Federal Ministry Of Health
Nigeria

NATIONAL GUIDELINES ON PAEDIATRIC HIV and AIDS TREATMENT AND CARE

October 2010

NATIONAL GUIDELINES

FOR

PAEDIATRIC HIV AND AIDS TREATMENT AND CARE

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FOREWORD

The Human Immunodeficiency Virus and Acquired Immunodeficiency Syndrome (HIV and AIDS) pandemic has since been widely recognised as a major public health crisis which affects not only the lives of individuals, but also the future socio-economic development of nations.

The pandemic disproportionately affects children and young adults. It is now an increasingly important cause of childhood morbidity and mortality in many African countries (including Nigeria) and has slowed down or reversed the gains of the child survival efforts of the last decade. This has become even more significant because children profoundly depend on adults, not only for physical and emotional needs, but also for the formulation and implementation of policies and programmes that affect their survival and development.

In Nigeria it is estimated that one HIV-exposed child is born every five minutes. In recognition of the magnitude of the HIV and AIDS problem in Nigeria, the Federal Government has put in place a multi-sectoral response to prevent and control the epidemic. Part of this effort is the Health Sector Response being implemented by the Federal Ministry of Health.

As part of the treatment, care and support strategies implemented by the Federal Ministry of Health, the first *National Guidelines on Paediatric HIV Treatment and Care* was developed in 2007. The guidelines provided standardized management protocols based on current evidence for children infected and/or affected with HIV in Nigeria.

However, with new development in the management of HIV/AIDS, it became necessary to review these guidelines to keep pace with international standards for best practices. The *2010 National Guidelines on Paediatric HIV and AIDS Treatment and Care* was put together by local and international experts in the care of HIV-infected and/or affected children, guided solely by key considerations bordering on quality treatment, care and support.

The Government expects that all health professionals and organizations in the country providing care for children infected and/or affected with HIV and AIDS will strive to attain the standards prescribed in these guidelines.

Professor C. Onyebuchi. Chukwu
Honourable Minister of Health

ABOUT THE GUIDELINES

The Federal Ministry of Health with the assistance of UNICEF in 2003 developed the first draft of the *National Guidelines for the Management of Paediatric HIV and AIDS,* in response to increasing paediatric HIV and AIDS and the neglect of children in the National HIV programme. This is part of the multi-sectoral response of the Federal Government to the HIV pandemic. Although the final print of that document was not produced, it provided the template for the inclusion of paediatric HIV and AIDS management in the 2005 *Guidelines for the Use of Antiretroviral (ARV) Drugs in Nigeria.* However, the 2005 Guidelines was considered inadequate in many aspects of paediatric HIV care. This realisation, in addition to the recent information on HIV and AIDS necessitated the current review of the document.

The *Guidelines* provide current evidence-based scientific information. It reviews the epidemiology, pathophysiology, clinical features, management and prevention of Paediatric HIV and AIDS including associated conditions e.g. tuberculosis (TB) co-infection. The legal and ethical issues related to HIV and AIDS are also briefly discussed.

It is written for healthcare providers at all levels responsible for the care of children both in public and private sectors. It will provide information for the implementation of the Paediatric HIV and AIDS programme throughout the country. Since situations at different levels of care vary, users should adapt it to their settings. It will facilitate the scale up of treatment, care and support of children infected with HIV and AIDS.

In the use of these *Guidelines*, health care providers at all levels must realize the need to establish linkages with the following pre-existing programmes (*see also Figure i.*) to ensure efficient use of resources.

- The Prevention of Mother-to-Child Transmission of HIV (PMTCT)
- The Adult Antiretroviral Therapy (ART)
- The HIV Counselling and Testing(HCT)
- Home-Based care (HBC) for HIV-infected persons
- Orphans and Vulnerable Children (OVC)
- Integrated Maternal, Newborn and Child Health
- School Health

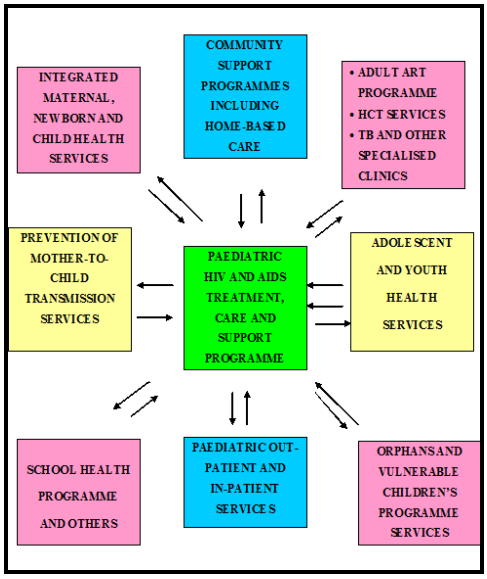

Fig. i. Linkages between Paediatric HIV and AIDS and other programmes

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ACRONYMS

3TC	Lamivudine
ABC	Abacavir
ADR	Adverse Drug Reaction
AFASS	Affordable, Feasible, Available, Sustainable, Safe
AFB	Acid Fast Bacilli
AFHS	Adolescent-Friendly Health Service
AIDS	Acquired Immunodeficiency Syndrome
ALT	Alanine aminotransaminase
ANC	Antenatal Care
APV	Amprenavir
ARV	Antiretroviral
ART	Antiretroviral Therapy
ARM	Artificial rupture of membrane
AST	Aspartate aminotransaminase
AZT	Azidothymidine (Zidovudine)
AZV	Atazanavir
BCG	Bacillé- Calmette-Guerin
BF	Breastfeeding
BFHI	Baby Friendly Hospital Initiative
BMS	Breast milk Substitute
CBOs	Community-Based Organisations
CCM	Country Coordinating Mechanism
CDC	Centre for Disease Control and Prevention
CD4+	Antigenic marker on T lymphocytes CD4+
CHAI	Clinton Health Access Initiative
CMV	Cytomegalovirus
CNS	Central nervous system
CPK	Creatinine phosphokinase
CPT	Co-trimoxazole Preventive Therapy
CRC	Convention on the Right of the Child
CRAG	Cryptococcal Antigen
CSF	Cerebrospinal Fluid
CSM	Cerebrospinal meningitis
CSO	Civil Society Organization
CT	Computerized Tomography
CTX	Co-trimoxazole
CXR	Chest X ray
d4T	Stavudine
DBS	Dried Blood Spot
DIC	Disseminated Intravascular Coagulopathy
ddC	Ganciclovir
ddI	Didanosine
DLV	Delavirdine
DRV	Darunavir
EBF	Exclusive Breastfeeding
EBV	Epstein Barr Virus

EC	Expert Client
ECG	Echocardiography
EEG	Electroencephalography
EFV	Efavirenz
EGA	Estimated Gestational Age
EID	Early Infant Diagnosis
ELISA	Enzyme-linked Immunosorbent Assay
EMG	Electromyography
ENT	Ear Nose and Throat
ESR	Erythrocyte Sedimentation Rate
EWI	Early Warning Indicators (for HIV drug resistance)
E/U	Electrolytes and Urea
FBC	Full Blood Count
FBO	Faith-Based Organization
FDC	Fixed-Dose Combination
FMOH	Federal Ministry of Health
FP	Family Planning
FTC	Emtricitabine
FHI-GHAIN	Family Health Initiative Global HIV/AIDS Initiative in Nigeria
G-CSF	Granulocyte Colony Stimulating Factor
GP41	HIV surface membrane glycoprotein antigen epitope for Chemokine co-receptor
GP120	HIV surface membrane glycoprotein antigen epitope for CD4+ receptor
HAART	Highly Active Antiretroviral Therapy
HBC	Home-Based Care
HBCW	Home-Based Care Worker
HBV	Hepatitis B virus
HBcAg	Hepatitis core antigen
HCVAb	Hepatitis C antibody
HBeAg	Hepatitis B e antigen
HBsAg	Hepatitis B surface antigen
HCT	HIV Counselling and Testing
HCV	Hepatitis C virus
HHV-8	Human Herpes Virus 8
HIV	Human Immunodeficiency Virus
HIVDR	HIV Drug Resistance
HSV	Herpes Simplex Virus
IATT	Inter-agency Task Team on PMTCT
ICAP	International Centre for AIDS Care and Treatment Programme
IDV	Indinavir
IEC	Information, Education and Communication
IF	Infant Feeding
IFA	Immunofluorescence Assay
IgG	Immunoglobulin G
IHV-N	Institute of Human Virology Nigeria
IMAI	Integrated Management of Adolescent Illnesses
IMCI	Integrated Management of Childhood Illnesses
INF-α	Interferon-alpha

INH	Isoniazid
IPT	Isoniazid Preventive Therapy
IPTp	Intermittent Preventive Therapy in Pregnancy for Malaria
IU	International Unit
IVF	Intravenous Fluid
KS	Kaposi Sarcoma
LFT	Liver Function Test
LIP	Lymphoid Interstitial Pneumonitis
LMIS	Logistic Management Information System
LPV/r	Lopinavir/ritonavir
MAC	Mycobacterium Avium Complex
MCH	Maternal and Child Health
MDG	Millennium Development Goal
MDT	Multi-Disciplinary Team
MIS	Management Information System
MTCT	Mother-to-Child Transmission (of HIV)
MCH	Maternal and Child Health
MRI	Magnetic Resonance Imaging
MUAC	Mid-Upper Arm Circumference
NACA	National Agency for Control of AIDS
NAFDAC	National Agency for Food and Drug Administration and Control
NASCP	National AIDS/STIs Control Programme
NEPWHAN	Network of People Living With HIV/AIDS in Nigeria
NFV	Nelfinavir
NGO	Non-Governmental Organisation
NHL	Non-Hodgkins Lymphoma
NHMIS	National Health Management Information System
NNRIMS	Nigeria National Response Information Management System
NNRTIs	Non-Nucleoside Reverse Transcriptase Inhibitors
NPC	National Population Commission
NRTIs	Nucleoside Reverse Transcriptase Inhibitors
NSAID	Non-steroidal Anti-Inflammatory Drugs
NtRTI	Nucleotide Reverse transcriptase inhibitor
NVP	Nevirapine
OFC	Occipito-frontal Circumference
OIs	Opportunistic Infections
OPV	Oral Polio Vaccine
ORT	Oral Rehydration Therapy
OVC	Orphans and Vulnerable Children
PABA	People Affected By AIDS
PCM	Paracetamol
PCNSL	Primary CNS Lymphoma
PCP	*Pneumocystis jirovecii* Pneumonia
PCR	Polymerase Chain Reaction
PCV	Packed Cell Volume
PE	Progressive Encephalopathy
PEP	Post-Exposure Prophylaxis

PHC	Primary Health Care Centre
PEPFAR	President's Emergency Plan for AIDS Relief
PI	Protease Inhibitor
PITC	Provider-Initiated Testing and Counselling
PSC	Project Site-Coordinator
PMTCT	Prevention of Mother-to-child Transmission of HIV
PLWHA	People living with HIV and AIDS
RDA	Recommended Daily Allowances
RHSO	Reproductive Health Services Outlet
RNA	Ribonucleic Acid
RTL	Raltegravir
RTV	Ritonavir
RUTF	Ready-To-Use Therapeutic Food
SAPC	State AIDS Programme Coordinators
SE	Static Encephalopathy
SMR	Sexual Maturity Rating
SMX	Sulphamethoxasole
SQV	Saquinavir
SR	Sero-reverter
SSS	Salt-Sugar Solution
STIs	Sexually Transmitted Infections
T-20	Enfuvirtide
TB	Tuberculosis
TDF	Tenofovir
TEN	Toxic Epidermal Necrolysis
TF	Task force
TFR	Total Fertility Rate
TLC	Total Lymphocyte Count
TMP	Trimethoprim
TT	Tetanus toxoid
TBA	Traditional Birth Attendant
UNAIDS	Joint United Nations Programme on HIV and AIDS
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
VHW	Village health worker/Voluntary health worker
VL	Viral Load
VZV	Varicella Zoster Virus
WHO	World Health Organisation
ZDV	Zidovudine

CHAPTER 1
INTRODUCTION

The World Health Organization (WHO) in 2008 estimated that 2.1 million children < 15 years were living with Human Immunodeficiency Virus (HIV) infection largely acquired through mother to child transmission. It is estimated that over 1150 children <15 years are infected with HIV every day all over the world. In 2008, 390,000 children were newly infected. Recent data from WHO and Joint United Nations Programme on HIV and AIDS (UNAIDS) indicate that only 15% HIV positive African children needing Anti retroviral therapy (ART) in West and Central Africa were receiving it in 2008.

From 1991 to 2008, the FMOH conducted biennial National Sero-prevalence Sentinel Surveys which showed HIV prevalence of 1.8% in 1992, 5.8% in 2001, 4.4% in 2005 and a slight rise to 4.6 in 2008 (Figure 1.1). Estimates from the Survey also showed that 52,000 new infections occurred in children <15 years. The number of HIV positive children requiring ART in 2009 was estimated to be 92,000 of which <15% actually received it. According to the 2009 Universal Access Report, Nigeria accounts for 30% of the global burden of mother-to-child transmission of (MTCT) of HIV and 10% of Paediatric HIV and AIDS. As at the end of 2009, the human immunodeficiency virus accounts for 3% of deaths in children younger than five years in Nigeria.

The initial national effort for the Guidelines development targeted adult ART and PMTC However, in 2007, the first Paediatric Guidelines was developed. With the 2010 WHO recommendations on antiretroviral therapy for infants and children, it becomes necessary for the *National Guidelines for Paediatric HIV and AIDS Treatment and Care* to be updated accordingly.

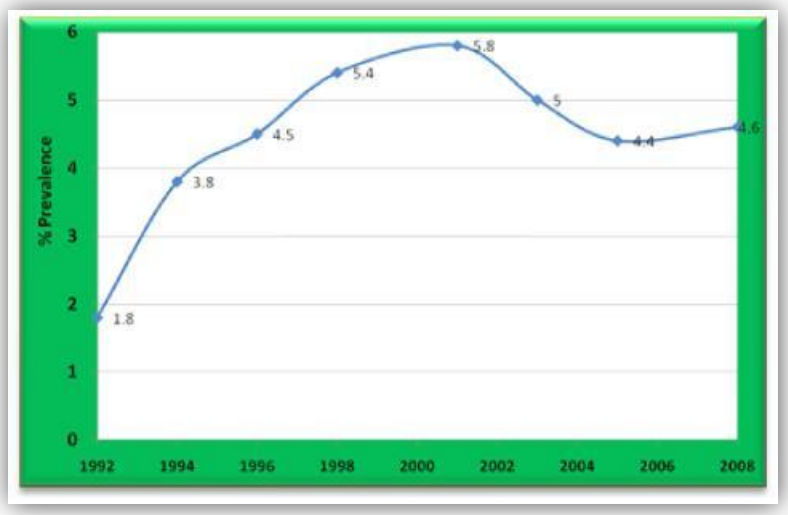


Figure 1.1: Median National HIV Sero-prevalence Trend

Objectives of the Guidelines

The overall objectives of the *National Guidelines on Paediatric HIV and AIDS Treatment, Care and Support* are to:

1. To provide standardized management protocols based on current evidence for children infected with or exposed to HIV infection.
2. To provide guidance for monitoring and evaluation of comprehensive Paediatric HIV and AIDS services.

3. To serve as a reference document to advisory boards, programme managers and other policy makers involved in paediatric HIV/AIDS programming.

Challenges of Paediatric HIV and AIDS

Paediatric HIV infection poses a number of challenges to the child, the mother/caregivers, the family, the community and the nation as a whole. It is important that these challenges are identified so that plans can be made to reduce the overall impact of HIV and AIDS in children. Some of these challenges include:

1. The challenges related to the prevention of mother to child transmission

In spite of the proven value of PMTCT services, a number of challenges negatively impact the attainment of its goal including:

- Making the PMTCT and paediatric HIV and AIDS services universally accessible.
- Deployment of proven and effective PMTCT and paediatric HIV and AIDS interventions.

2. Challenges of chronicity of the disease

- The provision of life-long counselling and support services to enable the child, family and caregivers cope with the disease and its complications
- Psychosocial issues.
- The cost of care to families, communities and nation at large.

3. Challenges to the health care system

- Increased burden on already overstretched healthcare system.
- Inadequate access, low uptake and utilisation of PMTCT and Paediatric HIV and AIDS services.
- Limited resources to manage PMTCT and Paediatric HIV and AIDS
- Issues around infant feeding and nutrition
- Poor integration, inadequate linkages and weak referral system.
- Weak Logistic Management Information System (LMIS)
- Limited and uncoordinated monitoring and evaluation of the services.

4. Societal challenges

- Loss of productive age group
- Increasing number of orphans and vulnerable children
- Stigma, discrimination and cultural barriers to effective care and treatment.

CHAPTER 2
VIROLOGY

2.0 Classifications and Structure of HIV

The aetiological agents of AIDS have been identified as HIV-1 and HIV-2. These viruses belong to the *Lentivirus* group of *Retroviridae* family. All the members of the family contain an enzyme called *reverse transcriptase* that is used for the synthesis of proviral DNA from the infecting viral RNA. This group of viruses is associated with many diseases some of which may run a rapid course or have a long latency period.

Human immunodeficiency virus, like other retroviruses, has a positive single stranded RNA. In the mature virus (Figure 2.1), the genome is diploid and has two identical copies (size of 60-70s dimer) of positive sense single-stranded RNA. Electron-microscopy studies showed that HIV has a dense, cylindrical core whose structural elements are coded by the *gag* gene for the protein that encloses the RNA genome.

The envelope is made of two glycoproteins Gp 120 and Gp 41 for HIV-1 and Gp 105 and Gp 36 for HIV-2. These trans-membrane proteins project out of the lipid barrier. Antibodies to these two sets of proteins do not usually cross react and thus differentiate serologic response to the two types of the virus. The envelope encloses the core proteins that house the viral genome (RNA) and the enzymes (*reverse transcriptase, integrase* and *protease*). The core is made up of two proteins, p18 and p24.

The HIV pro-viral genome is approximately 10kb in length with an open reading frame coding for the several viral proteins. The genome (Figure 2.2) is flanked at both ends by long terminal repeat (LTR) sequences that contain regulatory segments for HIV replication. It also comprises the *gag, pol* and *env* genes that code for the capsid proteins, the viral enzymes and the internal and external envelope proteins respectively. In addition to these major genes, an HIV genome has at least five other genes *Tat, Rev, Nef, Vif* and *Vpu/Vpx*. *Vpu* is present in HIV-1 while *Vpx* is present in HIV-2.

The gag precursor p55 gives rise to five smaller proteins p24, p17, p9 and p6 by proteolytic cleavage. The *pol* precursor protein is cleaved into products consisting of the *reverse transcriptase* (RT), the *protease* (PR), and the *integrase* (IN) proteins. The envelope precursor Gp160 is also split into two smaller glycoproteins, Gp120 and Gp41.

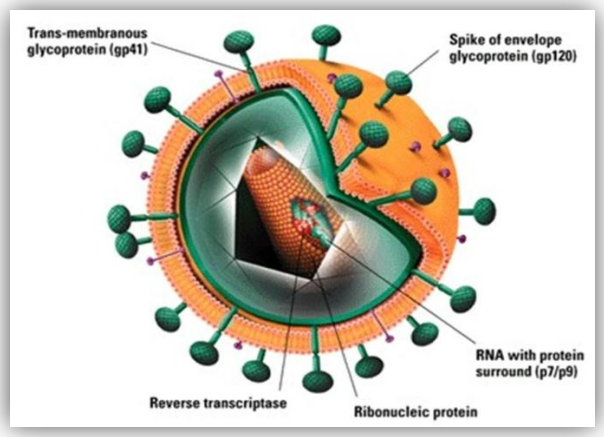


Figure 2.1: Simplified Schematic Structure of HIV
(*Source: ANECCA Handbook on Pædiatric AIDS in Africa 2006)*

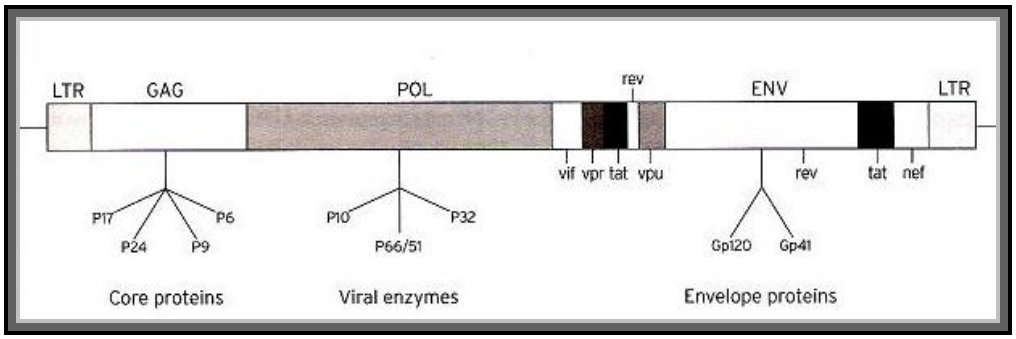


Figure 2.2: Genomic Structure of a Typical HIV-1 Virion

(*Source: AIDS in Nigeria, 2006)*

The Gp120 forms the external surface (SU) envelope protein and the Gp41, the transmembrane (TM) protein. The Gp120 contains the binding site for the cellular receptor and major neutralizing domain.

2.1 Variability of HIV isolates

HIV exhibits marked genetic diversity among different isolates. This heterogeneity is distributed throughout the viral genome and most of it is located in the *env* gene. Based on this variability HIV has been classified into types 1 and 2. HIV-1 has a global distribution while HIV-2 is limited to West Africa. Nevertheless, HIV-1 is still the predominant type in this sub-region. The 2 sub-types of the virus also vary in their biological characteristics. The rate of transmission is higher and progression to disease is faster in HIV-1 than in HIV-2.

HIV-1 is classified into subtypes using the nucleotide sequence of the *gag*, *pol* and *env* genes. Subtypes of HIV-1 using the *env* gene have been based mainly on the third variable region (V3 loop) of the Gp120, known to be important in viral cell type tropism, virus cell-fusion and cytopathology. Based on the nucleotide of the V3 loop of the Gp120, HIV-1 has been classified into four major groups, the group M (major), N (non-M, non-O), group O (Outlier) and P which is a new strain first described in a Cameroonian woman in 2009. The group M virus has been further classified into at least 9 different subtypes (A to K, excluding E and I). In addition, recombination of the virus subtypes is a well known phenomenon and many recombinant forms including the A/G which is the most predominant subtype in West Africa have been identified. In Nigeria, the A/G and the G subtypes of HIV-1are predominant. HIV-2 is classified into 8 subtypes, A-H and recombinant forms have not been identified.

Co-infection or super-infection of an individual by HIV-1 and HIV-2 has been well documented. Infection with different HIV-1 and HIV-2 subtypes has also been reported. However, HIV- 2 is not as transmissible, predominant or pathogenic as HIV-1. Mother to child transmission of HIV- 2 has not been documented.

2.2 Cellular Receptors

The primary receptor for HIV is the CD4+ molecule on the T-helper cells of humans. Recent advances in genetics of infectious diseases have shown that human genetic variation might influence susceptibility to pathogenic organisms. Variation in CD4+ receptive molecule on T-cells surface may influence the ability of HIV to bind and eventually penetrate the target cell. In addition, attachment to and fusion with the target cells is determined not only by its binding with CD4+ molecules, but also other secondary binding sites known as β-chemokines such as CCR5 and β. Individuals who are homozygous for a deletion in the CCR5 or CXCR4 gene are less frequently infected with HIV. Those who are heterozygous for the same mutation become infected but can be protected against rapid progression to disease compared with infected individuals homozygous for the normal CCR5 or CXCR4 gene.

2.3 HIV Replication

Replication of the virus particle begins with attachment of Gp120 to the CD4+ on the surface of a target cell. Following the Gp120-CD4+ binding, a structural change allows for the interaction of the V3 loop region in the Gp120 with a chemokine receptor, including CCR5 and CXCR4. The reaction with the co-receptor results in another conformational change in the viral surface glycoprotein, which exposes a fusion domain contained within the envelope trans-membrane glycoprotein. Exposure of the fusion domain results in the insertion of the Gp41 into the cellular membrane.

Subsequent to the fusion event, the viral core is released into the cytoplasm of the host cell. Once in the cytoplasm, the viral RNA genome is uncoated and reverse transcribed by the virally encoded RT enzyme to generate a double-stranded viral DNA pre-integration complex.

The double stranded DNA is then transported into the host cell nucleus where it becomes integrated into the host cell chromosome with the aid of *integrase*. It then resides as a provirus and may remain in a 'latent' state for many years or can begin the production of new viral RNA. On activation, the host cell enzyme RNA, *polymerase II* will transcribe the proviral DNA into messenger RNA (mRNA).

The mRNA is then translated into viral proteins that undergo extensive post-translational modifications. The viral RNA becomes the genetic material for the next generation of viruses. Viral RNA and viral proteins assemble at the cell membrane. After proper assembly and processing, new infectious virus particles are released by budding from the cell membrane.

The main steps in the HIV replication cycle can be summarized

1. Fusion of the HIV cell to the host cell surface.
2. HIV RNA, reverse transcriptase, integrase, and other viral proteins enter the host cell.
3. Viral DNA is formed by reverse transcription.
4. Viral DNA is transported across the nucleus and integrates into the host DNA.
5. New viral RNA is used as genomic RNA and to make viral proteins.
6. New viral RNA and proteins move to cell surface and a new, immature, HIV virus forms.
7. The virus matures by protease releasing individual HIV proteins.

These essential steps are illustrated in **Figure 2.3** below.

2.4 Natural History in Children below 6 years

Clinical Course of Illness

There are critical differences between the disease progression in children and in adults. Stemming largely from the lower efficiency of a child's immature (but developing) immune system, these differences result in much more rapid disease progression and a much shorter duration for each stage. Perinatally acquired HIV infection demonstrates defined modes of expression of disease.

At birth, viral load is usually very low but it slowly rises within the first 2 months of life to well over 100,000/ml, slowly declining after the age of 4-5 years. These viral dynamics are significantly different from the rapid increase and decrease of the viral load seen in untreated children older than 6 years and adults within a few months following the acute HIV infection (Figure 2.4).

In children, the higher viral load is associated with the somatic growth of the lymphatic system and the inability of their immature immune system to mount an HIV-specific response. When assessing the immune system in infants and children, it is very important to compare the child's CD4+ T-cell count with the age-appropriate values (e.g. the mean CD4+ T-cell count for a 6-month-old baby is 3000 cells/μl). Lymphocyte counts are very high in infancy and decline to adult levels around 6 years of age.

