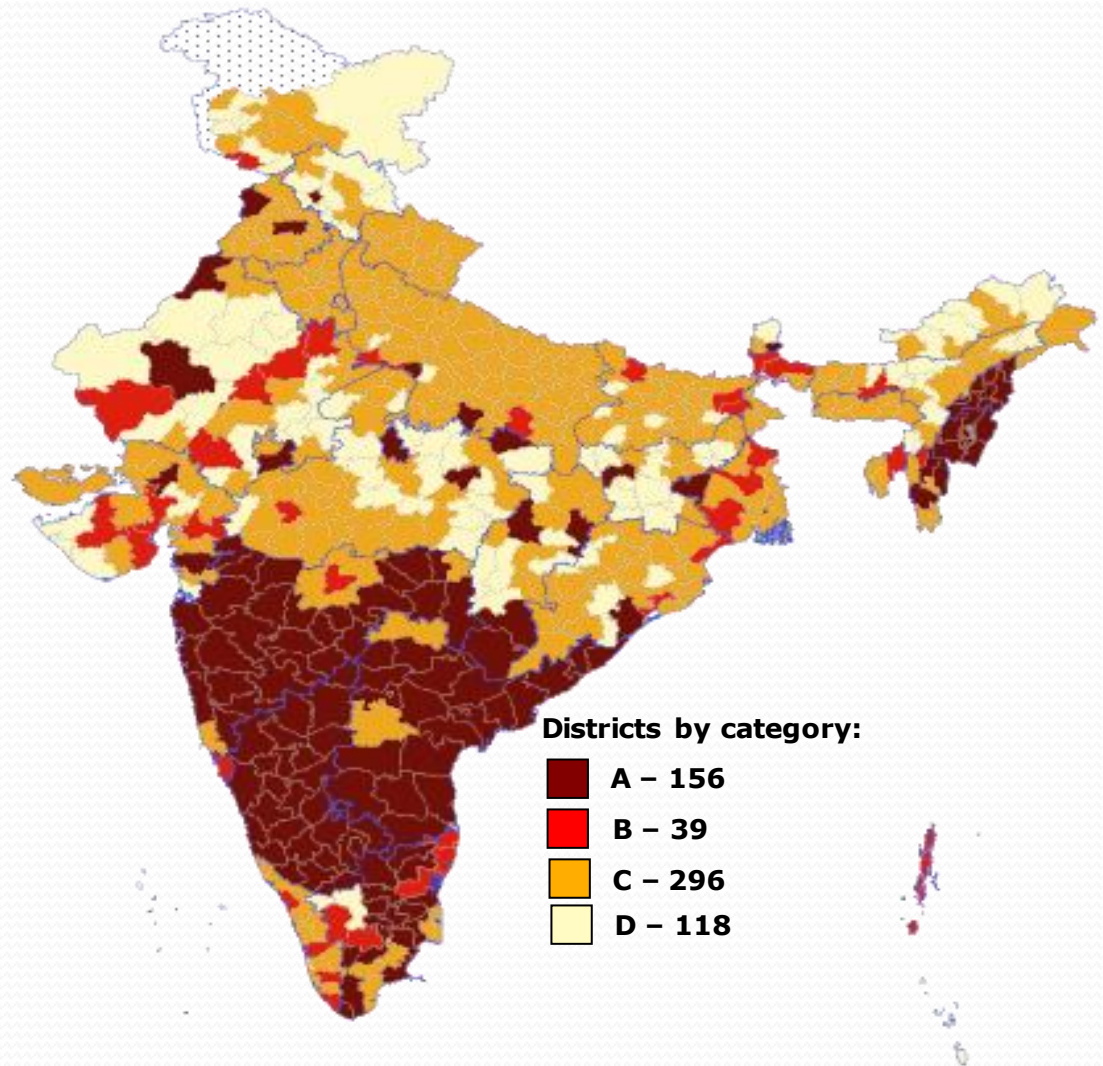


Pediatric HIV

Dr. Bageshree Seth
Professor, Pediatrics

HIV in India

- 2.39 million people are living with HIV/AIDS in India today, according to NACO (2011)
 - 39% are women
 - **4.4% are children**



Background: paediatric HIV infection

- HIV sero-prevalence in adult general population: 0.31% (NACO, 2011)
- Infected children constitute **4.4%** (NACO, 2011) of all persons living with HIV/AIDS in India .Estimated number of children living with HIV in country are **between 55,000 and 115,000** (country progress report, UNGASS 2010)
- **In the absence of HIV diagnostics and treatment a child who has acquired HIV infection through parent-to-child transmission will live on average only 3.75 years (Marston et al., JAIDS, 2005)**
- **Children living with HIV/AIDS live on average 4.2 years with cotrimoxazole prophylaxis alone (Aledort et al., Nature, 2006)**
- **With appropriate treatment children on ART live on average 23 years (U.S. data)**
- Estimated number of children living with HIV in country are **between 55,000 and 115,000** (country progress report, UNGASS 2010)
- In India more than **23,854 children** living with HIV/AIDS receive free antiretroviral therapy (ART) at NACO ART Centers

