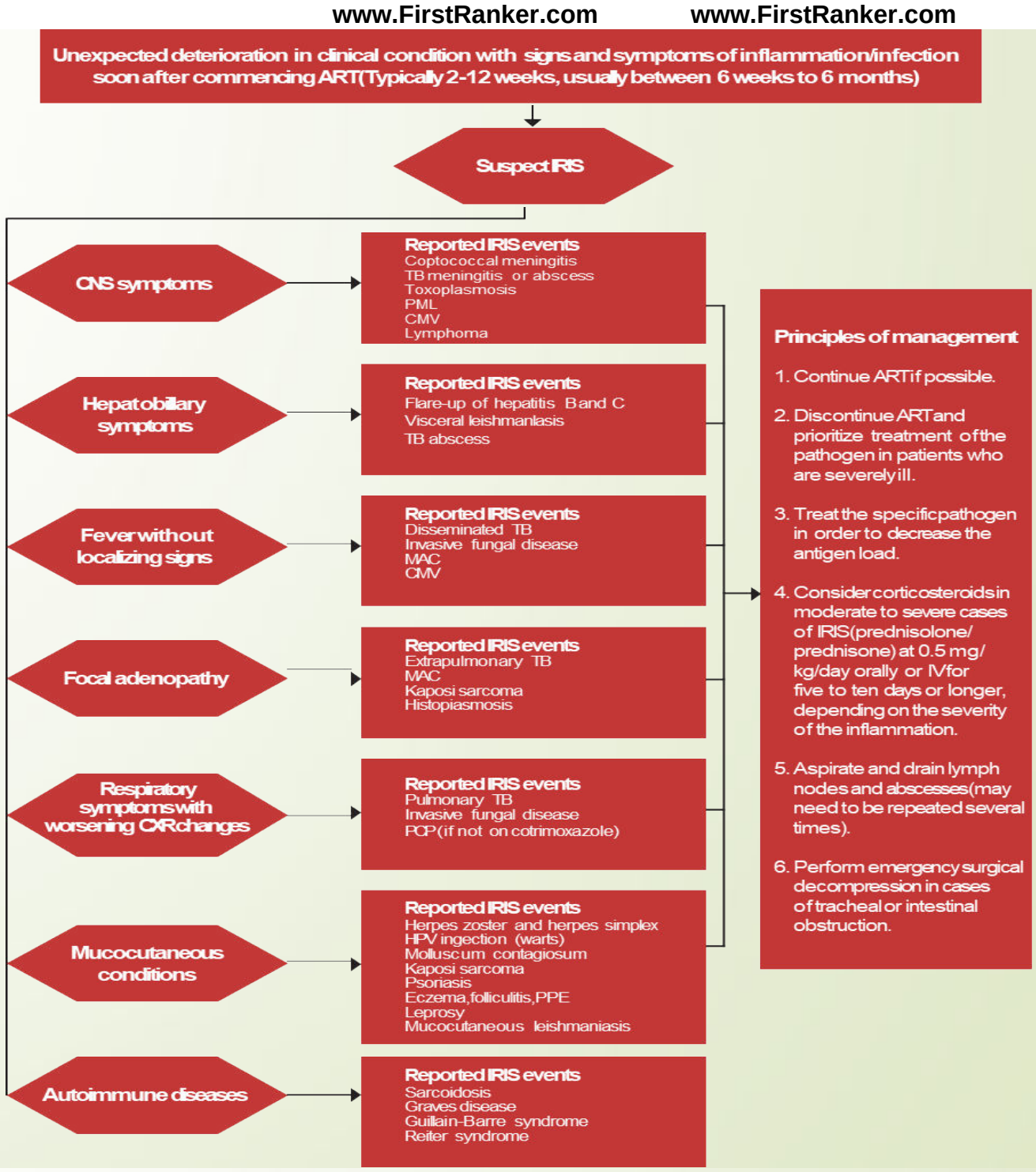
Prong 3: Prevention of HIV transmission from pregnant women infected with HIV to their child

Prong 4: Provide care, support and treatment to women living with HIV, her children and family.



What to Expect in the First Six Months of Therapy

1. **CD4 recovery**
2. **Early ARV toxicity**
3. **Mortality on ART**
4. **Immune reconstitution inflammatory syndrome** (In India, the agreed practical definition of IRIS would be the "occurrence or manifestations of new OIs or existing OIs within six weeks to six months after initiating ART; with an increase in CD4 count")



What Toxicities to Expect after Commencing First-line ART

Short term	Medium Term		Long Term
Drowsiness	Nephrolithiasis	Lactic	Osteopenia
Hepatoxicity	Teratogenicity	Diabetes	
Rash Anaemia	Hyperlipidaemia	Lipodystrophy	Cardiaovascular disease
Nausea and Vomiting	Peripheral neuropathy		Atherosclerosis
Confusion Diarrhoea	Pancreatitis	Hair loss Skin and Nail Changes	

Clinical, immunological and virological definitions of treatment failure for first-line regimen (WHO, 2010)	
Clinical failure	New or recurrent WHO stage 4 condition, after at least 6 months of ART
Immunological failure	• Fall of CD4 count to pre-therapy • 50% fall from the on-treatment peak value • Persistent CD4 levels below 100 cells/mm
Virological Failure	Plasma viral load >5,000 copies/ml after at least 6 months of ART