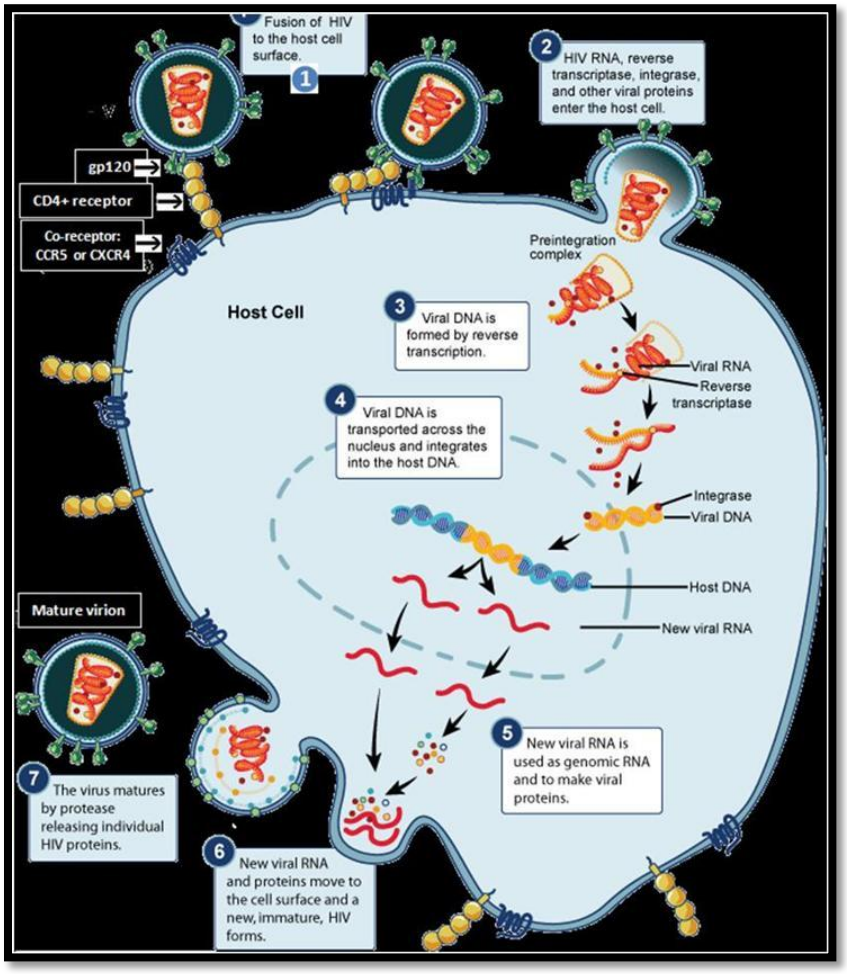


Figure 2.3: HIV Replication Cycle

(Source: http://www.niaid.nih.gov/topics/HIVAIDS/Understanding/Biology/Pages/hivReplicationCycle.aspx)

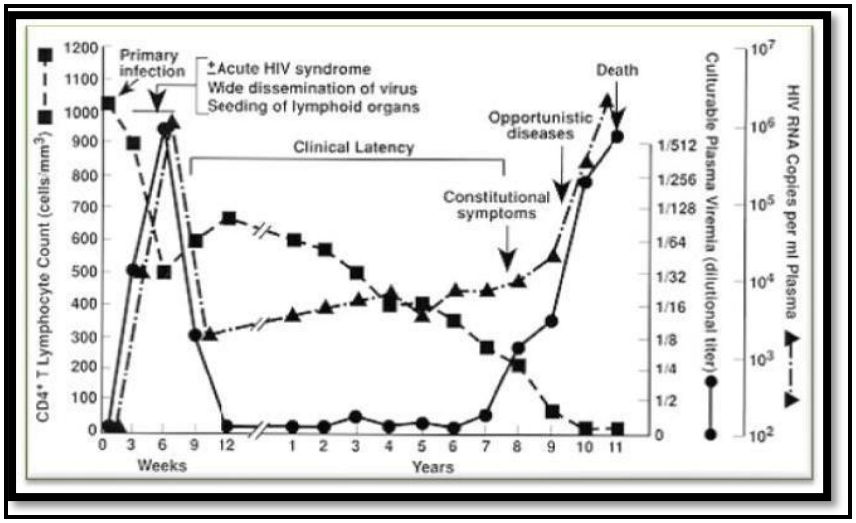


Figure 2.4: Dynamics of Viral Replication and CD4+ Levels over the Course of untreated HIV Infection

(Source: Pantaleo G, et al. The immunopathogenesis of human immunodeficiency virus infection. N Engl J Med 1993a; 328 (5):327-35)

A higher mortality in HIV-infected children may result from inter-current infections, malnutrition, and lack of access to primary HIV care including delayed definitive diagnosis. With no interventions, the majority of perinatally HIV-infected children develop HIV-related symptoms by 6 months of age. There is limited data on clinical and biological indicators of disease progression in HIV-infected children in Nigeria.

2.5 Natural History of HIV Infection in Children ≥ 6 years

The course of HIV infection varies within a population. Nonetheless, a typical infection can be divided into three stages: primary infection, asymptomatic infection, and symptomatic infection including AIDS. Following primary HIV infection, the CD4+ cell count decreases and the HIV RNA rises significantly. With sufficient exposure to viral antigens, cytotoxic T-lymphocyte responses are generated and the HIV viral load typically declines to an equilibrium known as a virologic "set-point," within 6 to 12 months of infection. Once this viral set-point is reached, the CD4+ cell count may rebound again marginally, although it does not often return to baseline values. Concurrent with these events are clinical manifestations of acute HIV infection in 30% to 60% of individuals.

About half of newly infected individuals experience flu-like symptoms; the remainder are asymptomatic. Once infected, adults experience an asymptomatic clinical latency that lasts 2 to 10 years, during which HIV is produced and removed by the immune system, and CD4+ T cells are killed and replaced. This latency period is considerably shorter in children. During this asymptomatic period, the number of infected circulating CD4+ cells and free virions is relatively low. Moreover, the haematopoietic system is able to replace most T cells that are destroyed, thus keeping the CD4+ cell counts in the normal range for adults and children >5 years (636-977 cells/µl).

Later in infection, replicating viruses disrupt the follicular dendritic cells' architecture, and more infected T cells appear in the circulation. Viruses are no longer retained in the lymph nodes; thus, the circulating levels of free virus increase. Eventually, the circulating CD4+ T cell levels drops to less than 500 cells/µl and opportunistic infections may occasionally occur. During the later stage of infection, the CD4+ cell count declines below 200/µl, a level at which the infected individual is deemed to have severe immune suppression.

A number of opportunistic infections, including recurrent oral candidiasis and tuberculosis are common during the early symptomatic phase of AIDS. As the CD4+ cell count declines to an even lower level, additional life-threatening opportunistic infections such as herpes zoster, amoebiasis, and dermatomycoses may occur with increasing frequency and severity. In the later stages of symptomatic HIV infection, the viral load levels rise again. Quantitative PCR methods (viral load assays), demonstrate:

- Continuous replication of HIV occurs in nearly all infected individuals, although the rates of virus production vary by as much as 70-fold in different individuals;
- The average half-life of an HIV infected cell in vivo is 2.1 days. Recent reports have suggested an even faster turnover of plasma virus of 28 to 110 per minute;
- Up to 10^9–10^{10} HIV particles are produced each day and an average of 2 x10^9 CD4+ cells is produced each day. Quantifying the viral load is currently the most direct measurement of the HIV disease process. It is used to assess the risk of disease progression and the response to antiretroviral therapy (ART). As the disease progresses, CD4+ cell count declines but may rebound if therapy is efficacious; this parameter alone is an incomplete marker for clinical assessment of a patient. Nevertheless, in resource poor settings, the CD4+ cell count is a more affordable and hence more practical yardstick for monitoring disease progression and ART efficacy.

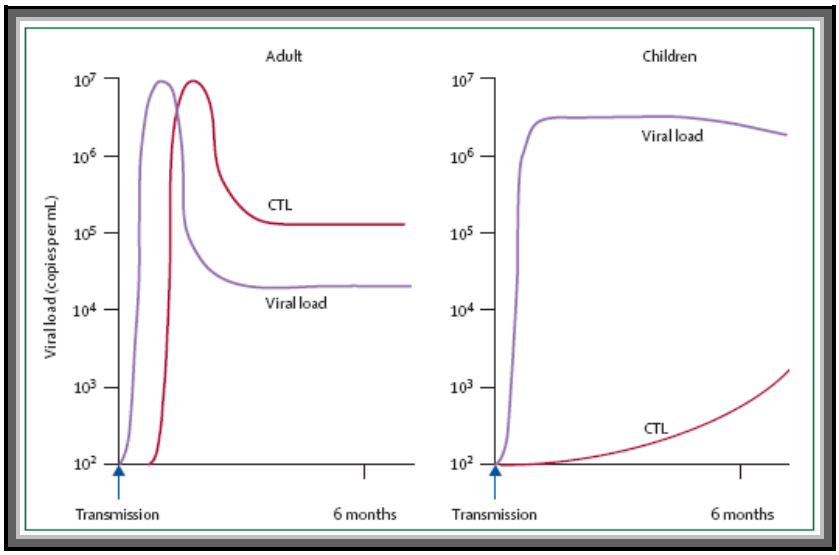


Fig. 2.5: Viral load trends and virus-specific T cell activity in untreated adult and infant HIV infection

(Source: Andrew Prendergast, et al. International perspectives, progress, and future challenges of paediatric HIV infection. Lancet 2007; 370: 68–80).

Perinatally infected children fit into one of three categories:

- *Category 1*: Rapid progressors develop signs and symptoms of HIV and AIDS and die by age 1 year. These children are likely to have acquired the infection in utero or during the early perinatal period (about 25–30%)
- *Category 2*: Children develop symptoms early in life, followed by rapid deterioration and death by age 3 to 5 years (about 50–60%)
- *Category 3:* Long-term survivors live beyond age 8 years (about 5–25%)

2.6 Factors Predicting Prognosis

Predictors of prognosis are derived mainly from studies performed in industrialized countries; however, these predictors are also useful in the African context. HIV RNA and CD4 percent provide complementary and independent information about the prognosis for HIV-infected children. The two markers together at baseline and with changes over time provide a more accurate prognosis. Table 2.1: provides the list of the factors that predict the risk of HIV disease progression in infants.

Table 2.1: Factors predicting disease progression in infants

Infant factors	Maternal factors
• Infecting viral dose • HIV infection before 4 months of life • Infant peak viraemia • Low CD4+ count and percent • Viral type and subtypes • Rapid decline in CD4+ count • Clinical AIDS • p24 antigenaemia	• Maternal viral load at time of delivery • Maternal CD4+ cell count (<200 cells/µl) • Rapidly progressive maternal disease • Maternal death, which is associated with a 2- to 5-fold increase in infant mortality when compared to infants born to mothers who survive

CHAPTER 3
DIAGNOSIS OF HIV INFECTION

3.0 Introduction

Clinical signs and symptoms are useful in making a diagnosis of HIV infection, but in children these features overlap with those of other common childhood diseases. Definitive diagnosis of HIV infection in childhood requires diagnostic tests to confirm presence of human immunodeficiency virus. HIV diagnostic testing should be accompanied by appropriate pre and post test counseling *(See Chapter 8, Section 8.2 for guidance)*.

3.1 Clinical Presentation

HIV infection is associated with an increased frequency of common childhood infections. These tend to be recurrent, persistent, severe and sometimes life threatening. As the immune system gets destroyed, opportunistic infections become very common. Majority of HIV-infected children develop symptoms and signs of severe immuno-suppression in the first year of life and frequently die from common childhood infections before their HIV status is determined. Consequently, HIV and AIDS have increased infant and under-five mortality in many developing countries.

HIV-infected children usually have flu-like symptoms shortly after infection. These resolve unnoticed or present as the common illnesses in the environment. Thus, the presentations range from the symptoms and signs of the common childhood illnesses to those highly specific to the HIV infection. The early features are non-specific and may include fever, diarrhoea, and weight loss, failure to thrive, and cough. As the illness progresses, the child presents with additional features that indicate severe immune suppression. These include those of opportunistic infections (OIs), recurrent and more severe forms of the common illnesses in the environment and malignancies. The clinical presentations of some of these are discussed in this chapter while further details on their management are presented in subsequent chapters.

3.1.1 General Manifestations

a. Fever

Fever (axillary temperature of ≥37.5^{o}C) in the HIV infected child could be due to the usual causes as in uninfected children, but HIV itself, malignancies and ARVs are important additional causes. Fevers in HIV-infected children tend to be persistent (lasting 7 days or more) or recurrent (see Table 3.3: WHO Clinical staging). The evaluation of a child with fever should be carried out as in the HIV uninfected child but attention should be paid to features of OIs. The assessment involves taking a detailed history and doing a full general examination to identify probable causes. Investigations such as full blood count (FBC) and cultures of specimens (such as cerebrospinal fluid (CSF), urine, blood or other body fluids/ tissues) to identify possible causes should be carried out. Blood film should also be examined for malaria parasites.

b. Persistent Generalised Lymphadenopathy

Persistent generalised lymphadenopathy is one of the most common early manifestations of HIV infection in children. It may also be associated with parotid enlargement and or hepatosplenomegaly. A biopsy may show non-specific inflammation of the nodes. Other causes include disseminated TB, infections due to toxoplasma, rubella, CMV, herpes, syphilis or malignancies like leukaemia or Kaposi's sarcoma (KS).

3.1.2 Common Infections and Illnesses

a. Respiratory infections

Respiratory infections are common in children and contribute to about 30% under-five deaths. The infections can affect the upper or lower respiratory tracts. The signs and symptoms include fever, cough, fast or difficult breathing, rhinitis, ear pain or discharge and sore throat. The common causes of the infection, especially

pneumonias, are viruses such as Respiratory syncytial virus, bacteria, such as *Strep. pneumoniae*, *H. influenzae* and *Staph. aureus*. These pneumonias tend to be acute and recurrent. In the early phase of the HIV infection, the child is still immuno-competent and responds to these infections as the uninfected child. However, as the immune system becomes suppressed, the child's susceptibility to opportunistic infections increases. At this stage, the child no longer responds appropriately to the infection and may be overwhelmed by the pneumonia with more persistent symptoms and signs and the complications become more frequent. Other respiratory infections include recurrent episodes of mastoiditis and pharyngotonsilitis. The assessment of the child involves taking a detailed history and carrying out a full clinical examination with emphasis on the respiratory system. Investigations include FBC, chest X rays and cultures of sputum, pleural fluid or blood. Health workers at the first level of care can use the *IMCI Guidelines* to manage the child.

Otitis Media

Ear infection is one of the most common infections in HIV-infected children. Acute otitis media refers to ear infections that have lasted for less than 14 days. Acute suppurative otitis media is more common in infected children in the first year of life. By age 3 years, most HIV-infected children will have had one or more episodes of acute otitis media. Signs and symptoms are similar to those in other children and include ear pain, pulling on the ears, excessive crying, ear discharge, and irritability. At otoscopy the eardrum is hyperaemic, bulging, and immobile and may be perforated. Chronic suppurative otitis media is painless ear discharge lasting >14 days. It is more frequent in HIV-infected children; its presence particularly with recurrence should prompt the health worker to screen for HIV infection.

b. Malaria

Malaria is a major cause of morbidity and mortality in children in Nigeria. Some reports have shown that infants born to HIV-infected women are more likely to suffer from congenital malaria than children born to uninfected women. Likewise, an increased frequency of malaria has been noted in HIV-infected children. Additionally HIV-infected children are more likely to be anaemic during an episode of malaria compared to uninfected children. There is need for research in these areas to generate local data. Clinical presentation is similar to uninfected children and treatment recommendations should follow the National Malaria Guidelines.

c. Malnutrition (*See Chapter 9 for details)*

Malnutrition is very common among HIV-infected children due to the following reasons:

- Decreased food intake because of anorexia associated with illness, mouth ulcers and oral thrush
- Increased nutrient loss resulting from mal-absorption and diarrhea
- Increased catabolism due to co-infections, OIs and the HIV infection itself.

The effects of malnutrition are compounded by the high burden and recurring infections and infestations in HIV-infected children. In addition, HIV-positive mothers have higher rates of low-birth-weight babies and premature birth, which are risk factors for malnutrition. Characteristics of HIV-infected children associated with malnutrition include:

- Micronutrient deficiencies (e.g. low serum levels of zinc, selenium, vitamins, A, E, B6, B12 and C) lead to reduced immunity which predisposes them to more infections and worsening nutritional status
- Decrease in linear growth and weight which become apparent as early as 3 months of age.
- The clinical presentation of diseases in HIV-infected children is similar to that of HIV-negative children. However, marasmus is more common than kwashiorkor among HIV-infected children.

d. Tuberculosis (TB) *[See Chapter 5, Section 5.2]*

HIV infection increases a child's susceptibility to infection with *Mycobacterium tuberculosis*. The presence of TB may allow HIV to multiply more quickly resulting in more rapid progression of the disease. Pulmonary

presentation is the most common form of TB in HIV-infected children. *M. tuberculosis* infection is one of the major causes of morbidity in the HIV- infected child. With increasing spread of HIV infection, there is a corresponding increase in the incidence of tuberculosis as well as an increase in multi-drug resistant strains of *M. tuberculosis*. The presence of multi-drug and extensively resistant *M. tuberculosis* has added considerable challenge to the treatment and control of TB. The symptoms and signs are similar to those in non-HIV-infected children but extra-pulmonary manifestations such as meningitis, disseminated or miliary forms are more common in HIV-infected children. The confirmation of the diagnosis of tuberculosis in children is difficult.

e. Measles

Measles is one of the major causes of morbidity and mortality and is a severe illness in children with HIV infection, particularly those with advanced immunodeficiency. It may occur in early infancy in HIV-infected children because of inadequate transfer of maternal antibodies. Infection may occur despite history of immunisation. Severe cases can occur without the typical rash and may be complicated by pneumonia or encephalitis. HIV-infected children with measles have a high case fatality and should be treated in hospital.

3.1.3 Gastrointestinal Manifestations

The common gastrointestinal manifestations of HIV infection are nausea, vomiting, diarrhoea and wasting.

a. Nausea and vomiting

These are common complaints in the HIV-infected child. The causes are many and may include inflammatory lesions of the gastrointestinal tract, meningo-encephalitis, malignancies and metabolic abnormalities. Medications such as ARVs, prophylactic and chemotherapeutic agents may also cause nausea and vomiting. Detailed history should be obtained with physical examination to determine the causes in each case.

b. Diarrhoea

Diarrhoea is a common presentation in HIV-infected children. Aetiological factors include HIV infection itself, other infections of the gut, osmotic diarrhoea, malabsorption syndrome and lactase deficiency. It may be acute, persistent, or chronic and is often recurrent. Assessment involves a detailed history and physical examination. Identification of the cause of the diarrhoea is often difficult but stool analysis and culture may be helpful.

c. Parotid enlargement

Parotid gland enlargement, usually bilateral, is one of the most specific signs of HIV infection in children. It is usually not tender and is commonly found in older children whose disease progression is slow. It may be associated with hepato-splenomegaly and LIP. When exceptionally large, it may be disfiguring and lead to emotional distress. Intermittently the glands may enlarge and regress over several months, and may become tender from bacterial super-infection.

d. Viral hepatitis

Hepatitis B and C infections are common in HIV-infected children. Infection occurs by the same routes as in the non HIV-infected child. It may be asymptomatic or present with fever, nausea, abdominal pain and jaundice. The patient may present with complications of the illness such as bleeding tendencies, seizures and coma because of liver failure. A detailed history and examination of the child should be carried out. Investigations include HBV and HCV antigen and antibody levels, LFTs, FBC, abdominal ultrasound and other tests as indicated.

3.1.4 Oral and Cutaneous Manifestations

a. Herpes simplex virus (HSV) infection

HSV-1 and HSV-2 occur 10-35 times more commonly in HIV-infected children and adults than in non- infected persons. The presence of herpetic lesion for >1 month is an indicator of AIDS. HSV infection causes painful

cold sores around the mouth, the rectal and genital areas. The presentations of the infection in HIV-infected children though similar to those in the non-infected, are more severe. Chronic progressive herpetic lesions may also be found. Recurrences of the lesions are very common. Diagnosis is mainly clinical but viral cultures can also be done.

b. Varicella-zoster virus (VZV) Infection

This is a herpes virus that causes varicella (chickenpox) and zoster (shingles) in children and adolescents. Past history of chickenpox increases the risk of shingles. Patients with severe immunodeficiency have severe manifestations of the infection with dissemination to the lung, liver, brain or pancreas. Some patients have a syndrome of chronic VZV infection. Symptoms of the infection include the presence of small, painful blisters that follow a dermatomal distribution. Complications include severe painful ulcerations, post-herpetic neuralgia and disseminated disease. Diagnosis is mainly clinical but viral cultures can also be done. Confirmation of diagnosis is by the use of Tzanck smear.

c. Molluscum contagiosum

The infection presents as painless, pale, umbilicated nodules measuring 3-5 mm. They may occur anywhere on the body but are most commonly seen on the face. The major effect is cosmetic. In adolescents, it occurs when the CD4+ cell count is <200 cells/µl. When the count is less than 50 cells/µl, the giant forms of the lesions are seen. There is a high rate of recurrence.

d. Bacterial skin infections

Bacterial skin infections often found in HIV-infected children include folliculitis, cellulitis, skin abscesses, and paronychia. These infections tend to be recurrent in the HIV-infected child. The commonest organism isolated is *Staph. aureus*.

e. Fungal infections

Candidiasis and dermatophytosis are common fungal infections found in HIV-infected children.

i. Candidiasis

Candida albicans is the most common cause of fungal infection in HIV-infected children. It can present with oral, oesophageal, and skin, perineal and vaginal lesions with oral thrush being the commonest. Oral thrush may be the only indication of HIV infection in a child, recurrence or poor response to therapy is highly suggestive of HIV infection. The patient presents with whitish or yellowish plaques on the oro-pharyngeal mucosa. When there is oesophageal infection, there may be inability to swallow or retro-sternal chest pain and refusal to feed. Cutaneous candidiasis is commonly found in the nappy areas and skin folds. Candida septicaemia may occur in severely ill patients and those on long-term antibiotics or carrying an indwelling catheter. Diarrhoea may be a gastrointestinal manifestation. Diagnosis is mainly clinical and isolation of the organism from relevant specimens can be done.

ii. Dermatophytosis

Dermatophyte infections such as tinea corporis, capitis or cruris occur commonly in HIV-infected children. They present characteristically as flat scaling lesions with raised borders. The presence of tinea unguim may be suggestive of immune suppression.

f. Aphthous ulcers

These are small painful blisters on the tongue, mucous membranes of the mouth, tonsils, oro-pharynx or gastrointestinal tract. The diagnosis of aphthous ulcer is one of exclusion when other infectious and non-

infectious causes of mouth ulcers have been excluded. Some medications such as AZT, and foscarnet can cause aphthous ulcers. Recurrence is however very common.

g. Seborrhoeic dermatitis

This occurs more severely in HIV-infected children. It is characterised by thick yellow scales occurring on the scalp but may also be seen on the face or nappy area. In older children (>12 months) the naso-labial folds and the skin behind the ear and eyebrows may also be affected.

h. Scabies

This is characterised by papular pruritic lesions found commonly in the webs of the fingers and toes, folds of the wrist, gluteal region, ante-cubital areas and axillae. The lesions may affect the soles and palms. In severely immuno-suppressed individuals the severe form, Norwegian scabies, occurs. This is characterised by generalised scaling and enlarged crusted plaques. Scraping of the sites viewed under the microscope will reveal the mites or their eggs or faeces.

i. Oral hairy leukoplakia

While this affects about one third of HIV-infected adults, it is less common in children. It is related to Epstein-Barr virus infection and occurs when the immune suppression is severe. The lesions appear whitish or greyish along the margins of the tongue. They often have vertical corrugations and appear hairy on dry mucosa.

j. Peri-odontal disease

This occurs commonly in children with HIV infection and the manifestations range from mild redness around the gum to necrotising ulcerative peri-odontitis, severe ulceration with destruction of the gum. The ulcerative peri-odontitis can result in extensive loss of soft tissue and teeth. Severe lesions cause pain and poor oral intake. Poor oral hygiene is a common problem among HIV-infected children and it needs special attention. Diagnosis is clinical.

3.1.5 Haematologic manifestations

The three cell lines in the blood can be suppressed in HIV infection resulting in anaemia, neutropaenia or thrombocytopaenia, occurring singly or in combination. The causes include drugs and infections by the HIV virus and other organisms.

a. Anaemia

The anaemia in HIV infection has multiple origins, which include the following:

- Reduced production of erythrocytes caused by HIV infection, other infections (CMV, *Parvovirus B19*, tuberculosis), malignancies (lymphoma and Kaposi's sarcoma) and drugs (AZT, d4T, sulphonamides and dapsone)
- Destruction of erythrocytes caused by the haemo-phagocytic syndrome, disseminated intravascular coagulation (DIC) and drugs
- Ineffective erythropoiesis due to deficiency of erythropoeitic factors - iron, folic acid and vitamin B12. These result from inadequate intake, poor absorption and/or infections in the gastrointestinal tract.

b. Neutropaenia

This is defined as an absolute neutrophil count of less than 1000/mm^3 for children aged 2 weeks to 1 year and 1500/mm^3 for children aged over 12 months. When the absolute neutrophil count is below 500/mm^3, opportunistic infections occur. The neutropaenia in HIV-infected children may result from decreased levels of factors that stimulate the production of white blood cells G-CSF. Decreases in the levels of white blood cell growth factors lead to reduction in the numbers of progenitor cells in the bone marrow. This leads to a

decrease in the number of granulocytes and monocytes. There is also a decrease in the level of G-CSF in the blood. This is associated with decreased numbers of neutrophils. Neutropaenia can also be caused by antiretroviral, antifungal, anti-neoplastic and PCP prophylactic drugs. The neutropaenic child may be asymptomatic or may present with fever, skin ulcerations or eruptions, chest infections, stomatitis, dysphagia, and peri-rectal pain or fissures.

c. Thrombocytopaenia

This is said to be present when the platelet count is less than 100,000/mm^3. HIV may cause thrombocytopenia but the cause is unknown in most patients. The thrombocytopaenic child presents with easy bruising, petechiae, purpura, epistaxis, gingival bleeding, haematuria and haematochezia.

3.1.6 Neuro-developmental manifestations of HIV infection

The nervous system is often involved in HIV infection with manifestations ranging from mild delays in developmental milestones to severe progressive encephalopathy. The causes of these nervous system manifestations include HIV infection (direct viral invasion of the CNS), complications related to immune suppression, chemical mediators and the neurotoxic effects of ARV therapy. The peripheral nervous system manifestations are multi-focal and may be due to the attack of the virus on the peripheral nervous tissue. Children who are severely immuno-compromised may have opportunistic infections of the nervous system. Malignancies of the CNS such as lymphomas and leiomyosarcomas may also contribute to the nervous system manifestations. These manifestations are described below (Table 3.1).

3.1.7 HIV-associated Malignancies

The incidence of malignancies in HIV-infected children is not as high as in HIV-infected adults. The common malignancies seen in HIV-infected children are non-Hodgkin's lymphomas and Kaposi's sarcoma. There has also been an increase in other types of malignancies in some African countries- retinoblastoma, rhabdomyosarcoma and nasopharyngeal carcinoma among HIV-infected children.
(*See Chapter 5, Section 5.4).*

3.2 Approach to Diagnosis of HIV infection

A rational approach to diagnosis of Paediatric HIV infection requires health workers to have high index of suspicion, knowledge and communication skills to enable them discuss and offer HIV testing to children and their parents. Diagnosis may be:

- Clinical (based on signs and symptoms), or
- Clinical supported by laboratory findings.

HIV and AIDS should be suspected among children with suggestive clinical signs or HIV-associated conditions (see Table 3.2). Health workers should also evaluate children born to HIV-infected mothers, those who are sexually assaulted and those exposed to potentially infectious body fluids. If HIV infection is confirmed, the exact clinical stage of disease should be determined using the WHO staging system (Table 3.3).

Table 3.1 Neurologic Manifestations of HIV Infection

Abnormality	Clinical Findings	Diagnostic Studies
Developmental delay	Delay/loss of developmental and language milestones and microcephaly	Neuro-developmental testing, speech and language testing, OFC measurements reveal delays for age.
Progressive encephalopathy (PE)	Fine and gross motor deficits (usually symmetrical), gait disturbance, hyper-or hypotonia, spasticity, inability to bear weight or ambulate, neuro-developmental delay, microcephaly, confusional states	CT/MRI: brain atrophy, white matter abnormalities
Static encephalopathy (SE)	Fixed non-progressive or static motor deficits, developmental delay, microcephaly	CT/MRI: loss of brain tissue
Seizures	Generalized or focal seizure activity	• EEG: abnormal patterns • CT/MRI: findings depend on aetiology • E &U estimation • CSF: may yield pathogens, if infectious aetiology
Myopathy	Muscle weakness, myalgia, loss of muscle bulk	• EMG: irritative myopathy • Muscle biopsy: inflammation and degeneration
Myelopathy	Gait disturbances, lower extremity weakness and stiffness, urinary and faecal incontinence, spasticity, Babinski sign, sensory abnormalities	• MRI: normal or inconclusive
Focal cerebral mass lesion	Headache, nausea, vomiting, gait instability, motor deficits, visual changes	• CT/MRI: enhancing lesions
Opportunistic infections	• Headache, nausea, vomiting • Malaise, fever • Behaviour changes, Confusion, coma • Seizure activity	• CSF: positive for pathogens • Serology: positive for aetiologic pathogens • CT/MRI: multiple enhancing lesions (toxoplamosis); peri-ventricular and meningeal abnormalities (CMV)
Peripheral neuropathy	• Distal symmetrical neuropathy, distal numbness, pain, paraesthesias, decreased ankle reflexes, glove-stocking sensory loss, pseudoparalysis. • Inflammatory demyelinating polyneuropathy: progressive weakness, paraesthesias, areflexia, mild sensory loss. • Progressive poly-radiculopathy: lower extremity weakness, paraesthesias, urinary incontinence and retention, diminished reflexes	• EMG: Distal axonopathy • EMG: demyelination • EMG: polyradiculopathy. • Increased creatinine kinase

Table 3.2 Clinical Signs or Conditions in a Child that may suggest HIV Infection

Specificity for HIV Infection	Conditions
Very Specific to HIV infection	• Pneumocystis pneumonia • Oesophageal candidiasis • Extrapulmonary cryptococcosis • Invasive salmonella infection • Lymphoid interstitial pneumonitis • Herpes Zoster (shingles) with multi-dermatomal involvement • Kaposi's Sarcoma • Lymphoma • Progressive multifocal leuco-encephalopathy
Conditions common in HIV infected and uncommon in uninfected children	• Severe bacterial infections especially if recurrent • Persistent or recurrent oral thrush • Bilateral painless parotid enlargement • Generalized persistent non-inguinal lymphadenopathy • Hepato-splenomegaly (in non-malaria endemic areas) • Persistent and/or recurrent fever • Neurologic dysfunction • Herpes Zoster, single dermatome • Persistent generalized dermatitis unresponsive to treatment
Conditions common in HIV infected children but also common in uninfected	• Chronic recurrent otitis media with ear discharge • Persistent or recurrent diarrhea • Severe pneumonia • Tuberculosis • Bronchiectasis • Failure to thrive • Marasmus

Table 3.3: WHO Clinical Staging for HIV Infection

Clinical Stage 1 (Asymptomatic)

- Asymptomatic
- Persistent Generalized Lymphadenopathy

Clinical Stage 2 (Mild)

- Unexplained persistent hepatosplenomegaly
- Papular pruritic eruptions
- Extensive wart virus infection
- Extensive molluscum contagiosum
- Recurrent oral ulcerations
- Unexplained persistent parotid enlargement
- Linear gingival erythema
- Herpes zoster
- Recurrent/chronic upper respiratory tract infection (otitis media, otorrhoea, sinusitis, tonsillitis)
- Fungal nail infections

Clinical Stage 3 (Advanced)

- Unexplained moderate malnutrition, no response to therapy
- Unexplained persistent diarrhoea (14 days or more)
- Unexplained persistent fever (>37.5^0 C, intermittent/constant, >1 month)
- Persistent oral candidiasis (after 1st 6 weeks of life)
- Oral hairy leukoplakia
- Acute necrotizing ulcerative gingivitis/periodontitis
- Lymph node TB
- Pulmonary TB
- Severe recurrent bacterial pneumonia
- Symptomatic lymphoid interstitial pneumonitis
- Chronic HIV-associated lung disease including bronchiectasis
- Unexplained anaemia (Hb <8.0 g/dl), neutropenia (<0.5 x $10^9/l^3$)
- Chronic thrombocytopenia (<50 x $10^9/l^3$)

Clinical Stage 4 (Severe)

- Unexplained severe wasting, stunting or severe malnutrition not responding to standard therapy
- Pneumocystis pneumonia
- Recurrent severe bacterial infections (e.g. empyema, pyomyositis, bone or joint infection but excluding pneumonia)
- Chronic Herpes simplex infection (oro-labial or cutaneous of >1 month, or visceral at any site)
- Extra-pulmonary TB
- Kaposi's sarcoma
- Oesophageal candidiasis (or candida of trachea, bronchi or lungs)
- Central nervous system toxoplasmosis (after the neonatal period)
- HIV encephalopathy
- CMV infection; retinitis or infection affecting another organ with onset >1 month)
- Extra-pulmonary cryptococcosis (including meningitis)
- Disseminated endemic mycosis (extra-pulmonary histoplasmosis, coccidiomycosis)
- Chronic cryptosporidiosis (with diarrhoea)
- Chronic isosporidiasis
- Disseminated non-tuberculous mycobacterial infection
- Cerebral or B-cell non-Hodgkin lymphoma
- Progressive multifocal leukoencephalopathy
- HIV-associated cardiomyopathy or nephropathy
- HIV-associated recto-vaginal fistula.