Modes of Transmission in Pediatric HIV

- Vertical Transmission(MTCT): 90-95%
- Contaminated blood and blood products
- Sexual Transmission

Estimated risk and timing of MTCT in the absence of interventions

During pregnancy	5 to 10 %
During labour and delivery	10 to 15 %
During breastfeeding	5 to 20 %
Overall without breastfeeding	15 to 25 %
Overall with breastfeeding to 6 months	20 to 35 %
Overall with breastfeeding to 18 to 24 months	30 to 45 %

Children vs. Adults

- Rapid progression compared to adults
- Bacterial infections commoner and severe
- Neurological/development problems in children
- Higher mortality

- 
- LIP, HIV Encephalopathy seen in children
 - Kaposi's sarcoma commoner in adults, rare in children
 - OI's like PCP pneumonia encountered in children
 - OI's like MAC, Cryptococcal infection less frequent

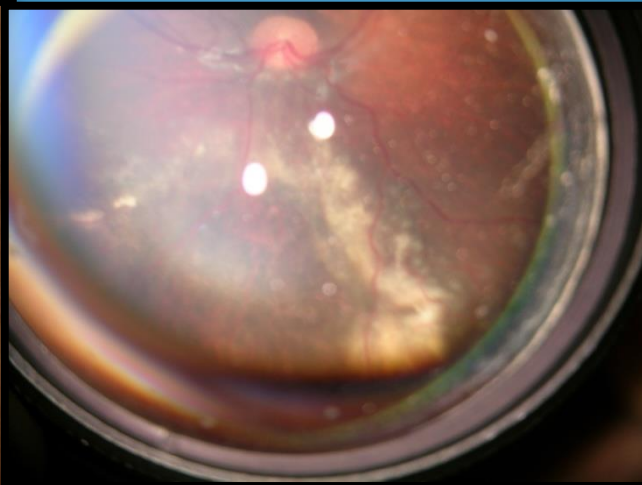
Patterns of Clinical progression

- Rapid Progressors
- Gradual progressors
- Slow progressors

Key Issues

- When to suspect HIV infection in a child?
- How to confirm HIV infection in a pediatric patient?
- How to stage the HIV disease in a child with confirmed infection?
- How to prevent /manage HIV infection in a child?

Clinical Manifestations of HIV



Common Symptoms

- Fever/ Cough > 1 month
- Failure to thrive/ not gaining weight
- Unexplained developmental delay
- Recurrent infections: diarrhea, skin infections

Common clinical findings

- Persistent Generalised lymphadenopathy
- Unexplained Hepatosplenomegaly
- Malnutrition : Wasting and Stunting
- Chronic Parotitis
- Oral Thrush
- Old/ acute Herpes Zoster
- Unexplained Clubbing
- Molluscum Contagiosum, Papular Pruritic infections

Clinical Manifestations

- **Organ Specific Manifestations:**

Nephropathy

Cardiomyopathy

Bronchiectasis/LIP

Encephalopathy

- **Infections: Common or Opportunistic**

Unusual severity

Unusual site

Unusual duration

Unusual pathogen















1. Suspect HIV in the presence of ;

- Clinical cues
- Non Clinical cues

2. Confirm the diagnosis with relevant laboratory tests

3. Stage the clinical disease

Key Issues

- When to suspect HIV infection in a child?
- **How to confirm HIV infection in a pediatric patient?**
- How to stage the HIV disease in a child with confirmed infection?
- How to prevent /manage HIV infection in a child?

Diagnosis

Confirm HIV infection

- In children > 18 months of age, by HIV antibody tests
- In children < 18 months of age, by virologic tests(DNA PCR)

Key Issues

- When to suspect HIV infection in a child?
- How to confirm HIV infection in a pediatric patient?
- **How to stage the HIV disease in a child with confirmed infection?**
- How to prevent /manage HIV infection in a child?

Revised WHO Clinical Staging Of HIV

- Useful for baseline assessment and follow up
- Decision making for starting cotrimoxazole prophylaxis
- Decision making for starting Anti retroviral therapy

WHO Revised Clinical Staging

Principles of Staging

Classification of HIV-associated clinical disease	WHO Clinical Stage
Asymptomatic	1
Mild	2
Advanced	3
Severe	4

Clinical Stage 1

Asymptomatic

Persistent generalized lymphadenopathy

It should be emphasized that WHO clinical staging of HIV disease can only be applied where HIV infection has been established