IDIOPATHIC CD4+ T LYMPHOCYTOPENIA

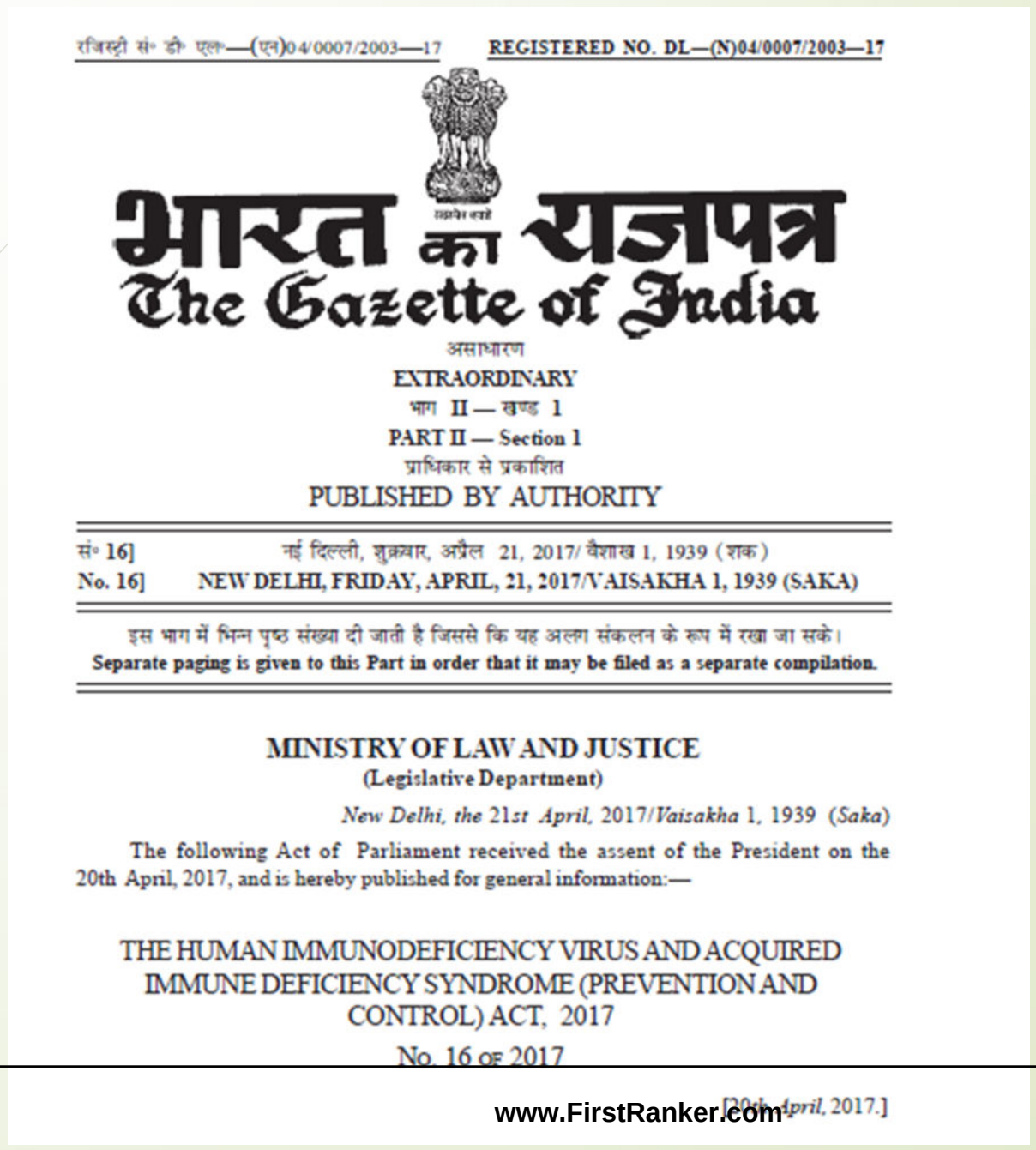
Recognized in 1992 characterized by:

- An absolute CD4+ T cell count of <300/µl or <20% of total T cells on a minimum of two occasions at least 6 weeks apart;
- No evidence of HIV-1, HIV-2, HTLV-1, or HTLV-2 on testing; and
- The absence of any defined immunodeficiency or therapy associated with decreased levels of CD4+ T cells

Development of vaccine

Development of vaccine is fraught with several problems unique to this virus. These include-

1) HIV can mutate rapidly, thus, it is not possible to design antibodies against all antigens.
2) Antibody alone is not sufficient, cell mediated immunity may also be necessary.
3) Virus enters the body not as free virions but also as infected cells, in which the virus or the provirus is protected against antibody or cell mediated lysis.
4) Virus readily establishes life long latent infection hiding from antibodies.



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भारत का राजपत्र
The Gazette of India

असाधारण
EXTRAORDINARY
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PART II — Section 1
प्राधिकार से प्रकाशित
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इस भाग में भिन्न पृष्ठ संख्या दी जाती है जिससे कि यह अलग संकलन के रूप में रखा जा सके।
Separate paging is given to this Part in order that it may be filed as a separate compilation.

MINISTRY OF LAW AND JUSTICE
(Legislative Department)

New Delhi, the 21st April, 2017/Vaisakha 1, 1939 (Saka)

The following Act of Parliament received the assent of the President on the 20th April, 2017, and is hereby published for general information:—

THE HUMAN IMMUNODEFICIENCY VIRUS AND ACQUIRED IMMUNE DEFICIENCY SYNDROME (PREVENTION AND CONTROL) ACT, 2017

No. 16 OF 2017

[20th *April*, 2017.]

Thank you