3.3 Laboratory Diagnosis of HIV Infection

There are 2 broad categories of tests for diagnosis of HIV infection: detection of antibodies or of the virus/viral components in a patient's blood sample. The choice of which method to use is determined by age, time of exposure and cost. It is strongly recommended that HIV serological assays used for the purpose of diagnostic testing have a minimum sensitivity of 99% and specificity of 98% and that HIV virological assays used for the purpose of clinical diagnostic testing (usually at or after 6 weeks of age) have a sensitivity of at least 95% (ideally greater than 98%), and specificity of 98% or more. It is also strongly recommended that HIV virological testing be used to diagnose HIV infection in infants and children less than 18 months of age. However, both the serological and virological tests should be performed by a quality-assured, standardized and validated laboratory.

3.3.1 Antibody Tests

- HIV rapid testing: these are relatively inexpensive and easy to perform and should be used according to the National Testing Algorithm.
- HIV Enzyme-linked Immunosorbent Assays (ELISA): Although requires more equipment, time and technical skills, it is more sensitive than rapid tests.
- Western Blot: This is the gold standard test for confirmation of HIV infection, but is expensive and subject to indeterminate results.

3.3.2 Detection of Virus/Viral Components

- DNA PCR on dried blood spots (DBS); this is a very sensitive test useful especially for infant diagnosis
- RNA PCR (on plasma or DBS): is especially useful for monitoring disease progression and response to treatment
- Ultra sensitive p24 antigen (Up24Ag) on plasma or DBS: This is a very specific test that detects the core viral antigen produced in the early phase of infection. It is useful for detecting infection in the window period, however, a negative result does not rule out infection as its sensitivity increases with higher viral loads.
- Isolation of HIV by culture: This technique is highly sensitive and specific. However, it is time consuming (4 weeks), very expensive and recommended mainly as a research tool.

3.4 Diagnosis in Children

a. Age < 18 months

- Children less than 18 months of age born to HIV infected mothers may have circulating maternal antibodies and a positive antibody test may be from the child and/or the mother. Therefore virus/viral component detection test such as DNA PCR is the test of choice.
- It is strongly recommended that all HIV –exposed infants have HIV virological testing at 4 to 6 weeks of age or at the earliest opportunity thereafter.
- In infants with a positive virological test result, it is recommended that ART be started without delay.
- It is recommended that test results from virological testing in infants be returned to the clinic and child/mother/care giver as soon as possible but at the latest within four weeks of specimen collection. Positive test results should be fast-tracked to the mother-baby pair as soon as possible to enable prompt initiation of ART.
- The optimal time for DNA detection test in infants is 6 weeks of life and 6 weeks after complete cessation of breastfeeding.
- For infants between the ages of 9 and 18 months, do a rapid test and if positive, do DNA PCR to confirm and if negative, HIV-infection is ruled out if the test has been conducted at least 6 weeks after complete

cessation of breastfeeding (see Figure 3.1 below for Algorithm for HIV diagnosis in infants and children <18 months)

- In sick infants in whom HIV infection is being considered as an underlying cause of symptoms and signs, and virological testing is not available, HIV serological testing and use of the clinical algorithm for presumptive clinical diagnosis of HIV infection is recommended.

b. Age >18 months

- Antibody detection is very useful and reliable for children >18 months except during window period (4-6 weeks post-exposure) where antibodies may not be present at a detectable level.
- Repeat of antibody testing 3 months later is recommended if window period is suspected.
- From 18 months of life, an antibody test should be performed irrespective of whether a child received breast milk or replacement feeds. If the child is receiving breast milk after 18months of age, repeat the test 6 weeks after complete cessation (see Figure 3.2below for Algorithm for HIV diagnosis in children >18 months)
- On rare occasions a patient with AIDS may test p24 antigen and/or antibody negative because of the formation of complexes between the viral antigens and the corresponding antibodies.
- Methods such as DNA/RNA PCR could be used to resolve false negative results.

NB: *Figure 4.1in Chapter 4 provides algorithm for all infants and children offered HIV testing in provider-initiated testing and counseling (PITC) settings.*

3.5 Clinical Assessment and Monitoring of Severity of HIV infection

The WHO has developed an improved clinical staging system which lists clinical conditions believed to have prognostic significance. There are four clinical prognostic categories (Table 3.4). The immunological staging criteria are also used *(see Chapter 6, Table 6.7)* to determine when to initiate therapy.

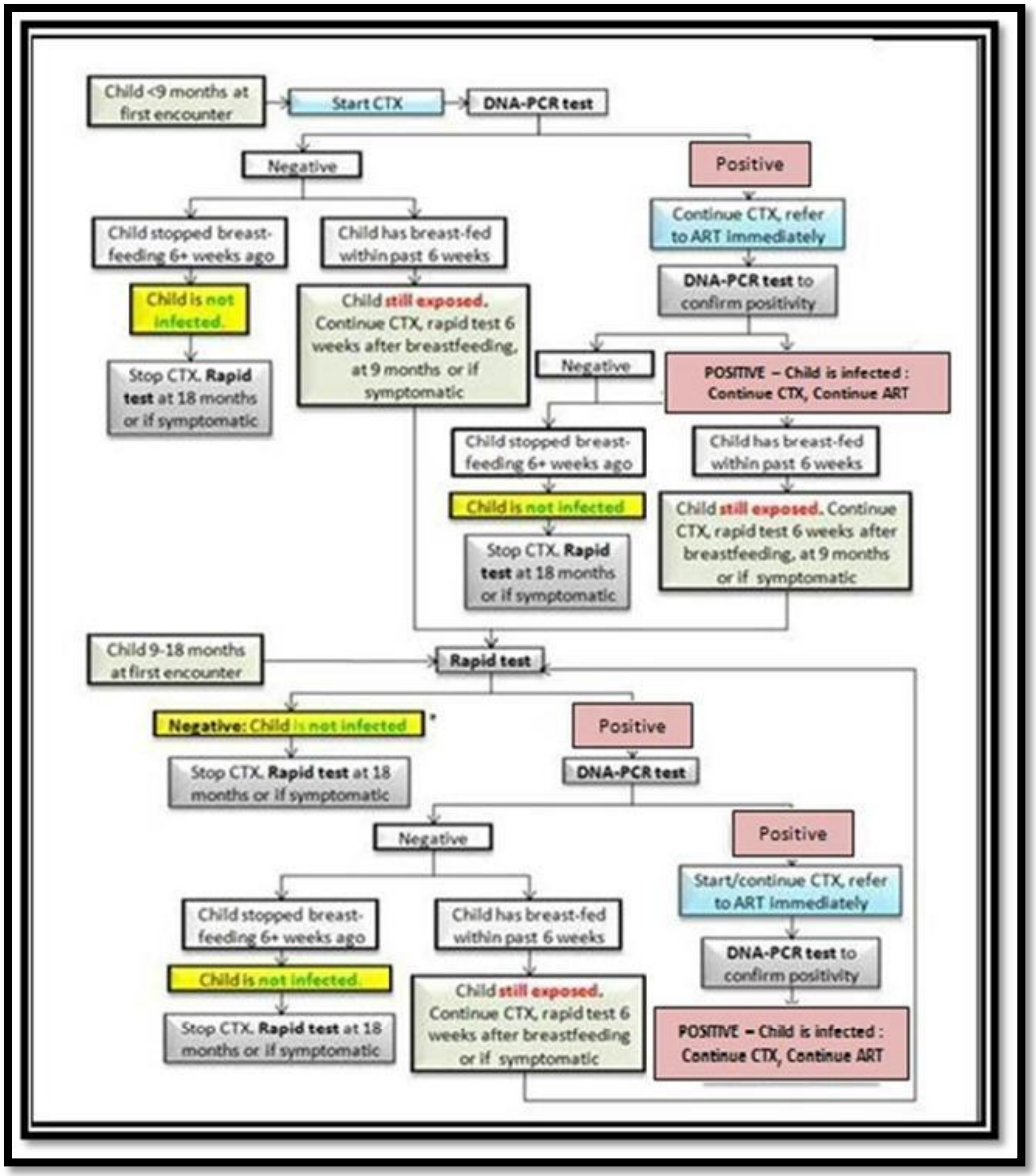


Fig. 3.1 Clinical Algorithm for Early Infant and Child (<18 months) Diagnosis of HIV infection

*(*Infants exposed through breastfeeding in the last 6 weeks should have a repeat rapid test 6 weeks after the exposure has stopped)*

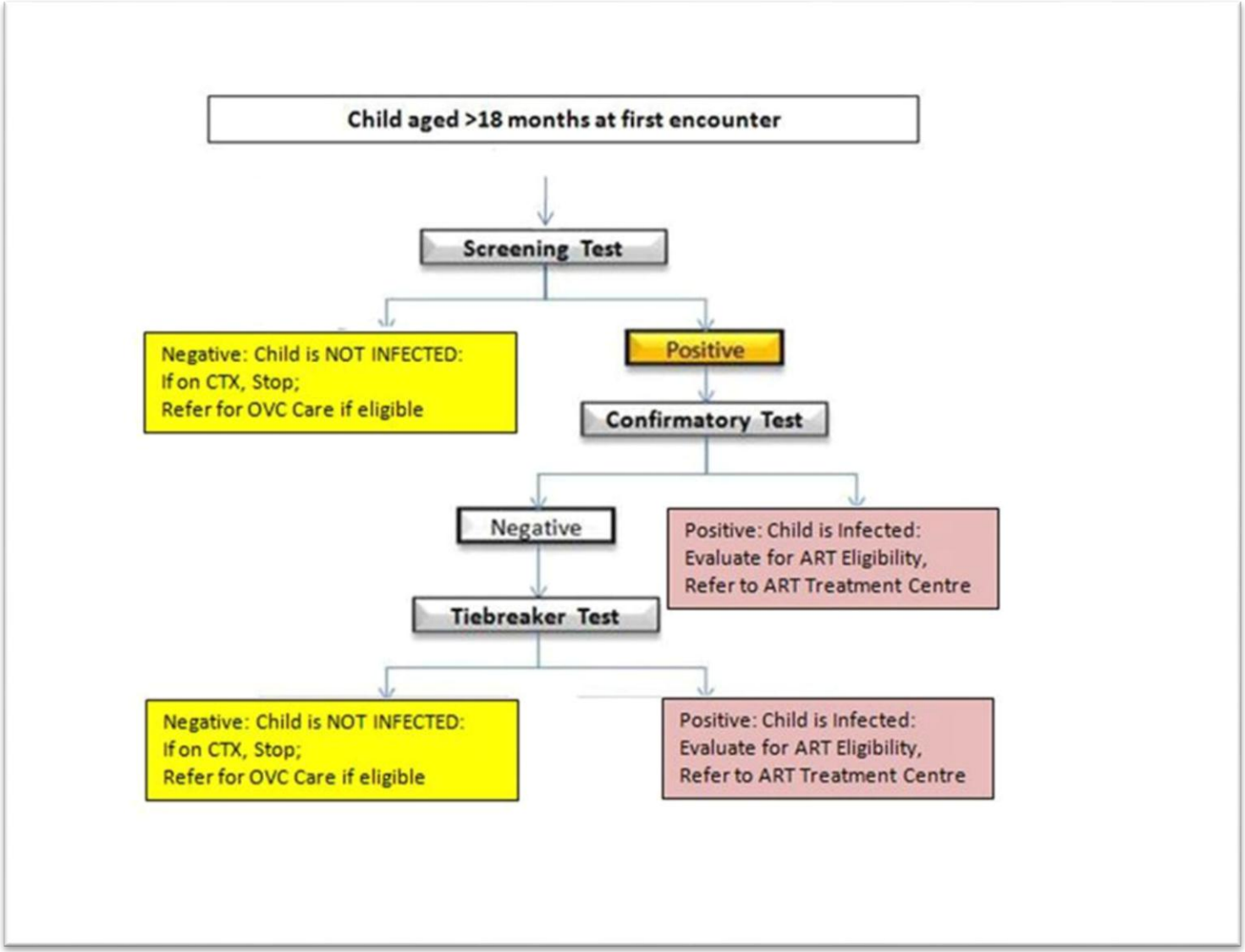


Fig. 3.2 Clinical Algorithm for Diagnosis of HIV Infection in Children >18 months Old

*(*Infants exposed through breastfeeding in the last 6 weeks should have a repeat rapid test 6 weeks after the exposure has stopped)*

Table 3.4: Diagnostic Criteria for HIV-related Clinical Events

Clinical Event	Clinical Diagnosis	Definitive Diagnosis
STAGE 1		
Asymptomatic	No HIV-related symptoms reported and no clinical signs on examination.	Not applicable
Persistent generalised Lymph-adenopathy (PGL)	Persistent swollen or enlarged lymph nodes >1 cm at two or more non-contiguous sites (excluding inguinal), without known cause	Clinical diagnosis
STAGE 2		
Unexplained persistent Hepato-splenomegaly	Enlarged liver and spleen without obvious cause.	Clinical diagnosis
Papular pruritic eruptions	Papular pruritic vesicular lesions.	Clinical diagnosis
Fungal nail infections	Fungal paronychia (painful, red and swollen nail bed) or onycholysis (painless separation of the nail from the nail bed). Proximal white subungual onchomycosis is uncommon without immunodeficiency.	Clinical diagnosis
Angular cheilitis	Splits or cracks on lips at the angle of the mouth with depigmentation, usually responding to anti-fungal treatment but may recur.	Clinical diagnosis
Lineal gingival Erythema (LGE)	Erythematous band that follows the contour of the free gingival line; may be associated with spontaneous bleeding.	Clinical diagnosis

Clinical Event	Clinical Diagnosis	Definitive Diagnosis
STAGE 2....*cont*...		
Extensive wart virus Infection	Characteristic warty skin lesions; small fleshy grainy bumps, often rough, flat on sole of feet (plantar warts); facial, > 5% BSA or disfiguring.	Clinical diagnosis
Extensive molluscum contagiosum infection	Characteristic skin lesions: small flesh-coloured, pearly or pink, dome-shaped or umbilicated growths, may be inflamed or red; facial, > 5% of BSA or disfiguring Giant molluscum may indicate advanced immunodeficiency.	Clinical diagnosis
Recurrent oral Ulcers (≥2/6 mo.)	Aphthous ulceration, typically with a halo of inflammation and yellow-grey pseudo membrane.	Clinical diagnosis
Unexplained parotid Enlargement	Asymptomatic bilateral swelling; spontaneously resolve and recur, unknown cause; usually painless.	Clinical diagnosis
Herpes zoster	Painful rash with fluid-filled blisters, dermatomal distribution, may be haemorrhagic on erythematous background; may become large & confluent. Does not cross midline.	Clinical diagnosis
Recurrent upper respiratory tract infection (URTI)	Current event with at least 1 episode in past 6 months. Symptoms: fever, unilateral facial pain, nasal discharge (sinusitis) or painful otitis media, sore throat with productive cough (bronchitis), pharyngitis, croup-like cough, persistent or recurrent ear discharge.	Clinical diagnosis

Table 3.4:*cont....* Diagnostic Criteria for HIV-related Clinical Events

Clinical Event	Clinical Diagnosis	Definitive Diagnosis
STAGE 3		
Unexplained moderate malnutrition	Weight loss: low weight-for-age, up to -2 standard deviations (SDs), not explained by poor or inadequate feeding and/or other infections, and not adequately responding to standard management.	Documented loss of body weight of -2 SDs, failure to gain weight on standard management and no other cause identified during investigation.
Unexplained persistent diarrhoea	Unexplained persistent (14 days or more) diarrhoea (loose or watery stool, three or more times daily) not responding to standard treatment.	Stools observed and documented as unformed. Culture and microscopy reveal no pathogens
Unexplained persistent Fever for >1 month	Fever or night sweats for >1 month, intermittent or constant, with lack of response to antibiotics or anti-malarias. No other foci of disease. Malaria must be excluded in malarious areas	Fever of >37.5 ^{o}C with negative blood culture, negative malaria slide, normal CXR, and no other obvious foci of disease.
Oral candidiasis (after first 6 weeks of life)	Persistent or recurring creamy white soft small plaques which can be scraped off (pseudo membranous), or red patches on tongue, palate or lining of mouth, usually painful or tender (erythematous)	Microscopy or culture.

Clinical Event	Clinical Diagnosis	Definitive Diagnosis
STAGE 3 *cont…*		
Oral hairy leukoplakia	Fine small linear patches on lateral borders of tongue, generally bilaterally, which do not scrape off.	Clinical diagnosis.
Lymph node TB	Non-acute, painless "cold" enlargement of lymph nodes, usually matted, localized in one region. May have draining sinuses. Response to standard anti-TB treatment in one month.	Histology or fine needle aspirate for Ziehl Neelsen stain. Culture.
Pulmonary TB (History of contact with adult with smear-positive PTB)	Nonspecific symptoms, e.g. chronic cough, fever, night sweats, anorexia and weight loss. In older children, productive cough and haemoptysis as well.	Isolation of *M. tuberculosis* on sputum culture. +/- Abnormal Chest X ray.
Severe recurrent bacterial pneumonia	Cough with fast breathing, chest in-drawing, nasal flaring, wheezing, and grunting. Crackles or consolidation on auscultation. Responds to course of antibiotics. Current episode plus one or more in previous six months.	Isolation of bacteria from appropriate clinical specimens (induced sputum, BAL, lung aspirate).
Acute necrotizing ulcerative gingivitis, stomatitis, or ulcerative periodontitis	Severe pain, ulcerated gingival papillae, loosening of teeth, spontaneous bleeding, bad odour, and rapid loss of bone and/or soft tissue	Clinical diagnosis.

Table 3.4:*cont....* Diagnostic Criteria for HIV-related Clinical Events

Clinical Event	Clinical Diagnosis	Definitive Diagnosis
STAGE 3 *cont...*		
Symptomatic LIP	No presumptive clinical diagnosis. CXR: bilateral reticulo-nodular interstitial pulmonary infiltrates present for more than two months with no response to antibiotic treatment and no other pathogen found.	Oxygen saturation persistently <90%. May present with cor pulmonale and may have increased exercise-induced fatigue. Characteristic histology.
Chronic HIV-associated lung disease (including bronchiectasis)	History of cough productive of copious amounts of purulent sputum (bronchiectasis only), with or without clubbing, halitosis, and crepitations and/or wheezes on auscultation;	CXR; may show honeycomb appearance (small cysts) and/or persistent areas of opacification and/or widespread lung destruction, with fibrosis and loss of volume.
Unexplained anaemia (<8g/dl), or neutropenia (<0.5 x 109/l) or chronic thrombocytopenia (<50 X 109/l)	No presumptive clinical diagnosis.	Laboratory testing, not explained by other non-HIV conditions, or not responding to standard therapy with haematinics, anti-malarial or anti-helminthics as outlined in IMCI.
STAGE 4		
Unexplained severe wasting, stunting/ severe malnutrition not adequately responding to standard therapy	Persistent weight loss not explained by poor or inadequate feeding or other infections and not adequately responding in two weeks to standard therapy. Characterized by: visible severe wasting of muscles, with or without oedema of both feet, and/or weight-for-height of -3 SDs, as defined by WHO IMCI guidelines.	Documented weight loss of >-3 SD +/- oedema.
Pneumocystis pneumonia (PCP)	Dry cough, progressive difficulty in breathing, cyanosis, tachypnoea and fever; chest in-drawing or stridor. (Severe or very severe pneumonia as in IMCI.) Usually of rapid onset especially in infants under 6 months of age. Response to high-dose cotrimoxazole +/- prednisolone.	CXR, typical bilateral perihilar diffuse infiltrates; microscopy of induced sputum or BAL or NPA
Recurrent severe bacterial infection, e.g. empyema, pyomyositis, bone or joint infection, meningitis but excluding pneumonia	Fever accompanied by specific symptoms or signs that localize infection. Responds to antibiotics. Current episode plus one or more in previous six months.	Culture of appropriate clinical specimen.

Table 3.4:*cont....* Diagnostic Criteria for HIV-related Clinical Events

Clinical Event	Clinical Diagnosis	Definitive diagnosis
STAGE 4…*cont*…		
Chronic herpes simplex infection; (orolabial or cutaneous of more than one month's duration or visceral at any site)	Severe and progressive painful orolabial, genital, or anorectal lesions caused by HSV infection for >1 month.	Culture and/or histology.
Oesophageal Candida (or Candida of trachea, bronchi or lungs).	Chest pain, dysphagia, odynophagia (pain on swallowing food and fluids) or retrosternal pain worse on swallowing (food and fluids) responds to specific treatment. In young children, suspect if oral Candida observed and food refusal occurs and/or difficulties/crying when feeding.	Macroscopic appearance at endoscopy, microscopy of specimen from tissue or macroscopic appearance at bronchoscopy or histology.
Extrapulmonary/ disseminated TB	Prolonged fever, night sweats, weight loss. Clinical features of organs involved, e.g. sterile pyuria, pericarditis, ascites, pleural effusion, meningitis, arthritis, orchitis.	AFB or culture of M. TB from blood or other specimen except sputum or BAL, Biopsy and histology.
STAGE 4…*cont*…		
Kaposi's sarcoma	Typical appearance in skin or oropharynx of persistent, initially flat, patches with a pink or blood-bruise colour, skin lesions that usually develop into nodules.	Macroscopic appearance or by Histology
CMV retinitis or CMV infection affecting another organ, with onset at age > 1 month.	Retinitis only: may be diagnosed by experienced clinicians: typical eye lesions on fundoscopic examination; discrete patches of retinal whitening with distinct borders, spreading centrifugally, following blood vessels associated with retinal vasculitis, haemorrhage and necrosis with onset at age >1 month.	Histology or CMV demonstrated in CSF by culture or DNA-PCR.
CNS toxoplasmosis	Fever, headache, focal neurological signs, convulsions. Usually responds within 10 days to specific therapy.	Positive serum toxoplasma antibody and single/multiple intracranial mass lesions on CT/MRI.
Extrapulmonary cryptococcosis including meningitis	Meningitis: usually sub acute, fever with increasing severe headache, meningism, confusion, behavioural changes that responds to cryptococcal therapy.	Isolation of Cryptococcus neoformans from extrapulmonary site or positive cryptococcal Ag (CRAG) on CSF or blood.

Table 3.4:*cont....* Diagnostic Criteria for HIV-related Clinical Events

Clinical Event	Clinical Diagnosis	Definitive Diagnosis
STAGE 4…*cont…*		
HIV encephalopathy	At least 1 of the following, progressing over at least 2 months in the absence of other illness: • Failure to attain/ loss of, developmental milestones, loss of intellectual ability; or • Progressive impaired brain growth with stagnation of OFC; or • Acquired symmetric motor deficit with ≥2 of the following: paresis, pathological reflexes, ataxia, gait disturbances	Neuro imaging demonstrating atrophy and basal ganglia calcification, exclusion of other causes
Disseminated mycosis (coccidiomycosis, histoplasmosis, penicilliosis)	No presumptive clinical diagnosis. .	Histology: usually granuloma formation. Isolation: Ag detection from affected tissue; culture/ microscopy from specimen or blood culture.

Clinical Event	Clinical Diagnosis	Definitive Diagnosis
STAGE …*cont…*		
Disseminated mycobacteriosis other than TB	No presumptive clinical diagnosis.	Non-specific clinical symptoms including progressive weight loss, fever, anaemia, night sweats, fatigue or diarrhoea; plus culture of atypical mycobacteria species from stool, blood, body fluid or other body tissue, excluding lung.
Chronic Isospora	No presumptive clinical diagnosis.	Identification of isospora.
Chronic cryptosporidiosis (with diarrhoea)	No presumptive clinical diagnosis.	Cysts identified on modified ZN stain.
Cerebral or B cell non-Hodgkin lymphoma	No presumptive clinical diagnosis.	CNS imaging: at least 1 lesion with mass effect; histology of relevant specimen

CHAPTER 4
PROVIDER-INITIATED TESTING AND COUNSELLING

4.0 Introduction and Definitions

Provider-initiated HIV testing and counselling (PITC) refers to HIV testing and counselling which is recommended by health care providers to persons attending health care facilities as a standard component of medical care. The major purpose of such testing and counselling is to enable specific clinical decisions to be made and/or specific medical services to be offered that would not be possible without knowledge of the child's HIV status.

Currently, many opportunities to diagnose HIV infection in infants and children are missed within the health system. HIV testing and counselling should be routinely offered to all children seen in health facilities including Emergency units, out-patient departments, inpatient admissions, antenatal care, prevention of mother-to-child transmission of HIV (PMTCT clinics), immunization, nutrition, and within programmes for other vulnerable children. This is because children have a more rapid progression of HIV disease than adults and signs and symptoms of HIV infection are often not specific. More importantly, asymptomatic children will be identified. Without access to care at least one-quarter of children with HIV die before the age of one year and most die before reaching five years. It is a basic responsibility of health care providers to recommend HIV testing and counselling as part of the child's routine clinical management. HIV control programmes with community outreach should make efforts to implement PITC strategy as a deliberate effort to scale up access to HIV care.

Whenever the testing of children is performed, the "three C's" – informed consent, counselling and confidentiality should be observed. The assent of the child should be sought in a developmentally appropriate manner. Special considerations apply for obtaining informed consent from parents/caregivers in the case of children. In "opt-out" approaches, caregivers and adolescents must specifically decline the HIV test after receiving pre-test information if they do not want to test.

Considerations for HIV Testing in Children

Child testing does not stop at merely drawing blood sample from a child and getting a result, but should include the following considerations:

- The potential benefit of HIV testing in the child child's welfare, concern's and fears
- Parents and caregivers concerns and fears
- Parental/caregivers consent and notification for older children
- Stigmatization within the community.

Testing a child older than 18 months for HIV is the same process as testing an adult and basically follows the same steps. However, psychological and emotional issues addressed during the session must be tailored according to the child's age and level of understanding. As in the case of adult HIV testing and counselling (TC), there is a need to define clear guidance for testing in children that takes into account the current thinking of broadening the TC entry points. As a result, PITC for children will serve as a tool for case finding, and at the same time it affords remarkable opportunities to promote prevention of *both* HIV acquisition and transmission. The ultimate goal of PITC is to make testing available and accessible to all children in health facilities and communities in order to have access to care and support services.