Clinical Stage 2

- Hepatosplenomegaly
- Papular pruritic eruptions
- Seborrhoeic dermatitis
- Extensive human papilloma virus infection
- Extensive molluscum contagiosum
- Fungal nail infections
- Recurrent oral ulcerations
- Lineal gingival erythema (LGE)
- Angular cheilitis
- Parotid enlargement
- Herpes zoster
- Recurrent or chronic RTIs (otitis media, otorrhoea, sinusitis)











Clinical Stage 3

- Moderate unexplained malnutrition not adequately responding to standard therapy
- **Unexplained persistent diarrhoea** (14 days or more)
- Unexplained persistent fever (intermittent or constant, for longer than one month)
- **Oral candidiasis** (outside neonatal period)
- Oral hairy leukoplakia
- Acute necrotizing ulcerative gingivitis/periodontitis
- **Pulmonary TB**
- **Severe recurrent presumed bacterial pneumonia**

- 
- Chronic HIV-associated lung disease including bronchiectasis
 - Lymphoid interstitial pneumonitis (LIP)
 - Unexplained anaemia ($<8\text{g/dl}$), and or neutropenia ($<1000/\text{mm}^3$) and or thrombocytopenia ($<50\ 000/\text{mm}^3$) for more than one month

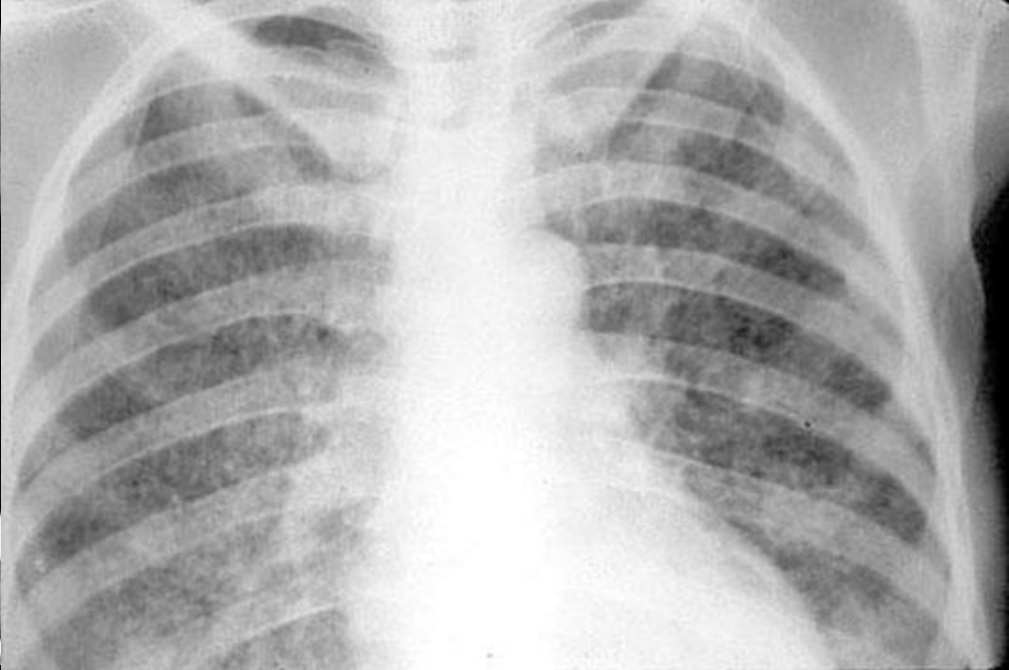
Clinical Stage 4

- Unexplained severe wasting or severe malnutrition not adequately responding to standard therapy
- Pneumocystis pneumonia
- Recurrent severe presumed bacterial infections (e.g. empyema, pyomyositis, bone or joint infection, meningitis, but excluding pneumonia)
- Chronic herpes simplex infection; (orolabial or cutaneous of more than one month's duration)
- Extrapulmonary TB
- Kaposi's sarcoma
- Oesophageal candidiasis
- CNS toxoplasmosis (outside the neonatal period)
- HIV encephalopathy