4.1 Recommendations for PITC in Children and Adolescent Health Care Services

a. Service Points:

PITC is recommended in all health facilities where children and adolescents receive health care whether in public or private health settings, including medical and surgical services, in-patient and outpatient facilities and mobile or outreach medical services.

In the case of phased-implementation of PITC an approximate order of priority maybe as follows:

- Paediatric in-patient and out-patient facilities including TB clinics
- Emergency Paediatric Unit
- Maternal and child health services (including immunization)
- Services for most at risk population e.g. sickle cell disease, haemophiliacs, oncology and STI/Dermatology clinics and OVC
- Adolescent services
- Surgical services.

Table 4.1 provides a list of HIV-related services where comprehensive provider-initiated HIV testing and counselling should be provided.

b. Circumstances to Provide HIV Testing in Infants and Children

Considering the high prevalence of HIV in the country, there is a need to test as many children as possible, even if the child does not have any known history of HIV exposure. Therefore testing is recommended in the following circumstances:

- To confirm HIV infection status of children born to HIV+ mothers six weeks after exposure to HIV has ceased, or at 18 months, whichever is sooner
- All infants and children of HIV-negative mothers and mothers of unknown status for the purposes of appropriate care at 4-6 weeks or soon thereafter for infants known to be exposed
- Infants receiving breast milk from surrogate mother and/or wet nurse
- Diagnosis in a child who is ill with or without features of HIV
- Diagnosis where a sibling or a parent has been diagnosed with HIV or has died from AIDS or other undiagnosed debilitating illness in the family
- Caring for a member of the household who is HIV positive
- Where a child has been exposed or potentially exposed to HIV through sexual abuse or contaminated needle stick injuries, or receipt of potentially infected blood or blood products
- The adolescent who expresses desire to have the test
- The pregnant adolescent
- Transmission of HIV in the health care setting is suspected
- The child has been diagnosed with a sexually transmitted disease.

4.2 Pre-test Information and Informed Consent for PITC in Children and Adolescents

Facilities where PITC services exist should provide information on HIV/AIDS, the need for the test and what services will be available for both child and the parents, in the event the child is infected.

a.) Minimum information for informed consent for PITC in Children and Adolescents

The following should be the minimum information that should be provided:

That HIV testing and counselling is being offered routinely and this has the benefits of early diagnosis of HIV infection to allow for prompt interventions

- The reasons why HIV testing and counselling is being recommended
- The clinical and prevention benefits of testing should emphasize that people should sustain safer behaviour.
- The test result will be treated confidentially and will not be shared with anyone other than health care providers directly involved in providing services to the patient
- The patient/caregiver has the right to decline the test, and unless that right is exercised, the test will be performed
- Declining an HIV test will not affect the patient's access to services that do not depend upon knowledge of HIV status
- In the event of an HIV-positive test result, prompt enrollment into HIV care and support services

- An opportunity to ask the health care provider questions and seek clarifications.
- For women and adolescent girls who are or may become pregnant should include:
    - The risks of transmitting HIV to the infant
    - Measures that can be taken to reduce mother-to-child transmission, including antiretroviral prophylaxis and infant feeding counselling
    - The benefits to infants of early diagnosis of HIV.

Table 4.1: HIV-related Services where Comprehensive PITC should be implemented

Services	Details of Activities
1. Education as part of individual or group pre-test Information	
2. Basic care and support services for persons diagnosed HIV-positive	• Education, psychosocial and peer support for management of HIV • Periodic clinical assessment and clinical staging • Management and treatment of common opportunistic infections • Co-trimoxazole prophylaxis • Tuberculosis screening and treatment when indicated; preventive therapy when appropriate • Malaria prevention and treatment, where appropriate • STI case management and treatment • Palliative care and symptom management • Advice and support on other prevention interventions, such as safe drinking water • Nutrition advice • Infant feeding counselling • Antiretroviral treatment, where available
3. Basic prevention services for persons diagnosed HIV-positive	• Individual post-test counselling with referral to prevention, care and treatment service • Support for disclosure to partner and couples counselling • HIV testing and counselling for partners and children • Safer sex and risk-reduction counselling with promotion and provision of male/female condoms • Needle and syringe access and other harm reduction interventions for injecting drug users • Interventions to prevent MTCT for pregnant women, including antiretroviral prophylaxis • Reproductive health services, family planning counselling and access to contraceptive methods
4. Basic prevention services for persons diagnosed HIV-negative	• Post-test HIV counselling for individuals/couples with information on preventive services • Promotion and provision of male and female condoms • Needle and syringe access and other harm reduction interventions for injecting drug users • Post-exposure prophylaxis, where indicated.

b).Informed Consent for PITC for children

As minors(under the age of 18 years), children cannot legally provide informed consent, thus informed consent for HIV testing should be obtained from the child's parent or guardian. Where there is no parent or legal guardian available, health care providers should seek consent from an individual

(sometimes known as a "substitute decision-maker" or "surrogate decision-maker") who has authority under the law to make a decision based on the best interests of the child. However, a child above age 10 years does have the right to participate in decisions affecting his or her life and according to the Convention on the Rights of the Child, their desires should be given due weight in accordance with their maturity. Verbal communication is adequate for the purpose of obtaining informed consent.

4.3 Guiding principles and Special Considerations in adopting PITC strategy for Children

The UN Convention on the Rights of the Child stipulates that "the best interests of the child shall be a primary consideration" in all actions concerning children. This includes decision-making about medical care. The purpose of HIV testing and counselling should always be to promote the best interests and optimal health outcomes for the child.

Where a child is extremely disadvantaged because he or she is orphaned, abandoned or affected by mental or intellectual disability, he/she may be at increased risk of discrimination, exploitation and unfavourable access to health care. HIV testing and counselling should therefore be recommended for such children only where the criteria of apparent HIV-related illness are satisfied, or maternal HIV-positive status is known. HIV testing should only be offered for the purpose of providing the child with appropriate HIV-related treatment, care and support.

Positive HIV test results in infants and young children in most instances indicates maternal infection and, possibly, paternal infection. HIV testing and counselling should therefore be recommended to parents and siblings of HIV-infected children, where possible and appropriate, in the form of couples or family HIV counselling and testing. Mothers should be specially informed that a negative test in the child does not mean that the mother is not HIV-infected.

Health care providers must be adequately equipped to deal with the needs of children. For example, counselling children requires skills that differ from adult and adolescent counselling, including the ability to assess maturity and use age-appropriate language (Refer to Chapter 3 in this Guideline).

4.4 Special Considerations in PITC for Adolescents

Efforts to expand PITC in health facilities should include training and supervision for health care providers on relevant laws and policies governing the consent for minors to access clinical services, including when they can and cannot recommend an HIV test to an adolescent independent of the consent of the adolescent's parent or legal guardian. Where the law does not allow a sufficiently mature adolescent to give his or her own informed consent to an HIV test, the health care provider should provide an adolescent patient with the opportunity to assent to HIV testing and counselling in private, without the presence or knowledge of his or her parents or legal guardians.

The pre-test information should be adapted to the patient's age, developmental stage and literacy level. If the adolescent provides assent, indicating that he or she understands the risks and the benefits of HIV testing and would like to receive the test, then the health care provider should seek the informed consent of the parent or legal guardian.

In some situations, a parent or legal guardian may not be available to give consent on the adolescent's behalf. The health care provider may need to assess whether an adolescent can request and consent to testing alone. The provider must always work within the framework of existing laws and regulations and be guided by the best interests of the patient.

4.5 Follow-up of Children and Adolescents where a test is declined

Declining an HIV test should not result in reduced quality or denial of services, coercive treatment or breach of confidentiality, nor should it affect a person's access to health services that do not depend on

knowledge of HIV status. Where testing is declined, further opportunity should be created by offering assistance to access either client-initiated testing or PITC in the future.
The patient's decision to decline the HIV test should be noted in the medical record so that, at subsequent visits to the health facility, a discussion of HIV testing and counselling can be re-initiated.

4.6 Post-test counselling for HIV-positive children and their families
Ideally, post-test counselling should be provided by the same health care provider who initiated HIV testing and counselling. However, where the initiating health care worker is absent, post test counselling for infected children should be referred to other counsellors within the facility. Follow up and support services for child and parents and/or caregiver should be provided Results should not be given in group settings.

It is not acceptable practice for health care providers to recommend HIV testing and counselling and to subsequently withhold or fail to convey test results. Although patients can refuse to receive or accept results of any test or investigation, health care providers should make every reasonable attempt to ensure that patients and/or caregiver receive their test results in a confidential and empathetic manner and understand them accordingly

The health care provider who provides post-test counselling in PITC should proceed to actively link the child into care directly or through a pre-identified peer health educator. including linkages to access other services within the facility and the community Immediate enrolment into care should be emphasized with commencement of cotrimoxazole prophylaxis. Subsequent effort should focus on providing testing and counselling for the other members of the family including siblings of the index child.

The focus of post-test counselling for families with HIV-positive test results is psychosocial support to cope with the emotional impact of the test result, facilitate access to treatment, care and prevention services, prevention of transmission and disclosure to sexual and injecting partners. Health care providers should:

- Provide information about the result simply and clearly, and give the client/caregiver time to consider it
- Ensure that the client/caregiver understands the result
- Allow the client/caregiver to ask questions
- Help cope with emotions arising from the test result
- Discuss any immediate concerns and assist in determining who in the client/caregiver's social network may be available and acceptable to offer immediate support
- Describe follow-up services that are available in the health facility and in the community, with special attention to the available treatment, PMTCT and care and support services
- Provide information on how to prevent transmission of HIV, including provision of male and female condoms and guidance on their use
- Provide information on other relevant preventive health measures such as good nutrition, co-trimoxazole prophylaxis and insecticide-treated bed nets
- Discuss disclosure of the result, when and how this may happen and to whom
- Encourage and offer testing and counselling of partners and children
- Assess the risk of violence or suicide and discuss possible steps to ensure the physical safety of family members
- Arrange a specific date and time for follow-up visits or referrals for treatment, care, counselling, support and other services as appropriate (e.g. tuberculosis screening and treatment, prophylaxis for opportunistic infections, STI treatment, family planning, antenatal care, pain relief and access to sterile needles and syringes).

4.7 Post-test counselling for HIV-positive adolescents

In addition to the information described above, post-test counselling for pregnant adolescents whose test result is HIV-positive should address the following:

- Reproductive health services including Family planning
- Use of antiretroviral drugs for the patient's own health, and to prevent mother-to-child transmission
- Adequate maternal nutrition, including iron, folic acid, Vitamin A, Cotrimoxazole and/or Intermittent Preventive Therapy in Pregnancy (IPTp) for Malaria
- Infant feeding options and support to carry out the mother's infant feeding choice
- HIV testing for the infant and the follow-up that will be necessary
- Partner testing.

4.8 Linkages and Referrals to other HIV services

HIV test results must be communicated with an explanation of the prevention, treatment, care and support services available to the patient. Programmes for other chronic illnesses and community-based HIV prevention, treatment, care and support services are especially important resources and it is important to establish and maintain active linkages with them.

At a minimum, referral should include providing the patient with information about whom to contact as well as where, when and how to contact them. Patient referral works best if the health care provider makes contact in the presence of the patient and schedules an appointment, making note of the contact and the organization in the patient's file. Staff within the referral network need to routinely inform each other of changes in personnel or processes which could impact upon the referral of patients.

4.9 Frequency of testing

The frequency of re-testing family members will depend on the exposure of the individuals. Risks of HIV transmission to the infant are very high if the mother acquires HIV during pregnancy or while breastfeeding. HIV testing and counselling should generally be recommended to patients where doubt exists about the patient's prior testing history or the accuracy or veracity of prior test results. It is important that regular HIV testing does not become a substitution for prevention behaviours. Health care providers should emphasize that people should sustain safer behaviour.

CHAPTER 5
CLINICAL CONDITIONS AND OPPORTUNISTIC INFECTIONS

5.0 Introduction

HIV infection is associated with an increased frequency of common childhood infectious and non-infectious clinical conditions including malignancies. Opportunistic infections (OIs) are caused by organisms which in the immuno-competent host would not cause significant disease and are generally caused by viruses, bacteria, fungi, protozoa and other parasites. OIs tend to be persistent, severe, recurrent and sometimes life threatening. These infections could be local or systemic and can occur in any system.

Prevention, early detection and treatment of OIs are critical components of care for HIV infected children including those on ART. Opportunistic infections could be pointer to the possibility of HIV infection among children whose HIV infection status is not known. Recurrence of OIs in children on ARV therapy should alert the care provider to the possibility of treatment failure. Thus the prevention, early detection and treatment of OIs remain important.

HIV-associated malignancies occur in children. However, they are less frequent than in adults. With the exception of children with primary CNS lymphomas, most paediatric patients are not profoundly CD4 cell depleted at the time of diagnosis of malignancy. This contrasts with HIV infected adults who are often severely immuno-suppressed when malignancy is diagnosed.

5.1 Clinical Conditions and Opportunisitc Infections

The common clinical conditions and opportunistic infections that occur in HIV infected children are summarized in Table 5.1 below. They could be grouped according to aetiological agents and the severity is variable.

Table 5.1: Clinical Conditions and Opportunistic Infections

Infection/ Conditions	Causative organisms	Symptoms and signs	Diagnosis	Treatment	Comments
• **Tinea corporis** • **Tinea capitis**	• *Malassaezia furfur* • *Trichophyton rubrum*	Itchy circular lesions with raised edges, fine scaly area in the centre, loss of hair	• Clinical • Laboratory: skin scrapings stained with KOH	• Topical application: - Whitfield's ointment applied b.d. for 3-5 weeks - 2% Miconazole cream bid to skin for 3-5 weeks • Oral therapy: - Griseofulvin 10mg/kg/day x 8weeks - Oral Ketoconazole 3.3-6.6 mg/kg o.d. x 2-4 weeks	**NB:** Extra caution for possible NVP interactions with ketoconazole (see section on drug interactions)
Seborrhoeic dermatitis	Allergic reaction to Yeast infection *(pityrosporum)*	Greasy scales over scalp and redness of cheek and flexural aspects	Clinical	• Selenium sulphide shampoo, OR • Tar shampoo followed by sulphur salicylic acid cream or 1% hydrocortisone , Or • Ketoconazole cream.	Secondary bacterial infection may be common.
Candidiasis: **A. Oral thrush**	Candida albicans	White painless plaques on the buccal and or pharyngeal mucosa or surface of the tongue that is not easily scraped off	• Clinical • Laboratory: Wet mount microscopy using KOH preparation.	• Nystatin 100,000-200,000 IU gargled or delivered to the cheeks in children 4-5 times/day for 14 days, Or • Pastiles (mucosal adhesive capsule MAC) 4-5x/day for 7 – 10 days, Or • 1% aqueous solution of gentian violet, local application 2 x daily x 7 days, Or • Fluconazole - oral 6mg/kg stat day 1, then 3mg/kg/day for 14 days	NB: Side Effects of antifungal drugs: • Mild - Nausea, vomiting, diarrhoea, abdominal pain • Severe - Hepatotoxicity agranulocytosis, seizures
B. Oesophagitis	Candida albicans	White patches, in mouth, retro-sternal pain on swallowing, food refusal, excessive salivation	Suspected presence of oro-pharyngeal thrush, odynophagia Oesophagoscopy	• Fluconazole – oral, 6mg/kg stat day 1 then 3mg/kg/day for 14-21 days • Ketoconazole 3.3-6.6mg/kg/day x 14-21 days	• With fluconazole, hepatotoxicity, nausea, vomiting abdominal pain, pancytopaenia may occur • Avoid use of ketoconazole with NVP

Table 5.1.....*cont....*

Infection/ Conditions	Causative Organisms	Symptoms and Signs	Diagnosis	Treatment		Comments
Cryptococcal meningitis	*Cryptococcus neoformans*	Headache, fever, delirium, neck pain, convulsion, photophobia	• Clinical • Lab: CSF Serology/ India Ink stain	Flucytosine orally 100mg/kg/day for 14 days followed by IV Amphotericin B 0.7-1mg/kg/day x 2 wks, THEN Fluconazole 6mg/kg/day x 8 wks then 3mg/kg/day for life.		Refer to infectious disease specialist
Pneumocystis pneumonia	*Pneumocystis jirovecii (carinii) PJP*	Acute/sub-acute non productive cough, difficulty in breathing		• Clinical: • CXR: focal interstitial infiltrates and mediastinal lymphadenopathy, ground glass appearance, • Laboratory: induced sputum or bronchio-alveolar lavage for cytology.	• Acute: Trimethoprim 20mg/kg PO or iv x 21 days (in divided doses, q.i.d), Or • Dapsone 2mg/kg o.d. max. 100mg/ day x 21 days, Or • Pentamidine 4mg/kg/o.d.iv x 21 days, Or • Clindamycin 10-30mg/kg/day i.v. tid x 14-21 days • For severe disease: (PO_2 <90mmHg: add prednisolone 2mg/kg/day x 7-14 days • Prophylaxis: CTX 6-8mg/kg/day PO daily	Complications of drug treatment - Severe reactions: • Stevens-Johnson syndrome • Toxic epidermal necrolysis • Anaemia, hepatitis, haemolysis in G6PD deficient patients
Stomatitis, Aphthous ulcers	*Herpes simplex virus 1 and 2*	• Recurrent, painful, oral vesicular lesions, shallow ulcers • Oesophagitis: odynophagia		• Clinical; • Laboratory: - Tzanck smear - Rising serum HSV antibody titres	• Mild-moderate lesions: 8 mg/kg/ dose t.i.d orally; If severe: Acyclovir 40-80mg/kg/day tid x 5-10 days • Topical antiseptics to avoid bacterial superinfection • Analgesics.	Nausea, vomiting, diarrhoea, headache, malaise, rash, seizures, renal dysfunction
Herpes virus encephalitis	*Herpes simplex virus 1 and 2*	Fever, altered consciousness, convulsions ± focal neurological signs		• Increased CSF:serum HSV antibody ratio • Viral isolation	IV Acyclovir 20mg/kg tid x 21days	

Table 5.1.....*cont....*

Infection/ Conditions	*Causative Organisms*	Symptoms and Signs	Diagnosis	Treatment	Comments
Herpes zoster (Shingles)	*Varicella zoster virus*	Painful vesicular lesions in a dermatomal distribution, on face and trunk	Clinical	IV Acyclovir 30mg/kg/day tds x 7 days Analgesics – NSAIDS, carbamazepine, amitriptyline; Local appl of calamine lotion; Topical application of Acyclovir cream	Refer intractable cases for specialist care.
Cytomegalovirus: • **Enteritis** • **Colitis** • **CNS involvement**	*Cytomegalovirus (CMV)*	• Enterocolitis: Fever, cramps, dysphagia, odynophagia, diarrhoea ± blood; • CNS: Delirium, lethargy, headache, malaise disorientation, , neck stiffness, photophobia, cranial nerve palsy, blurred vision or "floaters"	• Clinical • Laboratory: Biopsy (intracellular inclusions) Serology • Skull X ray • CT Scan • CMV in CSF	• Ganciclovir 5mg/kg iv bid x 2-3 weeks; • Foscarnet 40-60mg/kg 8 hrly x 2-3 weeks • Retinitis – Opthamological examination; same drug therapy as above.	
Measles	*Measles virus*	• Fever, cough, red eyes, kerato-conjunctivitis, coryza , maculo-papular rash; • Complications: Pneumonia, diarrhoeal disease, malnutrition.	Clinical	• Supportive therapy • Anti-pyretics • Vitamin A, antibiotics as indicated, adequate hydration	• Highly contagious; • Refer Complications; Nutrition support
Chicken pox	*Varicella virus*	Fever, centrifugal (starts from trunk to extremities) umbilicated rash in crops	Clinical	• Supportive therapy • Reduce fever; • Antibiotics for bacterial infections	
• **Anal/Genital warts** • **Cutaneous warts (**Verruca plana**)**	*Human papilloma virus*	• Anal/Genital: Crops of papules or nodules with a rough surface • Verruca planar: Widespread flat hypo/hyper-pigmented rash on face, trunk and limbs, not itchy, dry, often scaly.	Clinical	• Apply Salicylic acid preparation, OR • Liquid nitrogen, Cryotherapy OR Electrocautery	

Table 5.1.....*cont*....

Infection/ Conditions	Causative Organisms	Symptoms and Signs	Diagnosis	Treatment	Comments
Molluscum contagiosum	Pox virus	Light-coloured nodules with central umbilication commonly seen on face and trunk.	Clinical	• Leave alone unless super-infected, OR • Use Electro-cautery, OR • Use of Liquid nitrogen application.	Antibiotics for bacterial super-infection.
Toxoplasmosis	Toxoplasma gondii	Fever, reduced alertness, headache, focal neurological deficits, seizures, chorio-retinitis	• Clinical: Response to empiric therapy. • Serology: rising IgG titre • CT scan	• Pyrimethamine 2mg/kg/dose/day max 50mg x 2 days then maintenance 1mg/kg/day max 25mg + Sulphadiazine 50mg/kg/every 12 hours then treat 4 weeks beyond resolution of symptoms • Pyrimethamine + Folinic acid 5-20 mg 3 times weekly + Clindamycin 10-30mg/ kg/ day tds x 6wks • Corticosteroids to reduce oedema/mass effect. • Prophylaxis: CTZ.	• Complications of treatment - Nausea, vomiting, abdominal pain; Megaloblastic anaemia, pancytopaenia, rash, Stevens Johnson Syndrome, photosensitivity • Folinic acid 5-20 mg given as prevention
Pneumonia	• Respiratory viruses • Bacteria: - *S. pneumoniae* - *H. influenza* - *S. aureus* - *M. catarhalis* - *Kl. pneumonia* - *P. aeruginosa*	• Fever, chills, cough and pleuritic chest pain, difficulty/ fast breathing. • Crepitations, bronchial breath sounds	• Clinical • Laboratory: blood culture. • Chest x ray	• Viral pneumonia is self-limiting – requires only supportive care • Bacterial: - Out-patient therapy with CTX or Ampiclox, amoxicillin or Amoxicillin/clauvullic acid. For in-patient therapy: - Crystalline Penicillin & Gentamicin. - 2nd generation cephalosporins as 2nd line.	• For severe pneumonia in children <12 months old treat PJP presumptively with CTX. • If facilities to exclude PJP infections are not available or if child on CPT develops bacterial pneumonia do not treat with CTX but refer.

Table 5.1.....*cont....*

Conditions/ Infections	Causative Organisms		Symptoms and Signs	Diagnosis	Treatment	Comments
Acute Pharyngo–tonsillitis	• Respiratory viruses • Bacteria: - *Strep. pneumoniae* - *H. influenza* - *Moxerella Catarhalis* - *Klebs. pneumoniae*		Fever, cough, vomiting, refusal of feeds, drooling of saliva, inflamed tonsils/ pharynx.	• Clinical • Laboratory: - Throat swab for m/c/s	• Amoxicillin or Amoxicillin/ clauvullinic acid. • 2nd generation cephalosporins	
Acute otitis media	• Respiratory viruses • Bacteria: - *Strep. pneumoniae* - *H. influenza* - *Staph. Aureus* - *Moraxella catarhalis* - *Klebs. pneumoniae*		• Fever, vomiting, cough, ear-tugging; • Hyperaemic tympanic membrane, purulent ear discharge	• Clinical • Laboratory: - Ear swab for m/c/s	• Amoxicillin or Amoxicillin/ clauvullinic acid • 2nd generation cephalosporins Ear wicking	
Chronic suppurative otitis media	• *S. pneumoniae* • *H. influenza* • *S. Aureus*	• *M. Catarhalis* • *Kl. pneumoniae* • *P. aeruginosa*	Ear discharge lasting >14 days	• Clinical • Laboratory: - Ear swab for m/c/s • X ray of mastoid	Refer to ENT specialist	Hearing loss is a complication
Acute watery Diarrhoea	Viruses: • *Rotavirus* • *Enteroviruses* • *Other viruses*	Bacteria: • *Enterobacteriae* • *E. Coli* • *C. jejuni*	Frequent watery stools	• Clinical • Laboratory: - Stool m/c/s - Serology	Rehydrate (SSS,ORS or Resomal as required)	Provide and maintain adequate nutrition
Dysentery	• *E. hystolitica* • *G. Lamblia* • *Isospora belli* • *Cryptosporidia* • *Salmonella spcies* • *Shigella*	• *C. Pylori* • *C. jejuni Cyclospora* • *Microsporidia* • *C. albicans* • *M. avium complex* • *S. Stercoralis*	Frequent watery stools, abdominal cramps bloody stools, fever, nausea and vomiting, dehydration	• Clinical • Laboratory: - Stool m/c/s - Serology, e.g. Widal test	• Oral rehydration • If antibiotics required: - Ciprofloxacin - Metronidazole and CTX • For Strongyloidiasis: - Albendazole • Oral Zinc therapy	Provide and maintain adequate nutrition

Table 5.1.....*cont....*

Infections/ Conditions	Causative Organisms		Symptoms and Signs	Diagnosis	Treatment	Comments
Malaria	Mainly *P. falciparum*		Fever, chills and rigor, headache, nausea and vomiting	• Clinical • Laboratory: malaria parasite in blood	• Uncomplicated: Artemesinine Combination Therapy • Complicated: - IV quinine, IM Artemether	Refer to higher level facility if complicated
Sepsis	• *S. pneumoniae* • *H. influenzae* • *Salmonella* • *N. meningitides*	• *Staph aureus* • Gram negatives (*e.g. E. coli*) • Anaerobes	• Fever • Shock	• Clinical assessment • Laboratory: - FBC - Blood culture - Urine culture	While awaiting m/c/s results, either: • Penicillin + Chloramphenicol • Penicillin + Gentamycin • Ampiclox + Gentamycin • Amoxicillin/clauvullinate + genticin • Metronidazole for anaerobes • 2nd or 3rd generation Cephalosporins used as 2nd line	• Refer to tertiary facility if necessary • If in shock, provide supportive therapy
Impetigo contagiosum	• *Streptococcus spp,* • *Staph. aureus*		• Skin pustules crusts • Fever, rarely	Clinical	• Clean sore with antiseptics • Drain pus if fluctuant • Ampicillin/cloxacillin	
Meningitis	• *S. pneumoniae* • *H. influenzae* • *Salmonella* • *N. meningitides* • *Staph aureus*		• Fever, headache, vomits, irritability, altered sensorium, convulsions • Nuchal rigidity, bulging fontanelle	• Cinical assessment • Laboratory: - FBC - Blood culture - CSF analysis	• Penicillin & Chloramphenicol Or • 3rd generation cephalosporin + Gentamycin • Supportive treatment	Refer to tertiary facility if necessary
Scabies	*Sarcoptes scabei*		• Intense itchy lesions most prominent in inter-digital webs, cleft; • Papular rashes or generalised (Norwegian)	• Clinical, • Laboratory: Microscopy on KOH prep. of skin scrapings	• 20% Benzyl benzoate applied whole body, neck down nocte for 3 days OR • Permethrin cream 5% applied whole body, neck down and washed off after 8–14 hours. Repeat after 1–2 weeks.	• Treat super-imposed bacterial infection with oral antibiotics • Treat all household members even if asymptomatic

Table 5.1.....*cont....*

Infections/ Conditions	Causative Organisms	Symptoms and igns	Diagnosis	Treatment	Comments
Mycobacterium Avium Complex	*M. avium spp.*	Disseminated form – recurrent fever, chronic diarrhoea, lymph-adenopathy, weight loss/failure to thrive, abdominal pain, Respiratory symptoms rare	• Clinical • Laboratory: Multiple blood cultures; lymph node biopsy for intracellular inclusions	• Clarithromycin 7.5mg/kg/dose b.d or azithromycin 5-20mg/kg/dose once daily plus Ethambutol 15mg/kg/day for 6 months. • Prophylaxis guided by CD4+ count	• Nausea and vomiting • Optic neuritis
Lymphoid interstitial pneumonitis (LIP)	Unknown, but associated with co-infection with *Epstein Barr Virus*	May initially be asymptomatic. Recurrent Cough, respiratory distress, parotid enlargement, generalized lymphadenopathy, hepatosplenomegaly, digital clubbing, and poor response to TB therapy.	• Clinical • Chest X Ray: reticulo-nodular infiltrates, bilateral hilar/mediastinal lymphadenopathy; • Diagnosis of exclusion.	• Steroids (prednisolone 2mg/kg/day x 6 weeks, taper off) • Oxygen • Bronchodilators (salbutamol) • Chest physiotherapy • Referral to specialist (paediatric pulmonologist)	Complications of therapy with prednisolone include Hypertension, gastritis, adrenal insufficiency, seizures, pseudo-tumor cerebri, hypokalaemia, fluid retention, glucose intolerance.