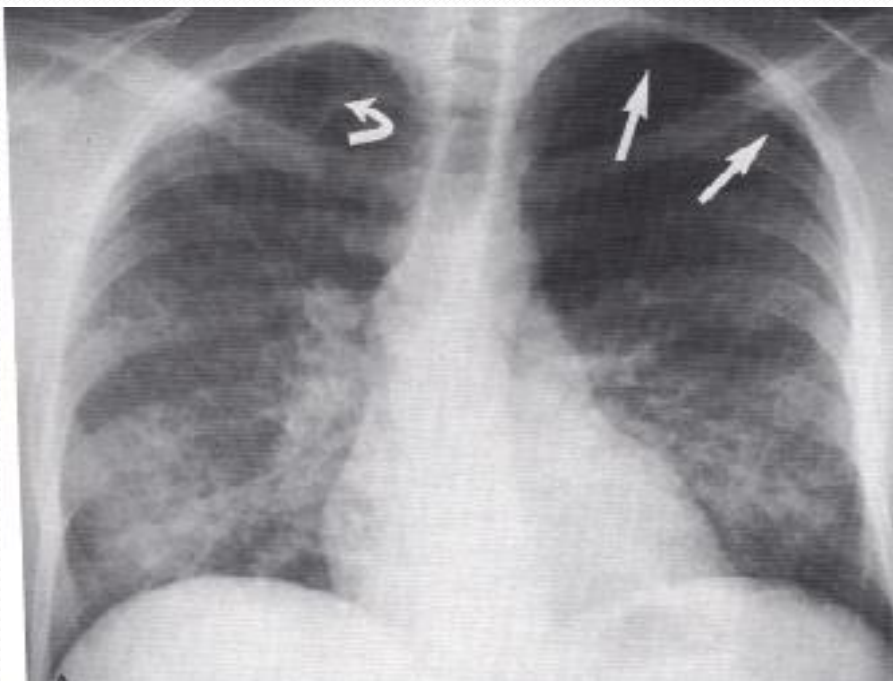
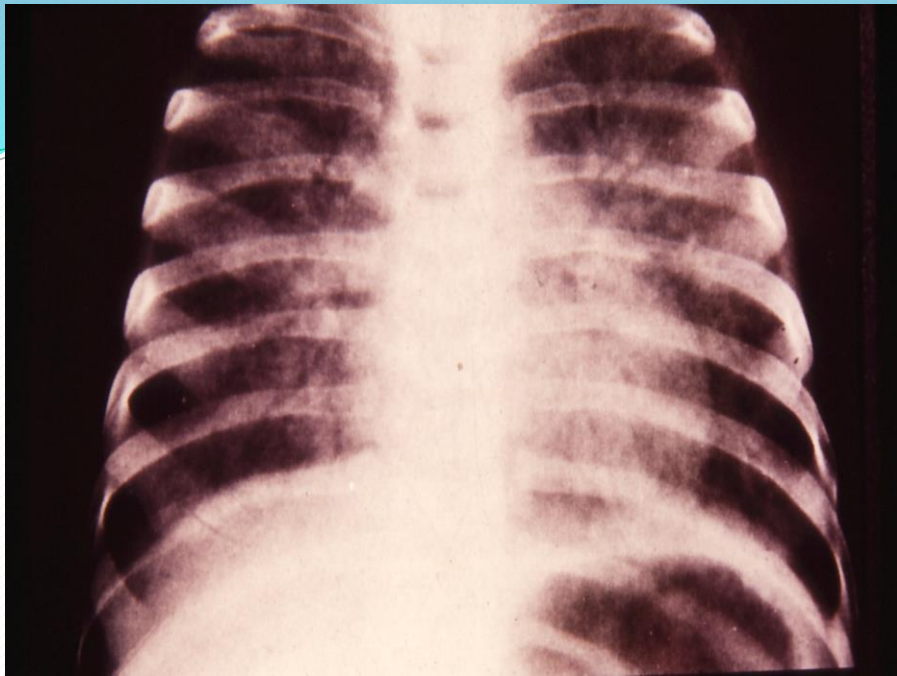
Clinical stage 4

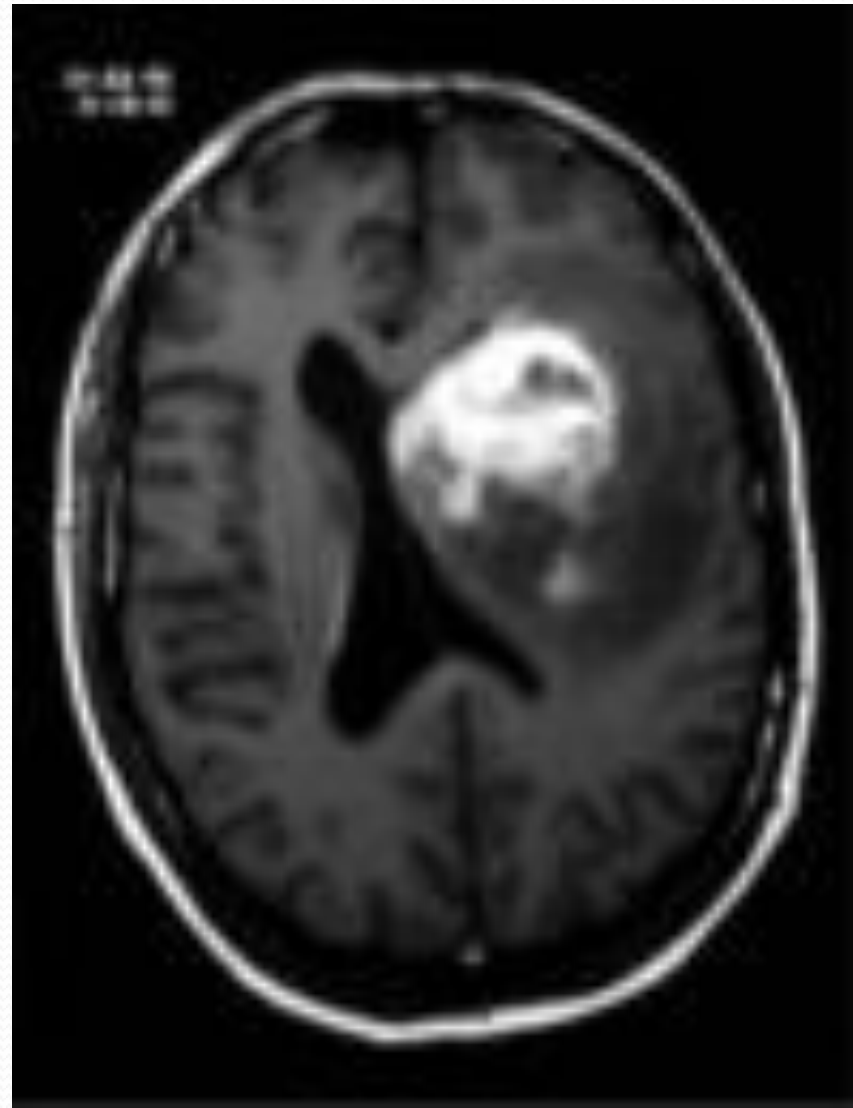
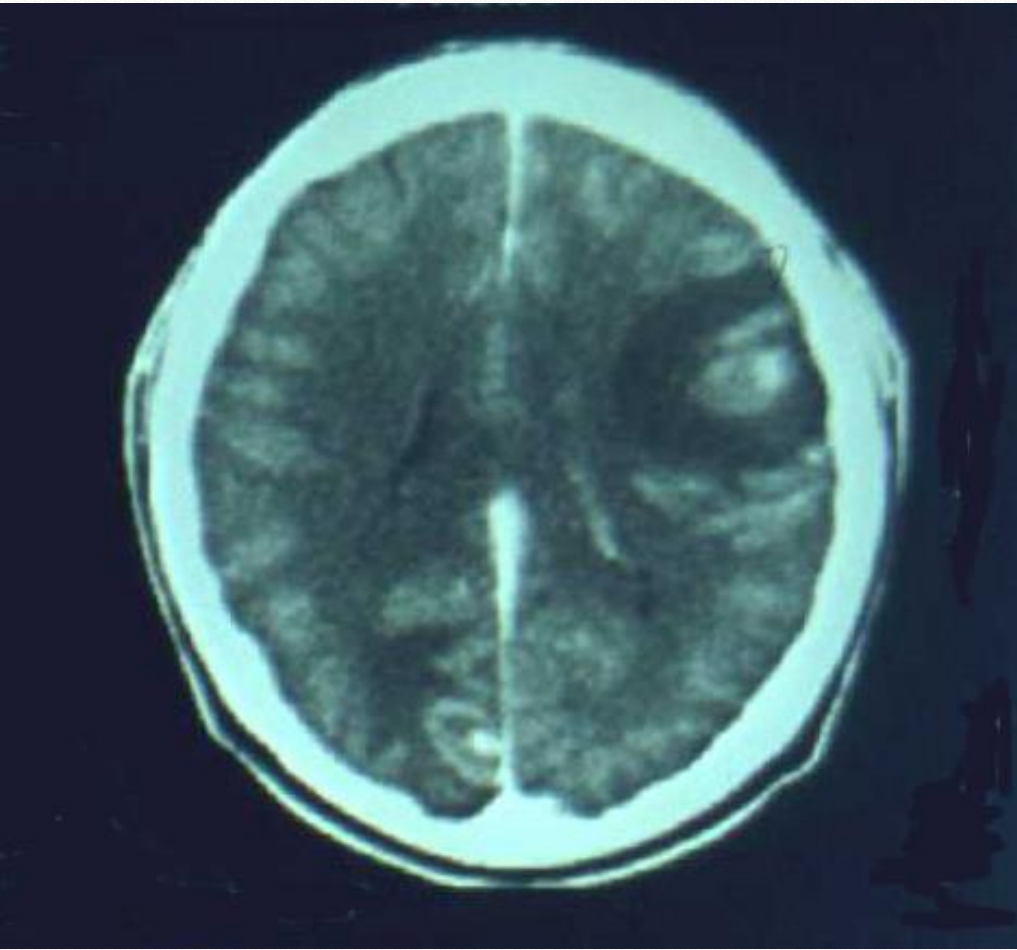
- CMV infection (CMV retinitis or infection of organs other than liver, spleen or lymph nodes; onset at age one month or more)
- Extrapulmonary cryptococcosis including meningitis
- Any disseminated endemic mycosis (e.g. extrapulmonary histoplasmosis, coccidiomycosis, penicilliosis)
- Cryptosporidiosis
- Isosporiasis
- Disseminated non-tuberculous mycobacteria infection
- Candida of trachea, bronchi or lungs
- Visceral herpes simplex infection
- Acquired HIV associated rectal fistula
- Cerebral or B cell non-Hodgkin lymphoma
- Progressive multifocal leukoencephalopathy (PML)
- HIV-associated cardiomyopathy or HIV-associated nephropathy