5.2 Tuberculosis

HIV infection increases a child's susceptibility to infection with *Mycobacterium tuberculosis*. TB may develop early in HIV infection and may be its presenting manifestation. The presence of TB allows faster replication of HIV resulting in rapid progression of HIV and AIDS. Following initial exposure to a case of transmissible TB, the hallmark of infection in the immune-competent is conversion of the Tuberculin skin test (positive result). Mantoux test response is generally poor in immune-compromised children due to anergy, rendering this test less reliable for diagnosis of TB in HIV infected children with advanced stages of AIDS. Once infected, certain risk factors increase the risk of progression to TB disease.

A strong risk factor for progression to disease is age at which infection occurs, with infants; children aged 1 to 5 and adolescents having a 43%, 25% and 15% risk of progression respectively. Adults, by contrast, have a 10% lifetime risk once infected. Recent TB infection, including among adults, is another risk factor for disease progression, as is malnutrition and immunosuppression. Immunosuppression due to HIV is the most potent risk factor for disease progression. In HIV-infected individuals with latent TB infection, the annual risk of progression to active TB disease is about 5 - 10%, whereas in individuals with normal immunity, the lifetime risk of progression is just about 10%.

The limits between TB infection (latent TB) and TB disease (active TB) in young children may sometimes not be so obvious since progression from infection to disease often occurs more rapidly. Children co-infected with HIV and TB, have been observed to have between 2-10 times fold higher risk of early mortality due to higher rates of progression than children with TB alone. Studies in countries with high prevalence of TB revealed that while mortality in hospitalized children with TB alone was 7%, the mortality in those with TB and HIV was up to 41%.

5.2.1 Clinical Diagnosis of Tuberculosis in HIV infected children

A high index of suspicion is required for the diagnosis of TB in HIV infected children. Pulmonary and lymph node involvement are the most common modes of presentation of TB in HIV-infected children although other forms do occur. These conditions are categorized as identifying features of WHO AIDS clinical stage 3, while other forms of extra-pulmonary TB and disseminated disease as Stage 4 AIDS. Dissemination of bacilli during primary TB infection in HIV infected children is usually much more extensive than in persons not infected with HIV, making extra-pulmonary TB commoner than when compared with children with TB alone.

- *History*
  - Unexplained weight loss or failure to thrive
  - Unexplained fever >14 days
  - Cough >14 days
  - Failure to respond to appropriate antibiotic treatment of presumed bacterial pneumonia or meningitis
  - Excessive night sweats
  - Exposure to an adult with probable or definite open pulmonary TB

- *Physical examination*
  - Pyrexia (temperature >37.5^{0}C)
  - Weight loss
  - Lymphadenopathy
  - Abnormal chest signs
  - Pleural effusion
  - Signs of meningitis
  - Abdominal distension

- Swelling and/or deformity of the spine

- Investigations to assist in the diagnosis of tuberculosis include:
  - Mantoux test: a result of >5mm should be considered positive but sometimes because of anergy, the test may be falsely negative
  - Radiographs of the chest and other relevant areas of the body e.g. spine: most changes are similar to those in the non HIV-infected children and chest x-rays may be normal. However, cavitations are particularly common in the HIV-infected child
  - Microscopy and cultures of relevant specimens: these may detect acid-fast bacilli and help isolate the organism
  - Histologic examination of tissues such as lymph nodes will show tuberculous granulomas
  - FBC and ESR are useful ancillary investigations
  - PCR testing for TB is useful in confirming the diagnosis. However it is currently not widely available in Nigeria.

HIV infection reduces both inflammatory reaction and cavitation of pulmonary lesions. As a result, smear-positive TB is generally uncommon in children and is even much less common when HIV co-infection is present. For the same reason a chest X-ray may only show non-specific pneumonic changes or even be normal.

The use of clinical scoring charts for the diagnosis of TB in children has been rarely evaluated and validated against a "gold standard". Score charts generally have poor sensitivity in children suspected of pulmonary TB (the most common form) and particularly in HIV co-infected children. They should therefore be used as screening tools and not as a means of making a final TB diagnosis to identify children who are likely to be infected especially in health care settings where limited skill exists in provision of care for children.
Appendix I has the Score Chart to be used as a screening tool for TB diagnosis in children recommended by the National TB Control Programme.

5.2.2 Treatment and prophylaxis of TB in HIV-exposed or infected children
TB in HIV-infected children generally responds well to usual anti-TB regimens, but for multi-drug resistant TB (MDR-TB) strains, outcomes are not as favourable because the drugs are more toxic and less effective. Therapy for TB should be continued for 6 months (2 months initial phase) but in patients with TB meningitis the continuation phase should be for 7 months. Where sputum or gastric aspirates were initially smear-positive, if the sputum culture remains positive after 2 months of therapy, treatment is prolonged to 9 months. HIV-infected patients whose tuberculin reactions are ≥ 5 mm should receive chemotherapy for tuberculosis.

For treatment of TB in HIV-infected children see Chapter 6, Section 6.3.6.
For TB prophylaxis in HIV-exposed/infected children see Chapter 8, Section 8.6.2 (ii).

5.3 HIV and Hepatitis B and C Co-infections
Although risk factors and routes for transmission are similar, HBV and HCV are more efficiently transmitted than HIV. Percutaneous exposure to infected blood carries a 30% risk of HBV transmission compared with a 0.3% risk of HIV transmission. In regions of Africa that are endemic for hepatitis B, the majority of HBV infections occur perinatally (vertical transmission) or during infancy through close contact within households (horizontal transmission), medical procedures and traditional scarification. Although the presence of serum HBe antigen is a major determinant of perinatal HBV transmission, studies have shown that African women with chronic HBV infection have lower prevalence of serum hepatitis B e antigen (HBeAg) compared to other endemic parts of the world.

The risk of developing chronic HBV infection varies with age of HBV acquisition. Perinatal acquisition and infection in infants leads to chronic infection in 90% to 100% of cases, whereas less than 5% of adults who acquire HBV develop chronic infection. HIV infected children are at significantly higher risk of developing chronic HBV, with a risk of 21% in the unvaccinated. The natural history of hepatitis B is adversely influenced by HIV. HIV-HBV co-infection is associated with:

- Increased HBV carriage rates - greater levels of HBV viremia (higher HBV DNA levels)
- Increased rate of HBeAg-positive disease (reduced rate of spontaneous HBeAg and HBsAg sero-conversion)
- More rapid decline in hepatitis B surface antibody (anti-HBs)
- Increased reactivation episodes of acute hepatitis flares
- Faster progression to liver cirrhosis
- High risk of development of hepatocellular carcinoma at a younger age
- Decreased response to interferon
- Decreased efficacy of anti-HBV therapy
- Increased lamivudine-resistant mutations.

Studies have also shown that the risk of liver-related mortality among HBV/HIV-co infected is increased compared with HIV mono-infected individuals, particularly in patients with low CD4 counts. The effect of HBsAg+ on progression to AIDS, death from all causes, liver-related deaths and response to HAART revealed a 3.6-fold higher risk of liver-related deaths compared to HBsAg-negative individuals.

There is limited data on HIV and HBV/HCV co-infection in children. Infants born to mothers who are co-infected with HIV and Hepatitis C are at a significantly increased risk of acquiring Hepatitis C. Table 6.2 shows the clinical features and management of Hepatitis B and C.

Table 5.2 Features and treatment of Hepatitis B and C infections in HIV and AIDS

Condition	Causative Agents	Symptoms and Signs	Diagnosis	Treatment	Comments
Hepatitis B	*Hepatitis B virus (HBV)*	• Acute: Fever, right hypochondria pain; jaundice, malaise • Chronic active hepatitis not common in children	• Clinical • Laboratory: ○ HBsAg, HBeAg, anti-HBs, anti-HBe, anti-HBc ○ LFTs	• Supportive care for all; • Chronic active hepatitis - treatment for life: ○ **For pts <10 yr HAART in-eligible**: – INF-α 5 Mega Units/m² SC 3 x weekly x 3-12 months ○ **For <10 yrs HAART eligible**: – HAART – 3TC, ZDV, EFV + INF-α • **For >10 years, HAART eligible**: – HAART (with 3TC or FTC + TDF Or ADF +/- INF-α 5 Mega Units/m² • **Prophylaxis:** HBIG 0.06ml/kg + HBV vaccine x 3 doses; • **For all HIV infected patient:** recombinant HBV vaccine if HBV markers negative.	Perinatal transmission, through blood transfusion and breast milk; Increased risk of hepato-toxicity with ART There is increased risk of hepatic failure with treatment interruption of ARVs when drugs used include 3TC and Tenofovir Use Tenofovir with 3TC or FTC in children <10 years if feasible
Hepatitis C	*Hepatitis C virus (HCV)*	Fever, right hypochondria pain; jaundice	• Clinical; • Labs: ○ LFTs ○ Serology: anti-HCV if >18 mo. ○ HCV RNA-PCR if <18 mo. • Liver biopsy	Supportive care; • Pegilated Interferon 1.5µg/kg/week sc; • Ribavirin 10.6mg/kg/day PO. • (Use ZDV, ddI with Ribavirin with caution due to side effects. Monitor ALT, FBC).	Perinatal transmission, through blood transfusion and breast milk Increased risk of hepatotoxicity with ART.

5.4 Overview of HIV associated Malignancies in children

HIV infection is associated with higher risk of development of malignancies than in the general population of uninfected people as a result of the dysregulated immune system and its interplay with oncogenic viruses. The incidence of these cancers is generally lower among children with HIV than among adults with HIV. Although globally the most common malignancies found in children with HIV and AIDS are Kaposi sarcoma (KS), non-Hodgkins lymphoma (NHL) and leiomyosarcoma, regional variations in the prevalence exist. While NHL is the most common paediatric HIV-related malignancy in the US, KS remains the most common paediatric HIV-related malignancy in sub-Saharan Africa. Why these differences exist is not entirely clear, although the prevalence of human herpes virus 8 (HHV-8), the virus necessary for the development of KS, is higher in Africa. Children with HIV also have a predilection for developing rare cancers.

5.4.1 Common Cancers Diagnosed in HIV-Infected Children and Adolescents

a.) Kaposi Sarcoma

Although categorized as the first and leading AIDS-defining malignancy, KS, initially observed in men who have sex with men, it is also an AIDS-defining illness in less than 1% of children younger than 13 years, increasing to 3% in adolescents. This prevalence could be as high as up to almost 20% of all childhood cancers in parts of sub-Saharan Africa where the prevalence of HIV and HHV-8 infection is higher.

Pathogenesis: An increased incidence of KS is found in immunosuppressed patients including HIV infected and transplant patients on immunosuppressive agents. HHV-8 has also been found in majority of cases, and therefore implicated in the pathogenesis of KS and other neoplasms. The pathogenesis of KS depends strongly on the proliferation of new blood vessels. Viruses such as the Epstein-Barr virus (EBV), human papilloma virus (HPV) and HHV-8 interact with HIV to create an environment that enhances tumour growth. These malignancies may occur with any level of CD4 count or percentage in children.

Clinical presentation: KS most commonly affects the skin and oral mucosa. Its lesions are often found on the face, trunk, arms, and neck or in the mouth. On the dark skinned, lesions are in form of dark plaques or nodules while on lighter-skinned people, the lesions are reddish-purplish or brownish. Skin lesions may first appear as erythematous macules, but over time they darken and become raised or nodular. Cutaneous lesions, specifically of the lower extremities, have been associated with peripheral oedema which can be debilitating. Nearly 30% of patients with KS also have lesions of the oral mucosa, most commonly on the hard palate. As these lesions grow, they may interfere with speech and feeding.

KS may spread to the lymphatic system, the lungs, and the digestive tract. Physical examination may reveal firm and non-tender lymphadenopathy; lesions in the oral mucosa strongly suggest the presence of other GIT lesions which may be asymptomatic or lead to diarrhoea and rectal bleeding. Metastases to the lungs may cause dyspnoea or haemoptysis. Patients rarely present with pulmonary or gastrointestinal KS with no apparent skin lesions.

Differential diagnosis for cutaneous KS lesions includes haemangioma, naevi, dermatofibromas, and bacillary angiomatosis. Distinguishing bacillary angiomatosis from KS is particularly important, because bacillary angiomatosis is caused by gram-negative bacteria (a *Bartonella* species) and responds readily to antibiotics. When necessary, performing a punch biopsy will help in making the correct diagnosis. (See *Table 5.4 below for a summary of distinguishing features of KS.)*

Treatment of KS: There is no effective cure for KS but the ultimate goal of treatment is largely palliative.

a. Localized disease: Antiretroviral treatment is the mainstay for the treatment of HIV-related KS. While PI containing regimens are most effective in adults this finding has not been clearly demonstrated in children.

Most forms of KS will regress with the initiation of HAART, with response rates of 60%-80%. For patients who do not respond adequately to standard HAART, other forms of treatment are effective.
Isolated oral or cutaneous lesions can be treated with either:

- Alitretinoin gel
- Intra-lesional vinblastine
- Liquid nitrogen
- Laser ablation
- Radiotherapy.

Other form of therapy for localised disease includes:

- Subcutaneous interferon α (IFN-α) for early disease.

Use of IFN-α can induce clinical responses in 32%-40% of patients. Severe flu-like illness may however limit its use (non-steroidal anti-inflammatory agents may help ameliorate some of the features of the flu-like illness).

b. Diffuse disease: Widespread cutaneous disease and major organ involvement require systemic chemotherapy:

- Liposomal doxorubicin (20 mg/m^2 every 2 or 3 weeks for six cycles) or daunorubicin: use of any of these agents gives a response rate of 40%-80%, is more effective and less toxic. Side effects of these include myelosuppression, alopecia and a painful hand-foot syndrome (painful erythema and desquamation of the palms and soles) unique to liposomal doxorubicin.
- When liposomal agents fail, paclitaxel (Taxol) is a second alternative; the response rate is 70%-90% but is also associated with myelo-suppression, alopecia, peripheral neuropathy and hypersensitivity.
- Combination chemotherapy with doxorubicin, vincristine, and bleomycin which until recently was the standard of care but is associated with more severe toxicity than the above 2 regimens.

b.) Non-Hodgkin's Lymphoma

The spectrum of HIV lymphoid malignancies includes lymphoproliferative disease such as lymphoid interstitial pneumonitis (LIP) to high-grade NHL, CNS lymphoma and Hodgkin's disease. Globally, NHL is the most common HIV-related malignancy (HRM) and usually presents as an extra-nodal high-grade B-cell lymphoma. NHL among HIV-infected children accounts for more than 80% of HIV-related childhood cancers, with Burkitt's (small non-cleaved cell) lymphoma and immunoblastic (large cell) lymphoma being commoner.

Clinical presentation:

Children present often with extra-nodal disease: most cases may probably have already metastasized to the brain, bone marrow, and gastrointestinal tract. The features may be indistinguishable from those of chronic HIV infection and include fever, fatigue, weight loss, night sweats, anorexia, hepatosplenomegaly and lymphadenopathy. NHL could present with features simultaneously affecting multiple systems and the mode of presentation therefore varies according to the sites of involvement. Table 5.3 below shows the site dependent features of NHL.

Diagnosis, staging and treatment

Staging requires the use of computed tomography (CT) scans (particularly of the head, abdomen, and pelvis), bone marrow biopsy, and cerebrospinal fluid (CSF) analysis. The prognosis is better in patients with CD4+ counts greater than 100 per microliter, a near-normal serum lactate dehydrogenase level, no history of OIs and a good functional performance status.

Use of HAART is critical to the treatment of HIV-related malignancies and should be instituted alongside chemotherapy. Treatment may be complicated by HIV-associated organ dysfunction, infectious complications, and drug interactions between chemotherapy and antiretroviral drugs.

Table 5.3 Site-dependent Symptoms of NHL

Mediastinal or pharyngeal tumor	**Abdominal tumor**
• Cough • Decreased breath sounds • Nasal flaring • Retractions • Tachypnea	• Abdominal distension • Ascites • Jaundice • Abdominal Pain • Palpable mass
CNS disease*	**Maxillofacial tumor**
• Developmental delay • Cranial nerve palsies • Gait instability • Headache • Hemiparesis	• Jaw mass • Asymmetric facial expression • Numbness of the chin (peripheral facial nerve compression)

**see Table 5.4 below for details*

Chemotherapeutic options:

- The best option is standard regimen with CHOP (cyclophosphamide, hydroxydaunomycin or doxorubicin, vincristine and prednisone)
- Other less successful regimens combine bleomycin, adriamycin, cyclophosphamide, vincristine and dexamethasone (BACOD or Adriamycin, bleomycin, vincristine and dexamethasone (ABVD).
- Use cyclophosphamide and methotrexate at high doses gives successful outcomes of treatment with well-tolerated toxicity.
- Because HIV NHL often spreads to the brain, treatment includes CNS prophylaxis with intrathecal methotrexate or cytarabine.

c.) Primary CNS Lymphoma (PCNSL)

PCNSL is a subtype of NHL limited to the brain tissue that is much more common in HIV-infected children than in uninfected children. Although about 30%-50% of HIV-related systemic lymphomas are associated with EBV, HIV-related PCNSL appears to have a near-100% association with EBV. The differential diagnosis includes CNS OIs such as toxoplasmosis or cryptococcosis. It is an important cause of an isolated brain tumour in HIV-infected children. It should be suspected in any HIV-infected child with neurological abnormalities accompanied by mass lesions on a brain imaging. The unique clinical features, diagnosis and treatment of PCNSL are detailed in Table 5.4below.

5.5 Lymphoproliferative Disorders

Children with HIV infection are at high risk of developing lymphoproliferative disorders which include lymphoid interstitial pneumonitis, pulmonary lymphoid hyperplasia, diffuse interstitial lymphocytosis syndrome, and mucosa-associated lymphoid tumours. These conditions generally respond well to HAART but if they progresses to lymphoma, the treatment would then be as described above for HIV-related NHL.

Table 5.4 Common HIV associated Malignancies

Types of Malignancies	Clinical manifestation	Diagnosis	Treatment	Remark/ Comments
Kaposi Sarcoma (KS)	• Commonly affects skin and oral mucosa • Appear as dark plaques or nodules on tip of the nose, trunk, arms, neck, or palate. • Cutaneous lesions on lower extremities - associated with peripheral oedema, • Disseminated forms - involvement of pulmonary, gastro-intestinal systems and lymph nodes	• Mainly Clinical • Confirmatory diagnosis is by tissue biopsy and histology	• ART is mainstay of treatment • Other modalities of treatment of localised isolated lesions: o Intar-lesional chemotherapy o Radiotherapy o Cryotherapy o Laser ablation o Retinoid (Alitretinoin gel) o Sub-cut aneous Alpha Interferon • Systemic chemotherapy • Systemic liposomal agents • Paclitaxel (Taxol)	• Good response to ART for HIV associated KS. • Differentials: Haemangioma. naevi, dermatofibromas, bacillary angiomatosis,
Primary CNS Lymphoma (PCNSL)	• Most common cause of isolated brain mass in HIV infected children • High index of suspicion in child with CNS manifestations, e.g. headache, focal Neurologic signs, seizures, developmental delay, features of raised intracranial pressure, etc.	• CSF cytology for malignant cells, present in up to 23% of cases • CSF analysis for EBV DNA by PCR • Brain biopsy • Serum toxoplasma IgG may help rule out CNS toxoplasmosis - negative titers • Neuro-imaging can be helpful in distinguishing from toxoplasmosis (multiple ring-enhancing lesions on CT or MRI suggest toxoplasmosis; solitary lesions more likely to be PCNSL.	• Whole-brain radiation or high-dose intravenous (IV) methotrexate along with intrathecal therapy. . • A trial of therapy for toxoplasmosis can help determine the true diagnosis. Lesions' failing to respond would be suggestive of and near diagnostic for PCNSL • Lesions' failing to respond would be suggestive of and near diagnostic for PCNSL.	• DDx: OIs such as toxoplasmosis or cryptococcosis • Prognosis for this tumor is rather poor. • With no treatment, survival is less than 1 month; with treatment, survival is 2-4 months.

CHAPTER 6
ANTIRETROVIRAL THERAPY IN INFANTS AND CHILDREN

6.0 Introduction

Antiretroviral drugs reduce the ability of the virus to replicate thereby increasing the ability of the body to fight infections. They do not provide a cure for HIV and AIDS but consistent and appropriate use have been shown to prolong the lives of infected children.

6.1 Principles of Antiretroviral Therapy in Children

The principles underlying the use of antiretroviral drugs in children are different from those in adults. The major differences are:

- Most HIV infections in children are acquired vertically (in utero, intrapartum and postpartum though breastfeeding)
- Infants who become infected perinatally have much faster disease progression and often develop severe illness within the first year of life
- Treatment of perinatally infected children should consider prior exposure to ARVs
- Drug pharmacokinetics change during the transition from the newborn period to adulthood, requiring specific evaluation of drug dosing and toxicity in infants and children
- Optimizing adherence to therapy in children is essential given need for lifelong treatment and limited number of treatment options for paediatric use
- Use of paediatric-friendly drug formulations (e.g. dispersible tablets) and fixed-dosed combinations (FDC) ease administration to small children.

6.2 Antiretroviral Drugs

6.2a Classes of Antiretroviral Drugs

The following are the classes of ARVs available based on the various sites and mode of action (*see also Figure 6, Tables 6.1 to 6.5 below)*:

- Non-nucleoside reverse transcriptase inhibitors (NNRTIs) stop viral replication by binding directly onto the reverse transcriptase enzyme preventing the transcription of RNA to DNA
- Nucleoside reverse transcriptase inhibitors (NRTIs) incorporate themselves into the DNA of the virus, stopping the building process. The resulting DNA is incomplete and cannot create a new virus
- Nucleotide reverse transcriptase inhibitors (NRTIs) act at the same stage of the viral life cycle as the NRTIs, but do not require to be phosphorylated for effective antiretroviral activity
- Protease inhibitors (PIs) work at the last stage of the virus reproduction cycle. They prevent HIV from being successfully assembled and released from the infected CD4+ cell
- Entry inhibitors also called HIV fusion inhibitors prevent HIV from infecting the CD4+ cell
- Integrase inhibitors interfere with the ability of the HIV DNA to get inserted into the host DNA and thereby establish its continuous presence in the host cell genome
- Chemokine receptor inhibitors: Miraviroc is the first and only licensed drug in this class of CCR5 receptor inhibitors; they act by blocking the fusion of HIV with host cell membrane.

Note: *Fusion inhibitors, chemokine inhibitors and integrase inhibitors are currently not available in the National ART program.*

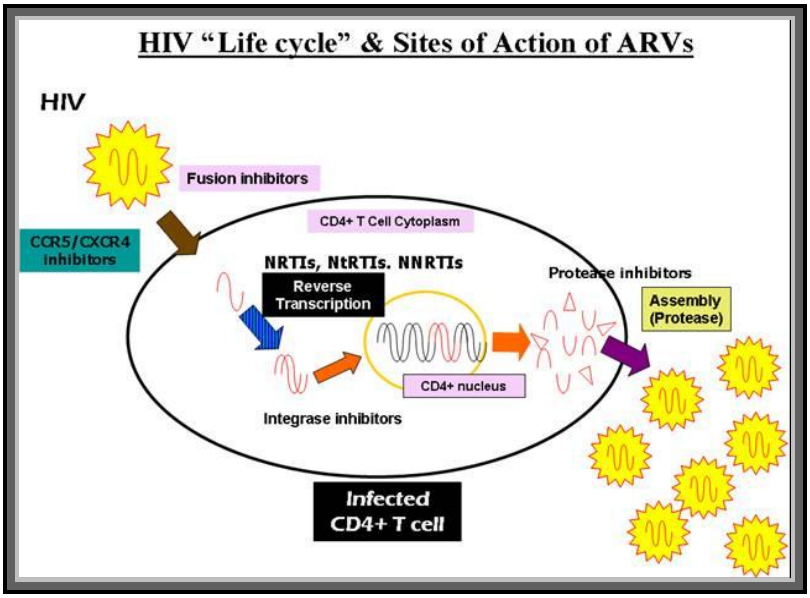


Fig 6.1 Life cycle of HIV showing the points of action of the ARVs

Table 6.1 Classes of Antiretroviral Drugs

Anti-Retroviral Drug Classes	Approved Drugs	
Nucleoside Reverse Transcriptase Inhibitors (NRTIs)	• Zidovudine (ZDV, AZT)* • Lamivudine (3TC)* • Stavudine (d4T)*	• Abacavir (ABC)* • Didanosine (ddI) * • Zalcitabine (ddC) • Emtricitabine (FTC)*
Nucleotide Reverse Transcriptase Inhibitors (NRTIs)	Tenofovir (Disoproxil Fumarate {TDF})	
Non-Nucleoside Reverse Transcriptase Inhibitors (NNRTIs)	• Nevirapine (NVP)* • Efavirenz (EFV)* • Delavirdine (DLV) • Etravirine (ETV) *	
Fusion inhibitors	• Enfuvirtide (T-20)*	
Protease inhibitors (PIs)	• Lopinavir-ritonavir (LPV/r)* • Ritonavir (RTV) {as pharmaco-enhancer}* • Nelfinavir (NFV)* • Saquinavir (SQV)	• Amprenavir (APV)* • Indinavir (IDV) • Atazanavir (AZV)* • Tipranavir (TPV) • Darunavir* (DRV) • Fos-amprenavir* (FPV)
Integrase Inhibitors	• Raltegravid (RAL)	
CCR5 inhibitor	• Maraviroc	

**Drugs indicated for use in children*

Table 6.2: Nucleoside Reverse Transcriptase Inhibitors (NRTIs)

ARV Drug	Strength/ preparation	Dosing	Information for parents/caregivers
Zidovudine (ZDV, AZT)	• 10mg/ml oral solution • 100 mg capsules • 300 mg tablets	180-240 mg/m²/dose b.d. to a maximum of 300 mg/dose	• Use with caution in the setting of anaemia - avoid if Hb < 8mg/dl • Toxicity possible if used with other drugs associated with marrow suppression • Should not be administered in combination with d4T • Use the higher dose with nervous system involvement • Storage: Room temperature and protect from light • No food restrictions.
Lamivudine (3TC)	• 10 mg/ml oral soln; • 150 tablets	4 mg/kg/dose b.d. to a max. of 150 mg/dose	• Store at room temperature • Low toxicity and no food restrictions
Stavudine (d4T)	• 1mg/ml powder • 15, 20, 30mg tablet	1 mg/kg/dose b.d. to a max. of 30mg/dose	• Not to be used with ZDV. Palatable solution that needs to be refrigerated and shaken well before use.
Didanosine (ddl)	• 25 mg tabs • 125, 200 and 400mg in enteric coated , 250 mg capsules	90-120 mg/m²/dose b.d. to a maximum of 200 mg/dose	• Suspension not easy to use – avoid use if possible • Requires refrigeration. Stable for 30 days • Tabs may be enteric coated or combined with buffering agent/ antacid • Buffered tabs should not be swallowed whole but should be chewed, crushed or dispersed in water or clear juice; in children tabs are not easily degradable and may not have to be taken on an empty stomach • At least 2 tabs of appropriate strength must be used at any one time for adequate buffering e.g. if dose is 50mg, two 25mg tabs are given, not one 50mg.
Tenofovir (TDF)	300 mg tablet	300mg o.d.	• Not recommended for use in patients <12 years • Requires baseline and routine renal function studies.
Abacavir (ABC)	20 mg/ml Solution 300 mg tablets	8 mg/kg/dose b.d. to a maximum of 300 mg/dose	• Potential for hypersensitivity (fever, rash, dyspnoea, abdominal pain) • Parents/caregivers to return to hospital in case of hypersensitivity • Should not be re-introduced if hypersensitivity occurs • No food restriction: tablet can be crushed, mixed with small amounts of water/food and ingested immediately • Stored at room temperature but solution may be refrigerated.