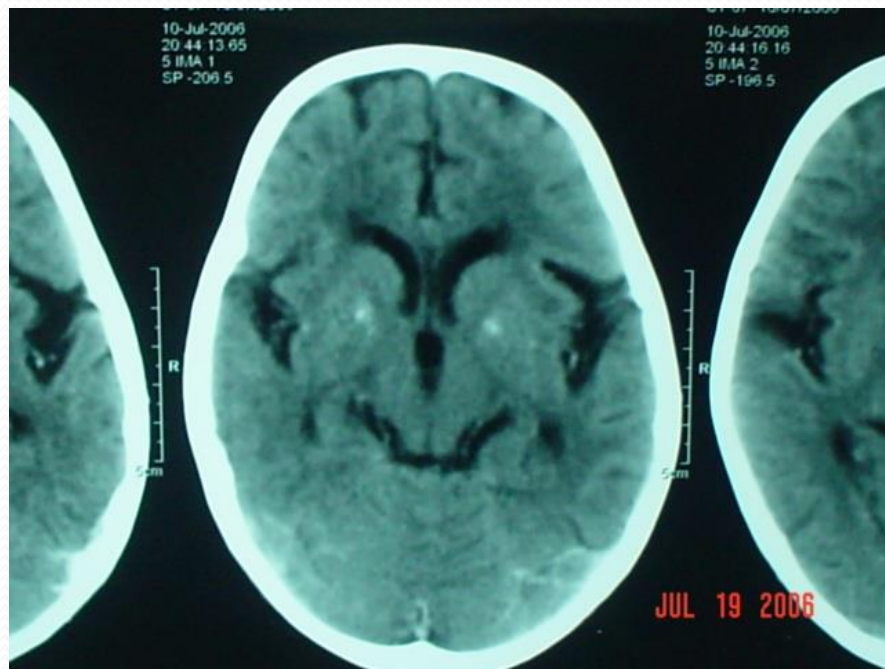
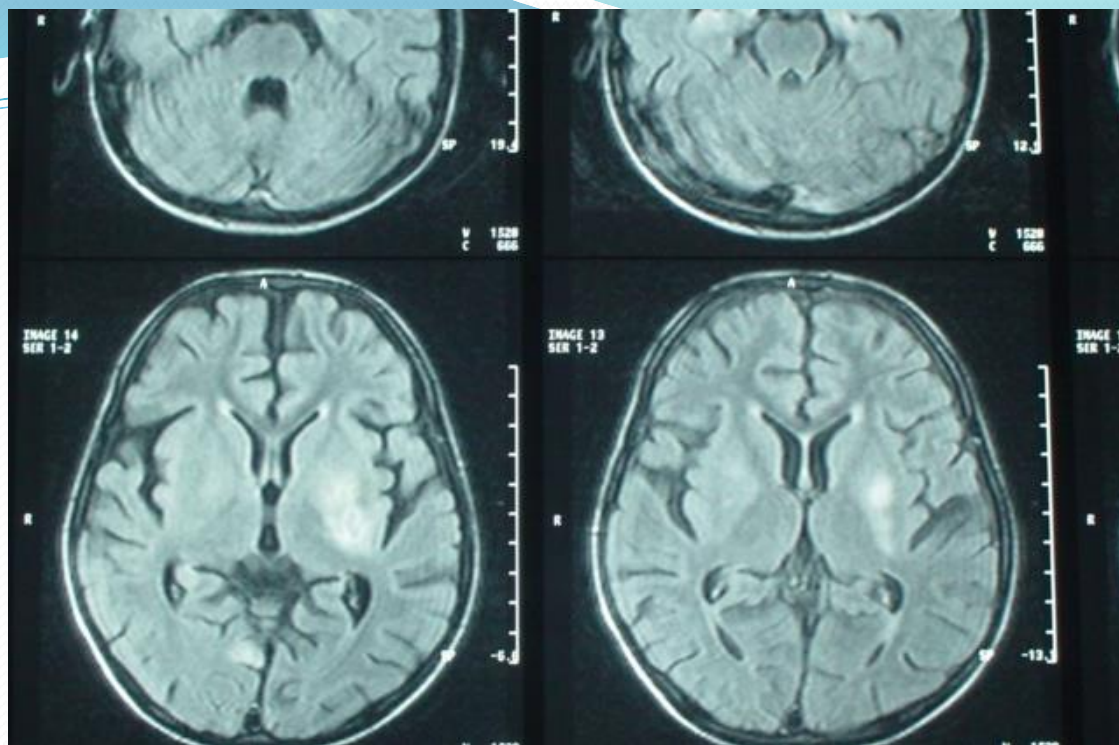