Table 6.3: Non-nucleoside Reverse Transcriptase Inhibitors (NNRTIs)

Drug	Strengths & Preparations*	Dosing	Information for parents/caregivers
Nevirapine (NVP)	• 10 mg/ml solution • 200 mg tablets	• 120mg/m² o d for 2 weeks, then 120-200mg/m² b d to a maximum of 200 mg/dose. • Dose for infant prophylaxis differs from therapeutic dose (refer to Care and Support Chapter)	• Patients should be warned about the potential for severe life threatening rash. • Solution stable for 2 months once opened • Metabolism of NVP may be increased with co-administration of rifampin or rifabutin • Ketoconazole should not be co-administered with NVP. • No food restriction needed • Oral suspension must be well shaken.
Efavirenz (EFV)	• 30 mg/ml syrup • 50, 100, 200 mg tablets	• 19.5 mg/kg/day syrup • 15 mg/kg/day capsule • Dose for patients > 40 kg: 600 mg	• Not recommended for use in children under the age of 3 years and weighing less than 10kg. • Best given at bedtime to decrease the risk of side effects. • Can be taken with food, however when taken with a high fat meal absorption is increased by 50%.
Etravirine (ETV)	25, 100mg tablets	• 200mg b.d. for adults • 5.2mg/kg for children>6 years • Studies on-going to determine dosing for younger children.	• A new NNRTI, often effective despite resistance to other NNRTIs

** Liquid formulations generally have limited shelf life once opened.*

Table 6.4 Protease Inhibitors (PIs)

Drug	Strength/Preparations	Dosing	Information for parents/caregivers
Lopinavir/r (LPV/r)	Oral soln: LPV/r 80/20 mg/ml Heat stable Tabs: • Adult: 200/50mg • Paediatric 100/25mg	10-16 mg/kg/dose b.d. Maximum dose 400 mg (Dosing refers to LPV component)	• Oral solution and caps should be refrigerated, but can be kept at room temp (up to 25° C) if used within 2 mos. • Caps to be swallowed whole & must not be crushed. • No food restrictions with heat stable tablets • Capsules taken with food: has a bitter taste.
Nelfinavir (NFV)	• 50 mg/1.25ml scoop powder for oral susp. 200 mg/5ml • Tablets 250, 625 mg	60-75 mg/kg/dose b.d, higher dose/kg for bigger child, to a max. of 1250 mg. Not approved for ≤2 years	• Administer with or after food; powder may be mixed with water, milk, formula feeds or pap; it should **not** be mixed with acidic foods or juices • Tabs may be halved/ crushed and dispersed in water/food
Atazanavir (ATV)	300mg tab	Not approved in < 6 years	• Needs to be boosted with ritonavir (separate formulation) • Can be taken once daily; does not require boosting
Ritonavir (RTV)	100mg tab; Oral solution (contains 43% alcohol by volume): 80 mg/ml	Major use is to boost other PIs; dose varies with PI.	• Not used alone, but to boost LPV or ATV • If prescribed with ddI, administer drugs 2 hours apart.
Fosamprenavir (FPV)	Oral susp: 50 mg/mL Tablets: 700 mg FPV calcium	• Not approved <2 years • Can be used with/ without RTV boosting	• Dose for ARV-naïve 2-5 years is 30mg/Kg b.d. • Dose for ARV-experienced >6 years is 18mg/Kg b.d. boosted with 3mg/Kg of RTV: Max dose 700mg/100mg
Tipranavir (TPV)	• Oral solution: 100 mg TPV/ml with 116 IU vitamin E/ml • Capsules: 250 mg	• Not approved <2 years • TPV/r 14/ 6 mg/kg, b.d. • Max dose: TPV/r 500:200 mg, b.d.	• Needs boosting with RTV (separate formulation)
Darunavir (DRV)	600mg, 300mg, 75mg tabs	Not approved <6 years	• Must be co-administered with RTV boosting

Table 6.5: Fusion, Integrase and CCR5 Inhibitors

Drug	Strength/Preparations	Dosing	Information for parents/caregivers

Enfuvirtide (T-20) –*Fusion Inhibitor*	• 108-mg vial
	• Reconstituted with 1:1 ml sterile water to deliver 90 mg/ml
		• Not used <6 years
		• 6-16 years: 2mg/kg (>16 = 90 mg b.d) subcut on upper arm or thigh
			• Hypersensitivity reaction
			  ○ Rash
			  ○ Fever
			  ○ Nausea, vomiting
			  ○ Chills, rigors
			  ○ Hypotension
			  ○ Elevated transaminases
			• Re-challenge not recommended if hypersensitivity manifests
			• Must be given subcut; severe reactions may occur if given I.M
			• Kept refrigerated after reconstitution (dissolves over 45 min).

Raltegravid (RTL) - *Integrase Inhibitor*	• 400mg tabs • Chewable formulation available for children under age 12	• Preliminary data suggests that RTL in combination regimens in children 6 – 18 years was generally safe, well tolerated and effective	• Higher doses required for patients taking hepatic enzyme inducing drugs
Miraviroc	150, 300mg tabs	• 12 hourly dosing • Safety and efficacy in children not yet established	• Higher doses required for patients taking hepatic enzyme inducing drugs

6.2b Considerations for drug formulations and doses for infants and children

Dosing in children is usually based on either weight or body surface area with use of nomogram *(See Appendix VII)*. As these change with growth, drug doses must be adjusted in order to avoid the risk of under-dosing. Standardization is important and use of tables of simplified drug doses for administration reduces chances of dosing errors.

Syrups, solutions and sprinkles remain necessary for treating infants and very young children who cannot swallow tablets or capsules, but they have shortcomings including limited availability, high cost, storage difficulties, reduced shelf-life, sometimes high alcohol content and poor palatability.

As children become older, it is preferable to give solid formulations. For most ARVs, capsules and tablets are available in sufficiently low doses to enable accurate dosing for children. Some drugs, however, do not have solid formulations in doses appropriate for paediatric use. The pharmacokinetic profile of crushed tablets or sprinkled capsule contents has shown that this can result in under-dosing or overdosing, particularly if the tablets are un-scored thereby increasing the risk of resistance or toxicity. Some solid formulations do not have even distribution of drug throughout the tablet. However, while suboptimal, cutting adult-dose solid formulation ARVs may be considered when no alternatives are available. When cutting un-scored tablets, the use of tablet cutters is preferred. Un-scored tablets should not be cut to fractions below one half.

Quality-assured ARV drugs in fixed-dose combinations (FDCs) have become available as simplified twice daily dosing for children. The advantages of FDCs include:

- Improved adherence – FDCs have pleasant tastes and are readily dispersible in small amounts of water
- Reduced chances of emergence of drug resistance
- Simplification of ARV drug storage and distribution logistics
- Significant impact on the scale-up of ART for children.

NB: *Pharmacokinetic studies have confirmed that for younger children the use of single drug liquid formulations is better than splitting adult FDCs.*

The range of FDC formulations for children now available are shown in **Table 6.6** below. A weight-band based dosing table (WHO) is also available for amount of liquid ARV formulations and number of tablets or capsules of adult ARVs for twice daily dosing in children (**Table 6.7**) and other tools for the standardization and calculation of drug doses.

Table 6.6 FDC dosing Schedules: Number of FDC tablets for twice daily dosing

Drug	Strength of Paediatric tab (mg)	Children 6 weeks and above										Strength of Adult tab (mg)	No. of tabs by weight band	
		No. of tabs by Kg weight-band b. d.												
		3-5.9		6-9.9		10-13.9		14-19.9		20-24.9			25-34.5 Kg	
		am	pm	am	pm	am	pm	am	pm	am	pm		am	pm
Single drugs														
AZT	60	1	1	1.5	1.5	2	2	2.5	2.5	3	3	300	1	1
ABC	60	1	1	1.5	1.5	2	2	2.5	2.5	3	3	300	1	1
NVP	50	1	1	1.5	1.5	2	2	2.5	2.5	3	3	200	1	1
ddI	25	2[a]	2[a]	3	2	3	3	4	3	4	4	25	5	5
Fixed Dose Combinations														
AZT/3TC	60/30	1	1	1.5	1.5	2	2	2.5	2.5	3	3	300/150	1	1
AZT/3TC/NVP	60/30/50	1	1	1.5	1.5	2	2	2.5	2.5	3	3	300/150/200	1	1
ABC/AZT/3TC	60/50/30	1	1	1.5	1.5	2	2	2.5	2.5	3	3	300/300/150	1	1
ABC/3TC	60/30	1	1	1.5	1.5	2	2	2.5	2.5	3	3	300/150	1	1
d4T/3TC	6/30	1	1	1.5	1.5	2	2	2.5	2.5	3	3	30/150	1	1
d4T/3TC/NVP	6/30/50	1	1	1.5	1.5	2	2	2.5	2.5	3	3	300/150/200	1	1
d4T/3TC	12/60	0.5	0.5	1	0.5	1	1	1.5	1	1.5	1.5	60/150	1	1
d4T/3TC/NVP	12/60/100	0.5	0.5	1	0.5	1	1	1.5	1	1.5	1.5	60/150/200	1	1
LPV/r[b]	100/25	NR	NR	2	1	2	2	2	2	2	2	100/25	3	3

[a] *This dose of ddI is only appropriate for children 3 months of age or older and weighing between 5 kg and 5.9 kg.*

[b] *Higher doses of LPV/r may be required when co-administered with enzyme-inducing drugs such as fos-amprenavir (FPV), rifampicin.*

Table 6.7: Dosage of Liquid Formulation and Number of Tablets/Capsules of Adult ARVs for Twice daily dosing

Drug	Strength of Paediatric tab (mg)	Children 6 weeks and above									
		No. of tabs by Kg weight-band b. d.									
		3-5.9		6-9.9		10-13.9		14-19.9		20-24.9	
		am	pm	am	pm	am	pm	am	pm	am	pm
AZT	10mg/ml; 300mg	6ml	6ml	9ml	9ml	12ml	12ml	0.5	0.5	1	0.5
ABC	20mg/ml; 300mg	3ml	3ml	4ml	4ml	6ml	6ml	0.5	0.5	1	0.5
3TC	10mg/ml; 150mg	3ml	3ml	4ml	4ml	6ml	6ml	0.5	0.5	1	0.5
d4T	1mg/ml; 15mg or 20mg	6ml	6ml	9ml	9ml	1 (15mg)	1 (15mg)	1 (20mg)	1 (20mg)	1 (20mg)	1 (20mg)
NVP	10mg/ml; 200mg	5ml	5ml	8ml	8ml	10ml	10ml	1	0.5	1	0.5
ddI	10mg/ml; 25mg	3ml[a]	3ml[a]	5ml	5ml	6ml	6ml	4	3	4	4
LPV/r	80mg/ml; 20mg	1 or 1.5ml[b]	1 or 1.5ml[b]	1.5ml	1.5ml	2ml	2ml	2.5ml	2.5ml	3ml	3ml

[a] This dose of ddI is only appropriate for children 3 months of age or older and weighing between 5 kg and 5.9 kg.

[b] LPV/r liquid: for 3 – 3.9 kg, use 1 ml a.m. and 1 ml p.m.; for 4 – 5.9 kg use 1.5 ml a.m. and 1.5 ml p.m. In addition, higher doses of LPV/r may be required when co-administered with enzyme-inducing drugs such as NVP, EFV, FPV or rifampicin.

6.3 Initiating Antiretroviral Therapy

The decision to start ART in children is complex. However new evidence has revealed that early initiation of ART in HIV infected infants and children less than 2 years of age significantly reduces morbidity and mortality from rapid disease progression and helps maintain normal growth and development. In older children (>2 years) the decision to begin ART should be guided by clinical and immunologic criteria.

6.3.1 Goals of Antiretroviral Therapy

The goals of antiretroviral therapy (ART) in children are to:

- Stop and reverse progression of the disease by sustaining maximal viral suppression thereby preserving the immune system and reducing the risk of opportunistic infections.
- Promote or restore normal growth and development
- Improve quality of life
- Achieve optimal response with minimal drug toxicity and
- Ensure rational use of ARVs to preserve future therapeutic options.

6.3.2 Important Considerations for Initiating ART

It is important to consider the following considerations for children found to be eligible for ART:

- A multidisciplinary approach involving doctors, pharmacists, nurses, medical laboratory scientists, counsellors, social workers, psychologists, nutritionists, data entry clerks, outreach workers and others is necessary to work closely with child's caregivers for a holistic provision of care and support
- Identification of a primary and secondary caregiver and/or treatment supporter for adolescents who understand the disease and implications of ART as a lifelong therapy, issues of adherence, drugs storage and toxicities is important for sustained therapeutic success
- Access to other aspects of support, e.g. nutritional counselling, micronutrient supplementation
- The status of disclosure to the child and other members of the family should be given priority
- Past exposure to ARVs, ease of administration, availability in the national program, possible limitation of future treatment options and potential for drug resistance should be reviewed in the course of decision-making for choice of any ART regimen being considered.
- Factors that could influence adherence to ARV therapy for consideration include;
  - Understanding by primary caregiver and/or child on importance of adherence
  - Availability and palatability of appropriate ARV formulations for the child
  - Impact of the medication schedule on quality of life, such as number of medications, frequency of administration and the need to take with or without food
  - Potential for drug interactions (including traditional medicines)
  - Economic situation (food security, transportation, etc)
  - Psychosocial issues (stigma, family issues, spiritual).
- Access to laboratory monitoring as a fundamental guide to successful ART management
- The influence of potential confounding effect of co-existing medical conditions in HIV infection and response to ART (e.g. malaria, malnutrition, TB, hepatitis B and C).
- The potential for drug toxicity profile to influence therapy.

6.3.3 Pre-treatment Evaluation

Baseline clinical assessment for children prior to commencing ARV therapy should include:

- Confirmation of HIV infection*
- Clinical evaluation of the child
  - Detailed past medical history and physical examination including WHO clinical staging
  - Family, medical and social history
  - Delivery history (including exposure to maternal ARV's or infant prophylaxis)

- Determination of immunization status
- Anthropometry (weight, height/length, MUAC, head circumference)
- Neuro-developmental assessment.

- Assessment of immunologic status: CD4 count/CD4% should be obtained prior to initiation but is not a requirement for initiation in children less than 2 years of age.
- Review history of contact with persons with open TB, Mantoux test result, chest x-ray, sputum/gastric aspirate for AFB to diagnose or exclude tuberculosis
- Review of other available laboratory results
- Development of child-specific adherence strategy including barriers to adherence
- Nutritional history.

* *In infants less than 18 months where DNA-PCR is not available, presumptive diagnosis of HIV is an indication for initiating HAART, however HIV status should be confirmed as early as possible if DNA-PCR becomes available, or by rapid test at 18 months of age.*

6.3.4 Indications for initiation of ART *(See Table 6.8 and Figure 6.1)*

a) Criteria for commencement of HAART in infants and children less than 18 months of age

1. When DNA-PCR is available:
   - All infants and children with a positive DNA-PCR should be initiated on HAART as soon as diagnosis is made.
     Infants and children <18 months who have a negative DNA-PCR but remain exposed to HIV via breast milk should be followed up regularly and have a repeat DNA-PCR test 6 weeks after complete cessation of breastfeeding, continued on CPT and monitored for development of signs and symptoms of HIV.
2. When DNA-PCR is not available:
   - If a presumptive diagnosis of HIV is made, HAART should be initiated without delay but a DNA PCR should be done as soon as testing is available.

b) **Criteria for commencing ART in children greater than 18 months of age** (*See also **Table 6.8** and **Figure 6.1** below*):

i. All children aged 18-24 months with a positive rapid test (using national testing algorithm) should be commenced on HAART
ii. Children >24 months (2years)* with a positive rapid test should be commenced on HAART if:

- WHO Clinical stage is 3 or 4 irrespective of CD4 count or CD4 %:
- CD4 count is <750 cells/mm^3 or <25% in children aged 24-59 months with WHO Clinical stage 1 or 2
- CD4 count is <350 cells/mm^3 or <25% in children >5 years with WHO Clinical stage 1 or 2

**Do not initiate ART in children >2 years with WHO Clinical stages 1 or 2 without obtaining CD4 count or CD4%.*
***NB:** TLC is no longer used as initiation criteria in children.*
CD4% is most preferable in children <5 years if available

Table 6.8: Immunologic Criteria for Initiating ART

Age	% CD4+	Absolute CD4
Infants and children less than 24 months[a]	All[b]	All[b]
Children aged 24 – 59 months	≤25	≤750 cells/mm^3
Children aged 5 years and above	Not Applicable	≤350 cells/mm^3 (as in adults)

[a] *All HIV-infected infants and children<24 months should receive ART due to the rapid rate of disease progression.*
[b] *In children with absolute lymphopaenia, the CD4 percentage (%CD4+) may be falsely elevated.*

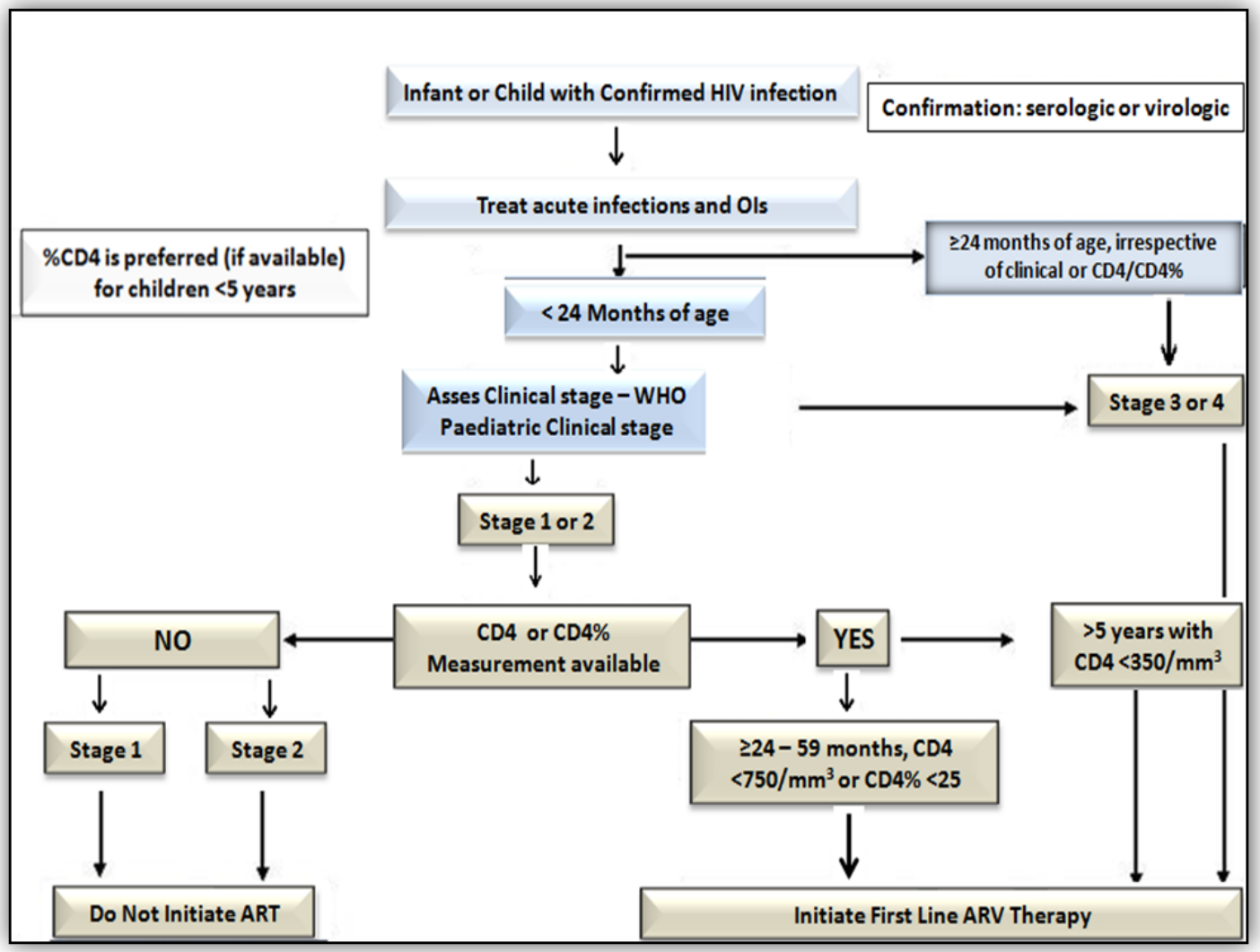


Figure 6.1 Initiating ARV Therapy for Infants and Children

6.3.5 First Line Anti-retroviral Therapy Regimen

The combination of three or more drugs from at least two different ARV classes, also called *Highly Active Antiretroviral Therapy (HAART),* is the standard treatment of HIV infection that ensures the best possible suppression of viral replication and arrest disease progression. The limited number of ARVs available for use in children as well as limitations of suitable child-friendly formulations, accessibility and affordability account for why there are only a few recommended ARV combinations for use in children. Table 6.9 below gives the preferred ARV combinations and preferred alternatives within the first line.

6.3.6 General Considerations for ART in children with TB Co-infection

The underlying principles for the treatment of TB in HIV-infected children are the same as for children who are not HIV-infected. However, the co-management of TB and HIV, and the treatment of HIV infection, is complicated by drug interactions, particularly between rifampicin and the NNRTI and PI classes of ARVs. Because these drugs have similar routes of metabolism, co-administration could presumably result in sub-therapeutic drug levels in the blood. New evidence has however shown that co-administration of rifampicin does not result in significantly lowered NNRTI concentrations in children. Therefore, prescribing the maximum dose of 200mg/m^2 is recommended as a safer approach to avoid sub-therapeutic drug levels. Such regimen with 2 NRTIs plus NVP could be considered for use but careful clinical and laboratory monitoring for potential liver toxicity must be assured.

The use of rifabutin, considered in adults to overcome interactions, is not recommended due to insufficient data and lack of a suitable formulation in children. Also, the choice of ART regimen in TB/HIV co-infected children is complicated by the relatively limited paediatric ARV formulations and the lack of dosing information for some ARVs (particularly for children less than 3 years of age).

6.3.7 Preferred ART regimens for Children with TB co-infection

The preferred ARV regimens for TB/HIV co-infected infants and children <3 years of age are:

- 2 NRTIs + NVP* (except for infants and children <2 years if previously exposed to NVP), OR
- 3 NRTIs: (d4T or AZT) + 3TC + ABC.

** Since rifampicin is known to reduce levels of NVP, lead-in dosing of NVP should not be used when initiating NVP-containing ART with TB treatment.*

The preferred ART regimens for TB/HIV co-infected children ≥3 years of age are:

- 2 NRTIs + EFV OR,
- 3 NRTIs: (d4T or AZT) + 3TC + ABC.

6.3.8 When to start ART in relation to initiation of rifampicin-containing TB treatment

The decision on when to start ART after starting TB treatment involves a balance between the child's age, pill burden, potential drug interactions, overlapping toxicities and the possible development of IRIS versus the risk of further progression of immune suppression with the associated increase in mortality and morbidity. Early initiation of ART is recommended for children with TB disease regardless of clinical stage and degree of immuno-suppression.

Children with active TB disease should begin TB treatment immediately and begin ART as soon as tolerated (2 to 8 weeks into TB therapy), irrespective of clinical stage and degree of immuno-suppression. The potential for IRIS (*see below*) should be considered in children starting ART, particularly those with low CD4 values.

Table 6.10 provides a guide on commencing ART following initiation of anti-TB therapy with rifampicin-containing regimen in HIV, while **Table 6.11** is the **m**anagement of TB/HIV co-infection in children who develop TB disease while on 1st line ARV regimen.

Table 6.9 First Line ARV Regimen

Age Group	Considerations	Preferred 1st line regimen	Alternative 1st line regimens
Infants	With no prior exposure to NNRTIs	Preferred: AZT + 3TC + NVP	• *ABC + 3TC + NVP* • *AZT+ 3TC+ ABC* ++ • *d4T* + 3TC + NVP*
	With prior exposure to NNRTIs (e. g. through PMTCT)	AZT + 3TC + LPV/r**	• *ABC + 3TC + LPV/r* • *AZT+3TC+ ABC*
	With unknown exposure to NNRTIs NB; Closely monitor for treatment failure	AZT + 3TC + NVP	• *ABC + 3TC + NVP* • *d4T^C + 3TC + NVP*
Children	12mos-2 years with exposure to NNRTI	AZT + 3TC + LPV/r	• *AZT+3TC+ ABC* • *ABC + 3TC + LPV/r* • *d4T* + 3TC + LPV/r*
	12mos- 2 years with no exposure to NNRTI	AZT + 3TC + NVP	• *ABC + 3TC + NVP* • *AZT+ 3TC+ ABC* • *d4T* + 3TC + NVP*
	2 – 3 years, regardless of NNRTI exposure	AZT + 3TC + NVP	• *ABC + 3TC + NVP* • *AZT+ 3TC+ ABC* • *d4T* + 3TC + NVP*
	> 3 years	AZT+3TC+EFV***	• AZT+3TC+NVP • *AZT+ 3TC+ ABC* • d4T*+3TC+NVP • ABC + 3TC + EFV
Special Circumstances	Severe Anaemia/Neutropenia	AZT should not be used with Hb<8g/dl	
	HBV/HCV in adolescents >12 years	TDF+FTC (or 3TC) + EFV	
	TB in children	*See Table 6.10 below*	

**d4T is no longer preferred NRTI for use given long term toxicity in children*

*** If LPV/r is not available, may start NVP based regimen, though not preferred due to high rate of NNRTI resistance in infants with previous exposure*

**** EFV is only indicated for use in children >3 years of age and >10kg. Also, because of teratogenic effects during the 1st trimester of pregnancy, should be used with caution in adolescent females that may become pregnant*

++ In case of ABC hypersensitivity reactions, do not use again

See Table 6.6 for available fixed dose combinations.

Table 6.10 Approach for Initiating ART in Children on anti-TB Therapy with Rifampicin containing Regimen

Child on treatment for Active TB	Time of initiation of ART[a]	Preferred ART regimen[c]

Not yet on HAART (used as eligibility criteria)	Start ART within 2 to 8 weeks after commencing anti-TB treatment	• **Children <2 years and prior exposure to NNRTI**
		  o Triple NRTI 1st line (AZT + 3TC + ABC)
		• **Children 2-3 years:**[d]
		  o 2NRTIs + 1 NNRTI (AZT + 3TC + NVP), or
		  o Triple NRTI 1st line (AZT + 3TC + ABC)
		• **Children >3 years:**[d]
		  o Standard 1st line 2NRTIs + 1 NNRTI (preferred AZT + 3TC + EFV[e]).
		Following end of TB treatment child should be maintained on same ART regimen if well tolerated.

Already on HAART	If <3 years and on NVP-based regimen	Continue regimen but increase NVP to maximum dose tolerable (200mg/m^2)
	If >3 years and on NVP-based regimen	Substitute NVP for EFV
	If <3yr and on LPV/r based regimen	Continue regimen but increase dose of Ritonavir to make 1:1 (full therapeutic dose).

[a] *Administration of CPT is important in children with TB/HIV co-infection.*
[b] *All children with HIV clinical stage 4 should be initiated on ART regardless of CD4+ criteria.*
[c] *Careful clinical monitoring with lab support, is recommended where NVP is used with rifampicin. This combination should only be used if there are no other options e.g. in a child with ABC hypersensitivity)*
[d] *Because of lack of data the ranking of preferred or alternative ARV regimens is not possible.*
[e] *EFV is not currently recommended for children <3 years of age, and should not be given to post-pubertal adolescent girls who are either in the first trimester of pregnancy or are sexually active and not using adequate contraception.*

Table 6.11 Management of TB/HIV Co-infection in Children who develop TB disease while on 1st Line ART

Time of TB diagnosis in relation to ART	Underlying cause of TB	Current ART regimen	Age Group	Considerations for ART	Additional Comments
Child on 1st line ART regimen	Primary infection (obtain history of exposure to determine if Primary infection is likely)	• 2 NRTI's + 1 NNRTI • 3 NRTI's • 2 NRTI's + LPV/r	Infants and children < 3 years	• If on NVP based regimen: o Change to triple NRTI or o Continue NVP and maximize NVP dose* • If on LPV/r based regimen: o Increase LPV:r ratio to 1:1	Monthly lab. monitoring (for hepatotoxicity) if NVP is given with rifampicin
			> 3years	• If on EFV based regimen, continue • If on NVP based regimen change NVP to EFV.	
Within the first 6 months of ART initiation	Possible IRIS	Continue current regimen	All Ages	Consider adjusting regimen as above	Refer to IRIS section below
After 6 months of ART initiation with good initial response	Possible Treatment Failure (consider after at least 24 weeks on ART)	• Reassess adherence • Consider switch to 2nd line treatment	All Ages	Refer to 64treatment failure section below	Consider referral to Paediatric TB/HIV specialist

- **If NVP is used with rifampicin, the dose should be maximized to the full 200mg/m²*
- *Children already on ART and diagnosed with TB should initiate TB treatment immediately without stopping ART (with adjustments if necessary)*
- *Important considerations for management of TB/HIV co-infection include active TB infection, TB treatment failure, BCG disease and IRIS (see TB section below)*
- *All children with diagnosis of TB and HIV should also be maintained on CTX prophylaxis*
- *Children on 2nd line ART who develop TB may be cases of 2nd line treatment failure and would require referral to Paediatric HIV specialists for possible salvage therapy.*

6.4 Antiretroviral Drug Toxicities

Most ART toxicities described in adults have also been reported in children; however there is limited data on toxicities compared to adults. It is sometimes difficult to differentiate between complications of HIV infection, ARVs toxicity and drug-drug interaction. Alternative explanations for features suggestive of toxicities must be excluded before concluding that they are ARV-related. Additional causes of these features include:

- Concurrent infection e.g. malaria with severe anaemia
- Immune reconstitution inflammatory syndrome (IRIS)
- A reaction to a non ARV drug such as co-trimoxazole in a child receiving CPT.

Table 6.12 below gives the common toxicities of commonly used ARV drugs and suggested monitoring of laboratory parameters and their management.

Lack of capacity to manage ARV drug toxicity is indication for referral to a higher level health facility. ***Appendix II*** gives severity grading of clinical and laboratory parameters occurring as toxicities and ADRs while ***Appendix III*** outlines the clinical manifestations, possible offending drug, laboratory derangements and suggested management.

Table 6.12 Toxicities of commonly used ARV Drugs

ARV drug	Major toxicities	Minor toxicities	Laboratory abnormalities	Monitoring and management
Zidovudine (ZDV, AZT)	• Hematological: ◦ Severe anaemia (exclude malaria; Hb< 7g/dl) ◦ Progressive macrocytosis; ◦ Neutropenia (absolute neutrophil count <500/mm^3) ◦ Thrombocytopenia • Severe sepsis • Myopathy • Gastro-intestinal intolerance: ◦ S evere, refractory e.g. persistent nausea and vomiting	• Blue-black discoloration of nails • Nausea • Headache • Fatigue	• Low haemoglobin • Macrocytosis • Neutropenia • Thrombocytopenia • Elevated CPK	• For anaemia: Change AZT to ABC or d4T Do not use if Hb <8 g/dl or PCV <24% (Re-initiation of ART should not include d4T or ZDV if possible therefore ABC is preferred) For myopathy: • Discontinue if CPK high
Lamivudine (3TC)	• Pancreatitis • Liver toxicity	Low toxicity profile: • Skin rash, headache • Mild peripheral neuropathy	• Increased serum amylase and lipase	• Discontinue all ARVs until symptoms resolve • Offer symptomatic management • Monitor serum amylase, lipase serially • Once symptoms resolve, restart ART, substitute with NRTI
Stavudine (d4T)	• Lipodystrophy/metabolic syndrome • Lactic acidosis • Hepatitis • Pancreatitis • Insulin resistant diabetes • Pain, tingling, distal numbness; inability to walk • Distal sensory loss	• Insomnia, anxiety, panic attacks • Mild peripheral neuropathy – tinglin • Mild muscle weakness, areflexia	• Hyper-triglyceridaemia • Hyper-cholesterolaemia; • Low high-density lipoprotein (HDL) levels • Hyperglycaemia	• Due to long term toxicity in children d4T should be used with caution • Substitution of ABC or AZT for d4T may prevent progression of lipoatrophy • Substitution of an NNRTI for a PI may decrease lipid abnormalities but might not reverse lipodystrophy.

Table 6.12 ARV Toxicities.....*cont....*

ARV drug	Major toxicities	Minor toxicities	Laboratory abnormalities	Monitoring and management
Abacavir (ABC)	• Hypersensitivity reaction: progressive worsening of symptoms within 6−8 weeks of starting ABC, • Combination of acute onset of respiratory and GIT symptoms: o Fever, fatigue, myalgia, o Nausea, vomiting, diarrhoea, abdominal pain o Pharyngitis, cough, dyspnoea • Rarely, Stevens Johnson Syndrome/Toxic epidermal necrolysis	Lactic acidosis Rash (usually mild) may or may not occur;	• Elevated eosinophil count	• Discontinue therapy if hypersensitivity occurs • Do not re-start when resolved
Didanosine (ddI)	• Pancreatitis • Lactic acidosis (life-threatening if with d4T) • Painful peripheral neuropathy	Abdominal cramps, diarrhoea -may herald onset of lactic acidosis	• Elevated serum amylase • Elevated serum transaminases	Discontinue if neuropathy is severe or serum amylase and transaminases are raised.
Tenofovir (TDF)	• Nephrotoxicity • Bone de-mineralization in younger children	Nil		• Not recommended for use in younger children but new data and dosing suggestions are ongoing and recommendations may change • Baseline and continued monitoring of renal function needed.

Table 6.12 ARV Toxicities .....*cont....*

ARV drug	Major toxicities	Minor toxicities	Laboratory abnormalities	Monitoring and management
Nevirapine (NVP)	• Hepatotoxicity • Stevens-Johnson syndrome (severe extensive rash with desquamation, angioedema or a serum sickness-like reaction; or rash with constitutional findings - fever, oral lesions, blistering, facial oedema and conjunctivitis). • DRESS syndrome (drug rash, eosinophilia and systemic symptoms manifesting as fever and arthralgia)	• Mild skin rash • Gastrointestinal symptoms • Fatigue, anorexia	• Elevated transaminases • Elevated bilirubin	• Low-dose given over first 2 weeks minimizes rash occurrence. • If rash is mild or moderate continue cautiously or substitute with EFV, a third NRTI or PI. (For life threatening rash do not substitute NVP with EFV because of class specific toxicity) • For severe rash or hepatitis: discontinue NVP permanently but also avoid EFV as alternative *NB: Symptomatic NVP associated hepatotoxicity is very rare in HIV infected preadolescent children.*
Efavirenz (EFV)	• Nightmares, Frank psychosis in predisposed individuals, • Potential teratogenicity (pregnant adolescents in 1st trimester & not on contraception)	• Dizziness • Rash, hepatitis	• Elevated transaminases, • Elevated serum bilirubin	• Rash may occur in 10%; may be severe in <1% of patients do not substitute with NVP • CNS symptoms often resolve in 2-4 weeks. • Night-time use recommended to reduce CNS side effects. • Discontinue if hepatitis develops Avoid in 1st trimester and in adolescents *8 Example persistent hallucinations or psychosis*
Lopinavir/r	• Lipodystrophy/lipoatrophy with re-distribution of body fat	• Diarrhoea • Skin rash • Headache, weakness		Substitution of an NNRTI for a PI may decrease serum lipid abnormalities

Table 6.12 ARV Toxicities ……*cont*…

ARV drug	Major toxicities	Minor toxicities	Laboratory abnormalities	Monitoring and management
Nelfinavir (NFV)	• Lipid and glucose abnormalities • Exacerbation of chronic liver disease	Diarrhoea occurs in 10-30% of cases at commencement of therapy		Diarrhoea often resolves on its own
Darunavir (DRV)	No major drug interactions reported.	• May rarely cause liver problems • Skin rash		Pharmacokinetic data available for children aged 6 years or more
Atazanvir (ATV)	• No major drug interactions reported. • Not to be used in neonates due to risk of kernicterus	• Used with RTV • Recommended for patients aged 6 to <18 years of age • Insufficient data for patients <6 years old.		

6.5 Pharmacovigilance

Activities relating to the processes of detection, assessment, understanding and prevention of adverse drugs reactions (ADR) are an important aspect of treatment, care and support for HIV infected children. Pharmacovigilance is directly dependent on the active participation of health care providers (doctors, pharmacist, nurses, laboratory staff, counsellors, nutritionists, etc) who are in the best position to report suspected ADRs observed in their every day patient care.

6.5.1 Recognition of Adverse drug reaction (ADR)

Adverse Drug Reaction is a response (whether mild, moderate or severe) to a drug that is noxious and unintended, and occurs at doses normally used for the prophylaxis, diagnosis, and treatment of disease, or for modification of physiological function (WHO). ADRs are a significant cause of morbidity and mortality especially in people living with HIV who often are on multiple drugs of different classes and can affect adherence to treatment schedules and increase the risk of resistance and relapse of the disease. ADR describes harm associated with the use of given medications at normal doses. .

Regardless of their severity, ADRs may affect adherence to therapy; the child and caregivers should be familiar with potential side-effects, and with signs of toxicities that are serious and require immediate contact with the provider. Serious adverse reactions are any ADRs that result in:

- Patient hospitalization or prolongs existing hospitalization
- Persistent or significant disability/incapacity
- Congenital anomaly/birth defect
- Permanent impairment /damage
- Life-threatening condition or death.

It is the responsibility of all health care providers to actively look for and document the occurrence of clinical and/or laboratory evidence of ADRs.

6.5.2 Clinical Manifestations of ADRs

Drug-related adverse events may be acute, occurring shortly after a drug has been administered, may be sub-acute (occurring within 1-2 days) or may be late (occurring after prolonged periods) of drug administration. Serious acute and chronic toxicities caused by ARVs may sometimes require dosage modification within a regimen or even temporary suspension of a single drug, single drug substitution or changing an entire regimen. Alternative explanations for toxicity should however be excluded before concluding that it is caused by an ARV drug or regimen.

Appendix II describes manifestations of toxicities unique to some offending drugs within an ART regimen with suggested laboratory monitoring and management.

6.5.3 Grading of Severity of ADRs

There are four different grades of adverse ARV drug interactions based on severity of manifestations:

- Grade 1 – Mild
  - Transient or mild discomfort
  - No limitation of activity
  - No medical intervention or therapy required

- Grade 2 – Moderate
  - Mild to moderate limitation of activity
  - No or minimal medical intervention required

- Grade 3 - Severe
  - Marked limitation in activity
  - Assistance usually required
  - Medical Intervention required or hospitalization required

- Grade 4 – Life Threatening
  - Extreme limitation in activity
  - Significant assistance required
  - Significant medical intervention, therapy or hospitalization required.

Appendix III gives grading of severity of clinical and laboratory parameters occurring as ADRs and suggested approach to management.

6.5.4 Stepwise Approach to the Management of ADRs

If adverse reaction is suspected:

- Withdraw the suspected drug, or where a combination regimen is in use and it is not certain which is the offending drug, consider stopping all the drugs in the regimen
- Identify the severity of the ADR observed (as above – mild, moderate, severe or life-threatening –see (Appendix II)
- Retrieve all suspected drugs and document their details (manufacturer, batch No., expiry dates, etc) and send to pharmacovigilance officer in the facility
- Evaluate concurrent medications and establish whether the ADR may be attributable to an ARV drug or drugs, or to a non-ARV medication taken at the same time
- Consider other disease processes (e.g. viral hepatitis in a child on ARV drugs who develops jaundice). Not all problems that arise during treatment are caused by ARVs
- Check available guidelines, literature and other materials for immediate intervention measures to counter the effect of acute ADRs (e.g. first aid, resuscitation, anti-dotes)
- Manage the adverse reaction according to its severity (see Appendices II and III).

In general:

a. *Severe life-threatening reactions:* Immediately discontinue all ARV drugs, manage the medical event (i.e. provide symptomatic and supportive therapy) and reintroduce ARV drugs using a modified regimen (i.e. with an ARV substitution for the offending drug) when the patient is stabilized
b. *Severe reactions:* Substitute the offending drug without stopping ART
c. *Moderate reactions:* Consider continuation of ART as long as feasible. If the patient does not improve on symptomatic therapy, consider single-drug substitution
d. *Mild reactions:* Reassure child and caregiver that while the reaction may be bothersome, it does not require a change in therapy; provide counselling and support to mitigate adverse reactions.

- Consider admission or referral of severe and life-threatening cases to specialists as necessary for assessment and appropriate management)
- Document all interventions made in the patient's medical records and in the *National Pharmacovigilance Reporting Form* (Appendix VI) for onward reporting to the facility pharmacovigilance officer in charge or reduce the dosage as soon as possible and please notify the ADR to the National Pharmacovigilance Centre, NAFDAC

6.6 Anti-Retroviral Treatment Failure

Treatment failure is defined as suboptimal response or a lack of sustained response to therapy using virologic, immunologic and clinical criteria. It is important to recognize that not all instances of treatment failure require an immediate change in antiretroviral therapy, and a careful assessment is required to evaluate the aetiology of treatment failure and determine the appropriate management strategy.

Before treatment failure is considered in any child on ART, the following factors should be taken into account:

- The child should have received the regimen for at least 24 weeks
- Adherence to therapy should have been assessed and ensured
- Inter-current opportunistic infections should have been treated and resolved
- Immune reconstitution inflammatory syndrome (IRIS) should have been excluded
- Adequate nutrition should have been ensured.

Treatment failure can be categorized by the type of failure as virologic, immunologic or clinical failure.

6.6.1 Virological Indicators of Treatment Failure

A major goal of ARV therapy is to achieve and maintain an "undetectable viral load" – usually defined by an HIV RNA PCR <400 copies/ml or <50 copies/ml, depending on the sensitivity of the PCR. Virologic failure occurs as the first event, followed by immunologic and clinical failure usually months or years afterwards. However, if a patient does not achieve or maintain an undetectable viral load, viral replication ensues, and often leads to the development of spontaneous, random mutations in HIV genome. Some random genetic mutations may lead to development of viral resistance to an ARV regimen.

Resistance is often caused by:

- Suboptimal levels of ARVs (e.g. where ARV dosages are not increased as a patient gains weight)
- Other causes of poor adherence
  - Drug or food interactions
  - Discontinuing a medication regimen without regard to the differing half-life of the ARVs in a regimen. This will often lead to the virus developing a mutation that may make the virus to become either partially- or fully-resistant to one or more medications in the regimen.

Virologic suppression may be sustained for many years with a regimen that has a low barrier to resistance, as long as adherence to medication is excellent. In particular, when viral load is high - namely, upon initiation of treatment – poor adherence at that time may lead to early resistance and virologic failure of a regimen. Therefore, it is essential to ensure that adherence counselling take place and that potential barriers are addressed at the beginning of therapy and sustained thereafter. It is also equally prudent to determine viral loads periodically if feasible – to prevent resistance and to allow an ARV regimen to have the best chance of success.

Where CD4+ and clinical criteria for recognizing treatment failure are conflicting or early failure is suspected, viral load assessment can add useful information. Virological failure is defined as persistent viral load higher than 5,000 RNA copies per ml after at least 24 weeks on ART, in a treatment-adherent child.

Viral rebound occurs in children who have previously achieved undetectable VL in response to therapy. It is defined as subsequent, repeated detection of plasma HIV RNA on ultra sensitive PCR assays. Infrequent episodes of low level viremia (<1,000 copies/mL) are common and not generally reflective of virologic failure, whereas repeated or persistent viremia (especially if >1,000 copies/mL) more likely represents viral rebound.

NB: Viral loads should not be measured during a concurrent infection; preferably, it should be measured at least one month after resolution of the infection.

6.6.2 Immunological Indicators of Treatment Failure

Immunological failure is defined as developing or returning to the following age-related immunological thresholds after at least 24 weeks on ART, in a treatment-adherent child:

- CD4 count of <200 cells/mm^3 or %CD4+ <10 for a child ≥2 years to <5 years of age
- CD4 count of <100 cells/mm^3 for a child 5 years of age or older.

Where CD4+ values are not available a new or recurrent stage 3 and 4 event is an indication of treatment failure. However, it is recommended that in the presence of pulmonary or lymph node TB or severe recurrent bacterial pneumonia, patients should receive appropriate treatment before treatment failure is considered.

6.6.3 Clinical Indicators of Treatment Failure

Clinical treatment failure should be considered when either new or recurrent stage 3 or 4 clinical events develop in a child on therapy (Table 3.4 for WHO clinical disease staging events).

Table 6.13 below provides **a** clinical decision-making guide for switching to 2nd line therapy upon treatment failure, using WHO clinical staging of events.

Table 6.13 Clinical Decision-making to Guide switching to 2nd line Therapy upon Treatment Failure using clinical staging of events

New/Recurrent clinical event after at least 24 weeks on ART[a, b]	Availability of CD4 monitoring	Management options [c, d]
WHO Stage 1 or 2 events	CD4 un available	Do not switch to new regimen Maintain regular follow-up
	CD4 unavailable	Increase clinical and CD4 follow-up if CD4 value approaches the age-related threshold Measure VL if available Treat and manage event Consider switching regimen only if two or more values are below the age-related threshold
Stage 3 events	CD4 unavailable	Manage event and assess response
	CD4 available	Treat and manage event and monitor response[e] Switching regimen is recommended if CD4 value is below the age-related threshold and particularly if the child initially had a good immune response to ART Measure VL if available Increase clinical and CD4 follow-up if CD4 value approaches age-related threshold
Stage 4 events	CD4 unavailable	Consider switching regimen
	CD4 available	Switching regimen is recommended if CD4 value is below the age-related threshold and particularly if the child initially had a good immune response to ART Switching may not be necessary where CD4 value is above age-related threshold VL testing may resolve discordant CD4 results

[a] A clinical event refers to a new or recurrent condition as classified in the WHO clinical staging at the time of evaluating the infant or child on ART.

[b] It should be ensured that the child has had at least 24 weeks of treatment and that adherence has been assessed and considered adequate before considering switching to a 2nd line regimen.

[c] Differentiating OIs from IRIS is important.

[d] In considering change of treatment because of growth failure, it should be ensured that the child has adequate nutrition and that any intercurrent infections have been treated and have resolved.

[e] Pulmonary or lymph node TB, which are clinical stage 3 conditions, may not be an indication of treatment failure, and thus may not require consideration of second-line therapy. The response to TB therapy should be used to evaluate the need for switching therapy.

[f] CD4 measurement is best performed once the acute phase of the presenting illness has resolved.

6.7 Immune Reconstitution Inflammatory Syndrome (IRIS)

IRIS has been primarily reported in adults but it does also occur in children. It is defined as a paradoxical clinical deterioration after starting HAART. It results from an improving immune system interacting with organisms that have colonized the body during the early stages of HIV infection. In spite of the clinical deterioration, there is improvement in CD4+ counts and suppression of viral loads.

IRIS is characterized by worsening of disease after initial clinical improvement, with onset of new systemic symptoms. Other features include pulmonary infiltrates, the development of peripheral and mediastinal adenopathy and worsening CNS manifestations. These reactions may occur during the first three months of ART, are generally self-limiting and last 10−40 days.

ART and TB treatment should not be interrupted when IRIS develops. Most cases will resolve spontaneously and can be managed with non-steroidal anti-inflammatory drugs. Some reactions may be severe and require a short course of treatment with prednisolone at a dose of 1-2mg/kg/day for 4-6 weeks. Rarely, mortality may occur if primary infection and resulting inflammation is not treated adequately. IRIS in the context of co-therapy needs to be differentiated from treatment failure.

The most common OI associated with IRIS is TB, but those on treatment for PCP or cryptosporidiosis, or who have herpes simplex virus (HSV), fungal, parasitic or other infections may also develop IRIS. Where BCG immunization is routine, BCG-associated IRIS (localized and systemic) is frequently observed. Initiation of ART can also unmask previously undiagnosed infections such as hepatitis B or C infections by improving the inflammatory response due to these infections.

6.8 Switching Anti-Retroviral Therapy

Switching is the replacement of a first-line regimen with a second line regimen because of treatment failure. The second-line regimen should:

- Preferably include at least two new drugs, one or both of them from a new class in order to increase the likelihood of treatment success and minimize the risk of cross-resistance
- Be based on drugs expected to retain potency against the virus
- Take into consideration prior exposure to ART.

Tables 6.15 and **6.16** below show recommended preferred ARV combinations and regimens for use at switching from 1st to 2nd line therapy with consideration for the combination of ARVs used in a previous first line regimen.

Table 6.14: Second Line ART Regimens

First-line regimen at time of failure	Preferred second-line regimen
2 NRTI (AZT, 3TC, ABC, d4T) + 1 NNRTI (NVP or EFV)	At least 1 new NRTI + May continue 3TC + LPV/r
2 NRTI + LPV/r	At least 1 new NRTI + May continue 3TC + NNRTI (EFV or NVP)** Or Triple NRTI
Triple NRTI	At least 1 new NRTI + may continue 3TC* + NNRTI or LPV/r

**3TC selects for the M184V mutation which confers increased susceptibility to NRTIs as well as decreased viral fitness. Despite failure on a 1st line regimen containing 3TC, it may be continued for maintenance of this resistance mutation.*

***Use of NNRTI class after 1st line failure with LPV/r may be compromised due to prior exposure to NNRTIs. Also, if LPV/r was substituted because of severe NNRTI toxicity, NNRTIs should not be used. Therefore, use of triple NRTIs regimen is indicated as a 2nd line.*

6.15 Second Line ARV Drug Combinations within Alternative ART Regimens

1st Line Regimen at time of failure	2nd Line Switch (in order of preference)
AZT+3TC+NVP	ABC + 3TC + LPV/r, d4T+3TC+LPV/r
ABC+3TC+NVP	AZT + 3TC + LPV/r, d4T + 3TC + LPV/r, ddI +3TC+LPV/r
AZT+3TC+ABC	ddI+3TC+NVP, TDF+3TC+EFV, ddI+3TC+LPV/r
d4T+3TC+NVP	ABC + 3TC + LPV/r, ddI +3TC+LPV/r, AZT+3TC+ABC
AZT+3TC+LPV/r	ABC +3TC+ ddI, ddI +ABC+NVP or EFV*
ABC+3TC+LPV/r	AZT+3TC+ddI, AZT+3TC+NVP or EFV*
d4T +3TC+EFV	ABC+3TC+LPV/r
AZT+3TC+EFV	ABC+3TC+LPV/r
TDF+3TC(or FTC)+EFV	AZT+3TC+LPV/r, d4T+3TC+LPV/r, ABC+3TC+AZT, ABC+3TC+d4T
TDF+3TC(or FTC)+ NVP	AZT+3TC+LPV/r, d4T+3TC+LPV/r, ABC+3TC+AZT, ABC+3TC+d4T

** Use of NNRTI class after 1st line failure with LPV/r may be compromised due to prior exposure to NNRTI*

6.9 Other Considerations in the Selection of a Second Line ART Regimen

Prior exposure to maternal ARV drug used for PMTCT has been associated with potential for treatment failure due to the development of ARV drug resistance particularly with nevirapine monotherapy. In situations where such use of NVP exposure took place, the ART regimen of choice for the infant that was later confirmed to be HIV infected should not include NVP but LPV/r.

6.10 Discontinuation of Anti-Retroviral Therapy

Under exceptional circumstances it may be necessary to discontinue ART. Such circumstances include poor adherence and cases where the administration of medication is repeatedly interrupted. Continuing suboptimal ART is not useful because it will lead to the emergence of viral resistance. Consider discontinuation only after exploring all potentially corrective measures, including intensive counselling, additional caregiver education, and family support. Discontinuation for medical or social reasons is not a contraindication to future restarting of medication when adherence can be assured.

Surgical necessity may require strict *nil per os* (e. g bowel surgery). In emergency situations, life-sparing surgical interventions should not be withheld and ART may have to be temporarily discontinued. However, it should be restarted without delay as soon as possible. Intravenous preparations can be used in the interim period.

6.11 Salvage Therapy

A number of treatment approaches have been considered in clinical trial settings, although largely in adults and where virological monitoring is possible. These include the addition or substitution of new drugs (such as enfuvirtide [T-20]), mega-HAART (combination of five or more drugs, including two or more protease inhibitors), strategic recycling of drugs, structured treatment interruptions and the continuation of current therapy until additional drugs become available. Children with such needs should be referred to higher levels of care or ART specialists if necessary.

When salvage treatment is unavailable, a second line failing regimen may be continued as there is evidence of some benefit despite emergence of resistance mutations.

6.12 Anti-Retroviral Drug Resistance

HIV drug resistance (HIVDR) in infants and children with HIV infection may result either from a drug–resistant strain being transmitted from the mother or a drug-resistant strain developing due to administration of paediatric ART or maternal or infant ARVs used for PMTCT or maternal ART. The transmission of a resistant virus can occur from:

- An ARV-naive mother infected with resistant virus
- A mother exposed to ARVs before becoming pregnant
- A mother exposed to ARVs during pregnancy either for her own health or for prophylaxis.

Although the risk of HIV-1 transmission to the infant is reduced with use of prophylactic ARVs the success of PMTCT depends on the ARV regimen used, duration of prophylaxis and the degree of adherence. Extended maternal or infant prophylaxis with ARVs, or continued maternal ART is also required to minimize breastfeeding transmission where this is the selected infant-feeding strategy.

Development of HIVDR in children on ART is usually related to poor adherence, use of suboptimal regimens, suboptimal dosing or to problems with drug absorption or pharmacokinetics. All of these factors give rise to sub-therapeutic drug levels and rebound of viraemia with emergence of drug resistant virus.

Routine HIV drug resistance testing for individual infant or child ART management is not recommended in settings where other basic laboratory measurements, such as CD4 and HIV VL are not yet available.

6.12.1 Considerations for Minimizing the Emergence of Drug Resistance

The increasing use of ART for prophylaxis and therapy raises growing concern on the emergence of HIVDR and represents a potential impediment to the achievement of long-term success in the rapid scale-up of ART in resource-limited settings. Minimizing the emergence and transmission of HIVDR is therefore essential in order to ensure the efficacy of the limited number of ARVs available especially for children in many countries.

The following situations warrant resistance testing where available:

- Prior to initiating therapy in a patient exposed to possibly resistant virus
- In patients who fail to adequately respond to therapy
- In patients who experience viral "rebound" or a return of HIV RNA towards baseline provided adherence is assured.

6.13 Monitoring HIV-DR Early Warning Indicators

ART site-based HIV-DR EWIs are identifiable factors that may be associated with the emergence of HIV-DR and which, if addressed at either the ART site or programme level, may prevent the development of HIVDR. Implementing an HIV-DR EWI monitoring system allows ART programmes to assess the extent to which they are optimally preventing HIV-DR. Monitoring of at least six EWIs (and two optional indicators) for which current information is readily available from data routinely recorded at the facility is recommended.

The EWIs should be monitored in all ART sites in a country when feasible, or from a representative sample of ART sites. Achieving the best possible performance as measured by these indicators will help minimize the preventable emergence of drug-resistant HIV. Sites which do not achieve one or more of the EWI targets may require increased resources, staff training, or additional review to clarify the kind of support needed. Likewise, lessons may be learned from sites achieving and surpassing targets and applied to sites observed to be functioning less well.

6.14 Adherence to Anti-Retroviral Therapy

Medication adherence is a central feature in the success or failure of ARV therapy. Poor adherence may lead to suboptimal levels of ARVs, which may facilitate the development of drug resistance to one or more drugs in the regimen. Long-term poor adherence may lead to cross-resistance to other drugs in the same class. Medication adherence of 95% (corresponding to missing not more than 3 doses per month of a twice-daily therapy) or higher is associated with the best chance of maximizing success of ART.

Adherence refers to a partnership between the patient, family and health care team to ensure that medication is taken exactly as prescribed. This entails two-way discussions with the patient and family to determine plans to incorporate medication dosing with current lifestyle. Efforts to support and maximize adherence should begin before the initiation of treatment. The development of an adherence plan and the education of children and their caregivers are important first steps. Initial education should cover:

- Basic information about HIV and its natural history
- The benefits and side-effects of ARV medications
- How the medications should be taken and the importance of not missing any dose
- If medication is mixed with food the consumption of all food is important in order to ensure administration of the full required dose.

The employment of additional methods may be necessary for young children, including the tasting of medications, practicing liquids measurement and training in pill swallowing. Adherence, however, goes beyond initial education. It must be assessed at EACH visit, and strategies to improve it should be discussed. Adherence in children is a special challenge because of a number of potential barriers. These barriers need to be addressed prior to starting therapy. Some of these include:

- Lack of disclosure to the patient or other family members
- Complex medication regimens
- Difficulty in measuring or administering medications
- Dietary requirements and restrictions
- Religious, cultural, and personal beliefs about taking medications
- High pill/liquid burden
- Multiple caregivers who may assume the other has given the medication;
- Difficulty with transportation to the clinic for refills and appointments;
- Travel away from home or having other family members visit;
- Poor palatability of ARVs
- Medication refusal
- Medication burn-out.

Assessing adherence is not simply asking if all medications are taken. It includes:

- A self-report/report from parents/caregivers
- Pharmacy refill counts
- Pill counts.

Additionally patients should be asked:

- What time they take the medication
- Whether they take it with food
- Who gives the medication
- What problems they have had with the medications
- Strategies they employ for remembering to take the medications.

Some strategies to improve adherence include:

- Having treatment partners (people that help remind the caregiver to administer the medications)
- Home visits by HBC or outreach teams
- Integration of medication administration with routine daily activities (tooth-brushing, prayers, meals, TV/radio shows, school hours)
    - Sunrise/sunset
    - Cell phone alarms/reminders
    - Calendars, pillboxes, blister packs and labelled syringe.

Viral load measurements can be used to assess adherence to medication. Directly observed therapy has been successful in some settings. Medication doses should be closely observed by the caregiver to ensure that drugs have been actually ingested by the child.

6.14.1 Optimizing ART Adherence

Optimizing adherence is vital for minimizing HIVDR, alongside adherence to standardized protocols for ARV use for prophylaxis and treatment. Specific problems that should be considered in treating children include the need to change dose and formulations as children cross thresholds of weight or age, and limited availability of

suitable paediatric ARV formulations. To avoid emergence of HIVDR in the event of discontinuation of ARVs due to toxicity, it may be necessary to not discontinue all ARVs at the same time.
Important strategies to minimize the development and spread of HIVDR include:

- Selection of appropriate drug combinations
- Ensuring reliable ARV drug quality and supply
- Providing appropriate support for adherence
- Surveillance and monitoring for HIVDR in paediatric populations.