Normal Retina



CMV Retinitis



Key Issues

- When to suspect HIV infection in a child?
- How to confirm HIV infection in a pediatric patient?
- How to stage the HIV disease in a child with confirmed infection?
- **How to prevent /manage HIV infection in a child?**

Scenario 1. Care of HIV Exposed Infant

- Immediate Care at birth
- ARV Prophylaxis
- Infant Feeding
- Immunization
- Cotrimoxazole prophylaxis
- Growth and Development
- Early Infant Diagnosis

PPTCT Recommendations

- Single dose Nevirapine to mother during labour
- Single dose to baby(2mg/kg) within 24 to 72 hrs after birth

If mother delivers within less than 2 hours after NVP dose,

- Give 1st dose immediately after birth
- Second dose within next 24-48 hours

Infant Feeding Options

- Exclusive Breast Feeding
- Exclusive Replacement Feeding

Immunization Schedule for HIV-exposed and/or infected infant

Age	Vaccine	Vaccine	Vaccine
Birth	BCG	OPV-0	Hep B-1
6 weeks	DPT+HiB-1	OPV-1	HepB-2
10 weeks	DPT+HiB-2	OPV-2	Hep B-3
14 weeks	DPT +HiB-3	OPV-3	
9 mo	Measles*	-	Vitamin A dose
15 mo	MMR*		
18 mo	Booster -1	Booster-1	
5 yrs	Booster – 2 DT	Booster – 2 OPV	

Cotrimoxazole Prophylaxis

- All HIV exposed infants from 4 weeks of age till proven to be uninfected
- All HIV infected infants < 1 year of age , irrespective of signs and symptoms
- All HIV infected children > 1 year of age with WHO stage 2 and above or CD4 % < 25% or < 350 cells/mm³
5mg/kg of Trimethoprim PO daily

Early Infant Diagnosis

- Children born to HIV +ve mothers have antibodies passively acquired transplacentally
- HIV antibody test can not be used for diagnosis under 18 months
- Under 18 months, DNA PCR testing is required (Early Infant Diagnosis)
- Over 18 months, diagnosis can be made/ excluded using adult strategies (antibody testing)

Scenario 2. Pediatric HIV patient

Pre ART:

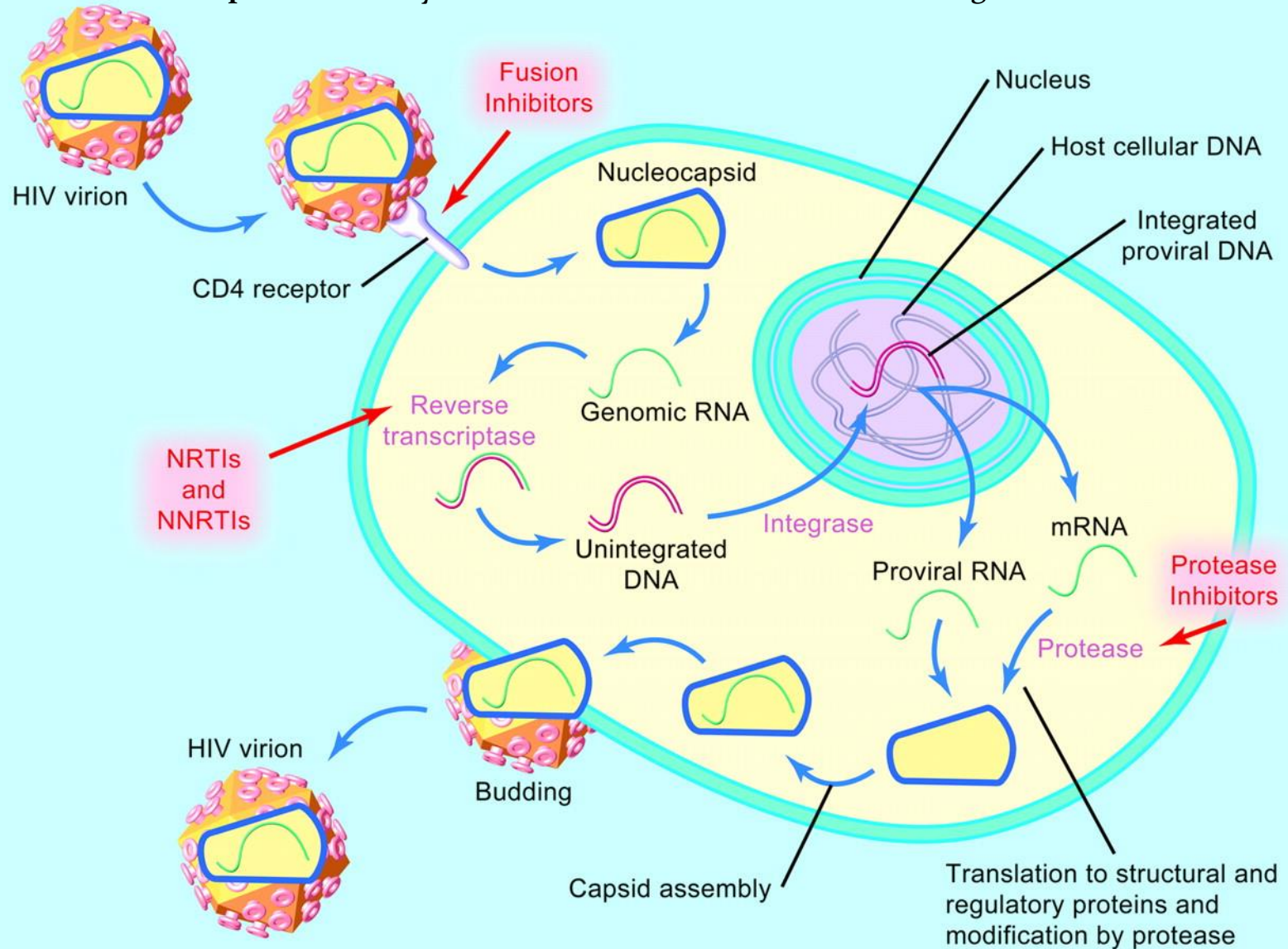
- Nutrition
- Vaccination
- Prophylaxis for infections
- Treatment of Intercurrent infections/coinfections
- Counseling/Disclosure

When to Initiate ART

	Clinical stage	Immunological stage
< 12 months	----- Treat	All-----
12-24 mnths(conditional)	----- Treat	All-----
>24 mnths	Stage 4	Treat all
	Stage 3	Treat all
	Stage 2	CD4 guided
	Stage 1	CD4 guided

WHO 2010 guidelines

Replication life cycle of HIV and sites of antiretroviral drug action



First line drugs

- **NRTI**

1. Thymidine analogue
AZT, d4T
2. Cytidine analogue 3TC
3. Guanosine analogue
ABC

- Newer drugs:
Tenofovir,
Emtricitabine.

- **NNRTI**

1. Efavirenz (EFV)
2. Nevirapine(NVP)

- Newer drug: Etravirine

Second Line Drugs

- Protease Inhibitors

- Lopinavir/ritonavir
- Saquinavir/ritonavir
- Nelfinavir

- NRTI

- Abacavir
- Didanosine

Pediatric First line ART Regimens

- Pediatric patients at all sites have access to stavudine (d4T-) and zidovudine (AZT-) based highly-active antiretroviral therapy (HAART) in the form of pediatric fixed-dose formulations (FDCs)

Paediatric Regimen	Regimen	Remarks
Regimen P I	Zidovudine + Lamivudine + Nevirapine	Preferred paediatric regimen for new initiation
Regimen P I (a)	Stavudine + Lamivudine + Nevirapine	For children with Hb ≤ 9 g/dL
Regimen P II	Zidovudine + Lamivudine + Efavirenz	preferred for children on anti-TB treatment; Hb >9 g/dL and age ≥ 3 yr and weight ≥ 10 kg
Regimen P II (a)	Stavudine + Lamivudine + Efavirenz	for children on anti-TB treatment tuberculosis treatment; Hb ≤ 9 g/dL and age ≥ 3 yr and weight ≥ 10 kg

1. Efavirenz is the preferred drug over Nevirapine, whenever children are being treated with Rifampicin containing drug regimen for TB co infection
2. **However, in Children aged <3 years and in children weighing <10 Kg, Efavirenz is contraindicated**

Preferred 1st line ARV regime for infants and children

- **NVP + 2 NRTI**

Infant or child <24 months not exposed to ARVs

Infant or child <24 months with unknown ARV exposure

- **LPV/r + 2 NRTI**

Infant or child <24 months exposed to NNRTI

- **NVP or EFV + 2 NRTI**

Children > 3 yrs

ART in CLHIV with TB co infection

Age Group / Bodyweight	ART regimen
Age ≥ 3 years Bodyweight: ≥ 10 kg	P II: Zidovudine + Lamivudine + Efavirenz Preferred for children with Hb >9 g/dL and bodyweight ≥ 10 kg
	P II a: Stavudine + Lamivudine + Efavirenz Preferred for children with Hb ≤ 9 g/dL and bodyweight ≥ 10 kg
Age < 3 years Bodyweight: < 10 kg	2NRTIs + Abacavir

To summarise

- Pediatric patients are innocent victims of the deadly HIV
- The need of the hour is to achieve **ZERO** 'mother to child' transmission of HIV by improving PPTCT coverage.
- As survival can be prolonged and quality of life improved with antiretroviral therapy, we need to ensure that pediatric HIV patients get access to free care and support provided at NACO ART centres.