Surveillance is an important public health tool recommended as a way of overall monitoring of the effectiveness of ART programmes in any ART scale-up effort, to provide guidance on trends in HIVDR patterns that could enable timely policy review to minimize the impact of such resistance. The essential package for HIVDR assessment and prevention strategy that complements plans for the implementation of ART scale-up should have elements that include:

- Regular assessment of HIVDR early warning indicators (EWIs) in paediatric ART sites (**Table 6.17**)
- Monitoring surveys to assess the emergence of HIVDR and associated factors in cohort(s) of treated children 12 months after ART initiation in sentinel paediatric ART sites; and
- Surveillance for drug-resistant HIV-1 among infants newly diagnosed with HIV prior to treatment initiation.

Table 6.16: WHO HIV Drug Resistance Early Warning Indicators

Indicator Number	Name	Definition
EW 1	**ART prescribing practices**	Percentage of children initiating ART at the site who are initially prescribed, or whose caregiver initially picks up from the pharmacy, an appropriate 1st line ART regimen; **Target = 100%**
EW 2	**Lost to Follow-up**	Percentage of children initiating ART who are lost to follow-up during the 12 months after starting ART; **Target ≤ 20%**
EW 3	**Patient retention on first line ART**	Percentage of children initiating ART who are taking an appropriate first line ART regimen 12 months later; **Target ≥ 70%**
EW 4	**On-time Drug pick-up**	Percentage of children whose caregiver picks up prescribed ARV drugs on time; **Target ≥ 90%**
EW 5	**On-time ART Clinic appointment-keeping**	Percentage of children who attended scheduled or expected clinical consultations on time; **Target ≥ 80%**
EW 6	**ARV Drug supply continuity**	Percentage of months in a designated year in which there were no Paediatric ARV drug stock-outs; **Target = 100%**

CHAPTER 7
CLINICAL AND LABORATORY MONITORING

7.0 Introduction

Clinical and laboratory monitoring are essential parts of HIV and AIDS care in children. These are required:

- At baseline (i.e. at entry into HIV care)
- During the care of patients who are not yet eligible for ART
- Starting ART
- Maintaining ART.

7.1 Baseline Clinical and Laboratory Assessment

All infants and children who are diagnosed with HIV infection should undergo a baseline clinical and laboratory assessment in order to determine:

- Weight, height, head circumference and other measurements of growth
- Developmental status
- Nutritional status, including assessment of quality and quantity of intake.
- The clinical stage of HIV disease
- CD4+ count/CD4+%
- FBC, LFTs, lipid profile, serum E/U, Creatinine, HBsAg, and HCVAb, chest radiograph, pregnancy test for adolescents (where applicable)
- Viral load (where available)
- Eligibility for ART and other interventions such as cotrimoxazole preventive therapy (CPT)
- The presence of active opportunistic infections
- The presence of co-existing diseases
- The need for referral to other support services.

7.2 Routine Monitoring of Children not yet Eligible for ART

The clinical evaluation of infants and children who are not yet eligible for ART should be performed every three months and should include:

- Clinical evaluation
- Immunological evaluation (CD4+ count/ CD4+ %)
- Other investigations as clinically indicated.

7.3 Routine Monitoring of Children on ART

The child should be seen:

- Two weeks after commencement of therapy
- Monthly for the first 6 months
- Thereafter every 3 months except otherwise indicated

See Table 7.1 below Schedule for starting and monitoring children on HAART

The following should be conducted during follow-up visits:

i. Clinical assessment

- Growth monitoring using the national growth chart

- Physical examinations (with special attention to pallor, jaundice, oral cavity, skin, lymph nodes, chest, liver and spleen)
- Developmental assessment
- Immunization status
- Nutritional assessment
- Psychosocial assessment
- Adverse ARV effects
- Review ARV dosages for every 10% increase in body weight.

ii. Laboratory evaluation

- CD4+ count at baseline, 3 months and 6 monthly thereafter (except otherwise indicated)
- Viral load every 6 months
- FBC at one month and every 3 months (except otherwise indicated)
- LFTs at baseline and AST and ALT plus bilirubin levels at baseline, 3 months and 6 monthly thereafter unless otherwise indicated (for patients on NVP these should be done after 1 month of commencement)
- E/U, creatinine and urinalysis at baseline, 3 months and 6 monthly thereafter unless otherwise indicated
- Serum lipid profile and amylase at baseline, at 3, 6months, and thereafter as indicated, where possible.

Table 7.1 below shows the recommended schedule for monitoring at commencement of ART and during follow up and Table 7.2 for tiered laboratory capabilities for laboratory monitoring of children on ARV therapy which recommends the basic minimum requirements for each level of care.

iii. Assessment and Monitoring of Adherence

- Ask parents/caregiver, and count or measure volume of drugs left
- Inquire in a non-judgemental manner about barriers to adherence
- Check pharmacy drug pick-up records

Greater than 95% adherence to the drug regimen will ensure a good virological response and prevent the emergence of viral resistance. For a child taking medication twice daily, omitting more than one dose in ten days implies less than 95% adherence.
For further information on adherence see Section 8.13.

iv. Monitoring Treatment and Adverse Drug Reactions

For monitoring treatment and adverse drug reactions refer to Table 6.9.

TABLE 7.1: Schedule for Starting and Monitoring Children on HAART

	Pre-Treatment (Baseline)	Week 2	Monthly x 6						Every 6 mo. thereafter
			1	2	3	4	5	6	
Physical Exam	X	X	X	X	X	X	X	X	X
Adherence Counselling	X	X	X	X	X	X	X	X	X
Confirm HIV status	X								
HIV-1 RNA(VL) *	X							X	
CD4+	X				X			X	X
FBC	X				X			X	X
E&U*	X				X			X	X
LFT*	X		X**		X			X	X
FBS	X				X			X	X
Serum lipids* & amylase*	X				X				
Urinalysis*	X				X			X	X
Chest X-ray*	**X**								

**Viral Load, done as clinically indicated*
***For children on NVP*

Table 7.2: Tiered Laboratory Capabilities for HIV Treatment

Primary health centre (Level 1)	Secondary hospital (Level 2)	Tertiary (referral) hospital centre (Level 3)
• Rapid HIV Antibody testing • Hb/PCV • Sputum smear for TB (refer if not available) • Collection of DBS for DNA PCR	• Rapid HIV antibody testing • ELISA or Western Blot • FBC and differential • CD4+ cell count/% • Serum E and U, LFTs, lipids • Sputum smear for TB • Collection of DBS for DNA PCR • VL (refer if not available)	• Parallel Rapid HIV antibody testing • ELISA or Western Blot • FBC • CD4+ cell count/% • Serum E and U, LFTs, lipids • Sputum smear for TB • Collection of DBS for DNA PCR • DNA PCR • TB PCR • Viral load testing • Drug resistance testing

CHAPTER 8
CARE AND SUPPORT

8.0 Introduction

Beyond ART services, HIV infected and affected children require other services to grow up safe, healthy, happy and well-educated with the chance to achieve their true potential. This is best accomplished by integrating HIV services and primary health care, addressing the ordinary threats to the health and well being of infants and children while at the same time attending to the special circumstances of HIV infection. A family focused model of care has been shown to be effective for engaging children and their families in the long-term management of HIV disease. Therefore HIV programs for children need to offer a package of care that is comprehensive, catering for their various needs. Some of the needs of HIV infected children include:

1. Counselling including for diagnostic HIV testing
2. Disclosure and nutritional support
3. Psychosocial services for the HIV infected child
4. Education and vocational training
5. Health care needs (immunization, OI prophylaxis and other child health support interventions)
6. Home-based care and Palliative care
7. Adherence counseling and support
8. Prevention with positives
9. OVC support
10. Protection and legal support.

Care and support for HIV infected children:

- Enhances the quality of life, and may also positively influence the course of illness
- Is applicable early in the course of illness, in conjunction with other therapies that are intended to prolong life, such as Antiretroviral Therapy (ART), cancer chemotherapy or radiation therapy, and includes those investigations needed to better understand and manage distressing clinical complications.

8.1 Retention in Treatment, Care and Support

Retention in treatment, care and support of HIV infected and affected children, is critical to the overall success of HIV and AIDS programme. Currently, therapeutic care such as ART serves as a life-long intervention that requires careful monitoring and follow-up. As treatment undergoes rapid scale-up, cohort monitoring, i.e. follow-up of children as they continue to receive ART over time has become critical to successful programme management and evidence generation on the outcomes of ART and patient retention. Patient retention refers to the proportion of people who continue ART among those who ever started. While ART can dramatically improve outcomes for children, excellent adherence is required for treatment success. It is important to note that retention of children can embrace the following:

- Children who:
    - Have a presumptive diagnosis of HIV
    - Were found to be HIV positive through PITC
    - Are HIV infected being evaluated for ART initiation (pre-ART)
    - Are on ART and known to be alive.
- HIV positive infants awaiting enrolment
- HIV exposed infants:
    - Not yet tested for HIV DNA PCR

- Tested positive for HIV DNA
- HIV positive pregnant women.

8.1.1 Monitoring Retention of Children on Care

Retention rates are calculated as follows:

$$\frac{\text{Number of children alive and still on antiretroviral therapy at 12 months}}{\text{Number of children started on antiretroviral therapy in the preceding calendar year}}$$

The numerator should include all children who started receiving ART in the past 12 calendar months and are still alive and on treatment after 12 months.
The denominator should include all children started on ART during the past 12 calendar months whether alive or dead.
NB: *Children who died before 12 months, stopped treatment and did not restart before 12 months or were lost to follow-up before 12 months should not be included in the numerator.*

Same approach should be used to estimate retention at 24, 36 and 48 months and 12 monthly intervals. To ensure effective monitoring and evaluation of Paediatric ART services, all treatment facilities should produce this indicator and forward the results for collation to produce national figure.

Attrition within Paediatric ART programme is defined as the number of children in a cohort who discontinue treatment. It is classified into three categories:

- Treatment stop
- Death
- Lost to follow-up.

Treatment stop refers to a health care decision to interrupt ART in a child. It can be permanent or temporary, such as in case of severe toxicity.

Death is the main indicator used to estimate the survival of children who start treatment. In Nigeria, where vital registration systems are weak, health information systems fail to capture deaths. When a child who started ART dies and the caregiver does not report to the clinic, the child is then classified as lost to follow-up and reported as such in cohort monitoring.

Lost to follow-up refers to a child that does not return to the treatment facility for a refill of ARV drugs until the end of the reporting period. All efforts to track clients must be exhausted before classifying them as loss to follow up.

8.1.2 Factors Contributing to Loss to Follow-up

The following factors contribute to loss to follow up:

- Patient/Caregiver-related factors:
  - Resources
  - Knowledge, attitudes, beliefs, perceptions, expectations and psychosocial issues, all of which influence behaviour.
- Medication related factors including the complexity of the medical regimen:
  - The dosage and duration of treatment
  - Toxicities
  - Availability of medical support
  - Patient/caregiver education

- Relationship between the patient and health care provider:
  - Lack of effective communication
  - Adequacy and quality of care
  - Lack of confidence and trust between patients, families, and providers
- Complexity of the system of care.

Adherence and retention are dynamic and complex processes that are influenced by the interplay of the above factors among others, including psychosocial. Thus, Paediatric HIV care, treatment, and support services require regular review and adaptation based on the individual needs and growth of the child.

8.2 Counselling for HIV infected and affected Children

Counselling is an integral component of the holistic approach to caring for HIV-infected/affected children and their families/caregivers. It is a continuous process that starts from the point of contact with the facility for HIV-related services and continues throughout the life of the child with health and non-health sector support services. Children, caregivers and families infected or affected by HIV and AIDS have numerous challenges and needs and therefore require these services to cope.

Each counselling encounter is tailored to a specific need of the counsellee and may include counselling for the following needs/circumstances at different stages of the disease process:

- HIV testing (pre-test and post-test counselling)
- Ongoing/follow-up for the continuous care of the child and family
- PMTCT including Early Infant Diagnosis
- ART
- Disclosure
- HIV prevention
- Bereavement.

Before discussing counselling in these situations, it is important to understand the concept of counselling, how to do it and its benefits.

8.2.1 Definition of Counselling

Counselling is a process by which a counsellor provides information and education about a situation and helps the client to make an informed choice of what is best to do in their situation. It is a helping process that involves a one-to-one communication that is aimed at meeting specific needs of the individual. Thus for HIV infected and affected children and their families since their needs differ from time to time, counselling must be given at every visit. The counsellor must identify the reason for each counselling encounter so as to maximise the benefit of the visit.

8.2.2 Benefits of Counselling

The benefits include the following:

- Meeting the specific need for which the counselling was sought
- Helping the child/caregivers and family members adopt a positive attitude to HIV and its related complications
- Helping detect HIV-related conditions that could be effectively managed and thereby improve the client's life
- Offering opportunity for the child and his/her family to access other support services (e.g., peer support groups and post-test clubs), nutritional support, and ART.
- Equipping the client with the knowledge and skills to support other affected persons.

8.2.3 How to Counsel

Care providers who counsel HIV infected and affected children and their families/caregivers in different situations of care should be knowledgeable and skilled in the aspect of the subject for discussion and must use appropriate counselling skills. These skills are those of:

- Listening and learning skills
  - Using helpful non-verbal communication
  - Asking open questions
  - Using responses and gestures that show interest
  - Reflecting back what the mother says
  - Empathizing – show that you understand how she feels
  - Avoiding words which are judgmental

- Building confidence and giving support skills
  - Accepting what a mother/caregiver thinks and feels
  - Recognizing and praising what a mother/caregiver and baby are doing right
  - Giving practical help
  - Giving a little relevant information
  - Using simple and appropriate language
  - Making one or two suggestions, not commands.

As a general rule, interaction with the child should take place in the presence of a parent and, when appropriate, with other family members or siblings, until the counsellor has gained the confidence and trust of both the child and the caregivers. Additionally, the presence of other family members enables the counsellor to observe the reactions and interactions of both the child and family/caregiver. Children are usually counselled by proxy - caregiver/parents are counselled and supported to address the child's needs. Older children can be counselled alone or with a family member present, or as the child may prefer. However, counsellors should not discuss issues of sexuality without permission from parents/caregivers.

Parents should be continually informed and participate in the decision-making and planning of appropriate care for their child, including decisions about where the child should be treated. The counsellor must ensure that the social needs of the HIV-infected and affected child are addressed by referring the parents to appropriate organisations/institutions for socio-economic and spiritual support.

Confidentiality should be ensured during counselling and physical examination. The protection of the child and his rights should be guaranteed especially when HIV infection resulted from sexual abuse. Health services for adolescents should be youth-friendly. Effective counselling for adolescents should be culturally sensitive, tailored to the developmental needs of youth, and in accordance with local values and laws.

8.2.4 Who should Counsel

All health care providers involved in the care of HIV infected and affected children and their families should be able to provide some basic counselling. Specific counselling sessions such as HCT, infant feeding, EID, ART and adherence should be referred to trained counsellors to improve the quality of the counselling.

8.2.5 Different Counselling Situations

i. Counselling for HIV testing (pre-test and post-test counselling)

- Pre-test counselling: Pre-test counselling is carried out before testing for HIV infection. Its objective is to obtain consent, preferably written, for HIV testing. This counselling, in addition to providing basic information about HIV and the test, should inform the counselee about the limitations of the testing

method, the benefits of early diagnosis for the child, and the implications of a positive HIV antibody test results for the family. If adolescents are counselled and tested without an accompanying adult, their request for non-disclosure of the result to the parents/caregivers must be respected.

- Post test counselling: This involves discussing the result of the HIV testing with the counselee and its contents depend on the result-negative or positive. The counsellor provides appropriate information, support and referral. If the test result is negative, the counsellor will discuss how the child/family can reduce their exposure to HIV infection. It is important to discuss the "window period" and the need to repeat the test after 6 weeks to 3 months. If the test result is positive, the counsellor should assist the counselee to understand the implications of the result and discuss their concerns about the disease. This counselling should be arranged for at the time of taking blood for the HIV testing. Results of a positive test should not be communicated through a phone call. The number of post test counselling sessions needed by a child/family varies and depends on how soon the child/family come to terms with the positive result. The counsellor should be equipped to handle the spectrum of reactions the child/family may express following a positive result; social workers and psychologists may be of assistance.

ii. Ongoing /Follow-up counselling for the other needs of the child and family

HIV infected or exposed children should be followed-up to ensure optimal growth and development. The follow-up counselling needs include:

- Nutritional support
- Growth monitoring and promotion
- Immunisation and other infant welfare services
- Prevention and management of the common disease conditions
- School-related issues
- Services for OIs and other HIV related conditions, e.g. cotrimoxazole chemoprophylaxis for PCP
- Support services to help families cope with the challenges of their HIV status.

iii. Counselling for the Prevention of Mother-to-Child Transmission of HIV

This counselling is aimed at reducing the risk of transmission of HIV infection from mother to child. It can be carried out before or during the pregnancy or after the birth of the child. It should be done at the earliest possible time, preferably prenatally so that the woman gets pregnant at a time when her risk of infecting the baby is lowest. It involves discussions of the different methods of preventing mother-to-child transmission of HIV. The mother may need to be referred for the different aspects of the services. The counselling should address the following:

- HIV testing & disclosure
- Delivery options
- Infant feeding
- EID
- ARV prophylaxis
- Primary Prevention.

The PMTCT services should be integrated into the health system.

iv. Counselling for ART

This counselling session is for the caregiver and the child where appropriate. It should help them understand the following

- That the treatment will not cure the disease but reduce the multiplication of the virus and improve quality of life

- The need for treatment, when to start, schedule and duration
- The different ARVs and their adverse effects
- Resistance to the drugs
- Adherence to the treatment
- Monitoring of treatment at home, community and facility

At different stages of the disease and during follow-up care visits, these issues should be revisited to provide continued support for the child and the family/caregiver.

v. Counselling for disclosure

This involves counselling the parents/caregivers to support the process of disclosure of the child's HIV status to him/her with minimal negative impact. Parents who, for different reasons may want to withhold disclosure from their children should be counselled to understand the importance of the child knowing his/her status and assisted to do so.

vi. Counselling for primary HIV prevention

HIV prevention counselling is a counsellor-led and client-focused exchange designed to help individuals make behaviour changes that will reduce their risk of acquiring or transmitting HIV. The counselling should provide information on the following:

- Behaviour change communication
- Encouragement of abstinence
- Condom use-promotion and provision
- Prompt treatment of STIs
- Family planning in HIV infected adolescents and couples.

vii. Bereavement counselling

- HIV-infected and affected children and their families face a major challenge of coping with chronic ill health and death in themselves or their family members. They need counselling and support to cope with these experiences. Health workers should encourage open communication about what is happening between the children themselves, the parents, and the health workers. Parents must be reassured and understand that professionals are not giving up on their children, but rather that there is nothing more that can be done.

- The children and their families/caregivers require continual and ongoing counselling and help after the death of a loved one. Parents and caregivers also need support for their emotional reaction toward a dying child, and the dying children themselves need help.

- Counselling should help the child cope with the terminal illness in themselves or their parents. Where the parents are terminally ill the children need counselling to cope with the loss of the parents and the new roles they may have to take on in the absence of their parents and siblings. When children lose someone they love, they need:
  - Simple and age-appropriate information about what has happened
  - To be listened to by someone who must be prepared to answer same question several times
  - Reassurance that they will be loved and taken care of.

Issues that need to be addressed in counselling children with terminally ill/deceased parents include:

- Psychological stress
- Anxiety about their security and safety

- Lack of parental nurturing
- Lack of basic needs
- Loss of inheritance
- Need to work
- Less education and skills
- Mental health needs
- Emergency and long-term childcare

8.2.6 Steps for Counselling Children and their Families

There are certain steps that can be used as a basis for counselling HIV-infected/exposed children and their families/caregivers. These steps vary with the situation:

i. Child with unknown HIV status presenting with clinical signs suggestive of HIV infection and/or has risk factors such as mother/sibling with HIV/AIDS

- Ascertain child's and/or mother's or caregiver's understanding of HIV infection in general and, more specifically, MTCT
- Discuss presumptive diagnosis of HIV in light of existing signs, symptoms, and risk factors
- Explain the benefits of early awareness of HIV infection in the child's life and for the family
- Counsel and test child/parents to determine their HIV infection status
- If parents decline testing or decide to postpone the test, accept their decision and reassure them that while their refusal will not compromise the management of the child's current illness, they and the health workers may be missing the opportunity to plan for the child's optimum care if the child is HIV infected.

ii. Child known to be HIV infected and responding poorly to treatment

- Ascertain child's and/or mother's or caregiver's understanding of HIV infection
- Discuss the management of current problems and the reasons for poor response to treatment
- Ascertain adherence to ARV therapy
- Refer child to a higher level of care for further investigations
- Discuss psychological implications of HIV for child, mother, father, and other family members
- Provide ongoing psychosocial support on coping with a chronic illness such as HIV.

iii. Child known to be HIV infected and responding well to treatment

- Discuss follow-up, care, and risk factors for future illness.
- Discuss shared confidentiality and the social well-being of the child and the family.

8.2.7 Challenges in the Counselling of Children and their Families

There are a number of challenges which a counsellor involved in care for children should consider and plan to mitigate their impacts. They include:

- Making and confirming the diagnosis in the child – e.g. difficulties in obtaining informed consent for testing, consideration for "window period", the types of tests available and the need to wait for some time to confirm results
- Disclosure of HIV status to child; e.g. difficulty with choice of appropriate language and skills to communicate, age to disclose, risk of child revealing the status to others
- Follow-up and other care for the child – e.g. getting parents/caregivers to comply with schedule of treatment, reduction of stigma arising from frequent visits to health facilities
- Starting and adhering to ART i.e. providing relevant information that will enable adherence to treatment.

8.3 Disclosure of HIV positive status to Children

Disclosure means to *reveal, make known, make public or to share information on an issue*. In this context, it means informing a child about his/her HIV status; it is a sensitive issue which must consider the needs, feelings, beliefs of the child and those of the parent(s)/caregiver(s). It must however be done to improve the management outcome. It is also important to consider the current and evolving developmental and cognitive stages of the child as well as existing family dynamics and communication.

Disclosure of the child's HIV status is difficult for parents due to the following:

- Fear of impact of disclosure on child's psychology and emotional health
- Fear of inadvertent disclosure to others by child
- Attempt to protect child from social rejection and stigma
- Guilt about the mode of HIV transmission
- Difficulty of families coping with their own illness and those of their loved ones
- Established coping strategies within families (i.e. traditional silence around illness and disease, limited communication within families and denial)
- Belief that the child will not understand
- Children as hope for future (avoiding thought of HIV may keep fatality at bay).

8.3.1 Importance of Disclosure to Children

These include:

- Reduction of the risk of development of fantasies about their illness
- Improvement of access to care and support services
- Enhancement of adherence to treatment and coping strategies
- Reduction of the negative psychosocial impacts of the disease

8.3.2 When and How to Disclose

Disclosure is more than revealing HIV status. It also entails an ongoing discussion of health and health-related issues. Parents/caregivers have the primary responsibility for disclosure. They should begin the process as early as possible and continue to dialogue with the child about the condition and related issues. Simple explanation of the nature of HIV disease for younger children and disclosure about nature and consequences for older children is recommended.

When to use the words "HIV and AIDS" will vary with the needs of the child and family. The process can usually be started between the ages 5 and 7 years depending on the child's understanding and on the parent(s)/caregiver(s) consent. The process should be gradual and the child could be led to guide the discussion. Alternatively, the approach could be individualized to tailor the discussion according to the cognitive development, use of tools and language for different developmental capacities (drawing, story-telling, play, drama), level of maturity, coping skills and the child's health status. Health care providers should provide the necessary support, including materials for the disclosure process.

8.3.3 Assisting Families with Child Disclosure

In preparing to disclose HIV status to a child, it is important for parents to have the requisite knowledge to explain HIV infection and handle the related questions and responses. Arrangements should be made on appropriate place and time of disclosure, who needs to be there, what will be said and the plans after disclosure. Issues of disclosure to peers and others must also be addressed. A follow-up arrangement to ensure school and family functioning, monitoring of medical treatment and adherence should also be arranged. A role for support groups and further on-going counselling should be outlined.

8.3.4 Nutritional Counselling and Support *(see Chapter 9 for details on nutrition)*

Nutritional education and counselling is an integral part of care and support of HIV infected children and should be provided for every patient. Counselling may be supplemented by fliers with written and pictorial information. Caregivers should learn the importance of adequate nutrition, the basics of food and water safety, hygiene interventions that reduce risk of infection, (particularly infectious diarrhoea). Nutritional supplementation, additional support as food assistance may also be required, and linkages to community based organisations that provide food are very important.

8.4 Psychosocial Support (PSS)

HIV and AIDS impact upon the fundamental human attachments essential to normal family life and child development as well as their ability to participate cooperatively in home and community activities. Diagnosis of HIV infection in a child also has the potential to disrupt the family stability by placing uncertainty over the family's future. Cultural taboos surrounding the discussion of AIDS and death often compound these problems. Children suffer anxiety and fear during the years of parental illness, then grief and trauma with the death of parents/family members. The care of HIV infected child should be comprehensive using a multidisciplinary approach and should be family-centred to strengthen the family's ability to cope with the child's illness and its psychological consequences. Appropriate and adequate PSS should provide care that is suitable for child's age and situation, and recognize that children respond differently to trauma and loss.

The psychosocial needs of children include:

- Care, attention, security, love, nurturing, play, acceptance, a supportive home environment and specific help to overcome their individual problems
- Simple and age-appropriate information about the loss of a loved one
- Someone who is prepared to listen and answer the same question several times
- Reassurance that they will be taken care of and loved.

8.4.1 Psychosocial Assessment

This should explore issues around:

- Child and family's knowledge and reactions to the disease
- Beliefs, attitudes and expectations regarding treatment and outcome
- Coping ability during previous crises
- History of child abuse or molestation
- Family history of depression or any psychiatric illness
- Family history of non-prescribed drug and alcohol use
- Nature and stability of residential and occupational arrangements
- Quality of relationships between members of both nuclear and extended family
- Level of disclosure – parent to child on both status of parent and child
- Socio-economic status of the family
- Socio-cultural factors or religious beliefs that might affect treatment decisions and adaptation
- Sources of emotional and financial support
- Health status of other family members.

8.4.2 Periods of Psychosocial Vulnerability

Psychological stress is heightened at the time of initial diagnosis, during periods of illness and terminally.

a) **At time of diagnosis**: The family's response to the diagnosis of HIV and AIDS in a child includes shock, denial, fear, guilt, disbelief, anger sadness and acceptance. Once the HIV status is accepted,

families experience grief reactions as they mourn the loss of their hopes and dreams for the future, and some family members may develop depression that requires intervention.

b) **During episodes of illness:** Parents struggle with feelings of helplessness, sadness blame and anger. The implications of the disease become an emotional reality at these times.
c) **During terminal illness:** One of the most challenging tasks in the care of the HIV infected child. Parents need assistance to ensure that child receives dignified end-of-life care in the hospital or at home.

8.4.3 Issues to address in Psychosocial Support for the HIV Infected Child

i. ***Issues from the child's perspective:***

- Dealing with chronic ill health, pain, and discomfort
- Being different from others
- Watching a family member battle terminal illness and caring for them
- Bereavement and its consequences
- Asking questions that are not answered or getting evasive answers
- Behavioural problems such as aggression, disruption, and/or restlessness, truancy, depression and withdrawal
- Other problems such as bed-wetting, sleep disturbance and bodily complaints with causes that may be difficult to ascertain.

ii. Issues from caregiver's perspective

In Nigeria, where MTCT is the main mode of HIV transmission in children, the mother who is invariably the primary caregiver is most often HIV infected.

Psychological issues she will need to deal with include:

- Dealing with her own HIV status and/or illness
- Dealing with the child's HIV status and/or illness and the related feelings of guilt, anger and hopelessness
- Deciding on whether or what to disclose to spouse, child, relations, neighbours or school authorities
- Reproductive desires and decisions in the face of HIV
- Time away from work and implications for job security and earnings
- Concern about who will take care of the children after the caregiver's death
- Her own fear for death.

iii. Challenges from healthcare provider's perspective include:

- Not having the knowledge and skills to communicate effectively (including counselling) with children
- Not knowing what information is developmentally appropriate
- Not having the time to develop and nurture a relationship designed to make a child open up
- Not being aware of referral options.

8.5 Education and Vocational Training

Schools provide children with a safe and structured environment, emotional support, supervision of adults, and the opportunity to learn how to interact with other children and develop social networks. Education acts as a 'social vaccine against HIV and AIDS as it delays sexual debut in girls who complete secondary education, and provides opportunities for the children to receive age appropriate HIV prevention messages.

Barriers that limit children's access to education (e.g. mandatory payments for levies, uniforms, books or tuition fees) must be identified and tackled. Special attention should be paid to the vulnerability of girls, by

addressing the disproportionate levels of risk they face when leaving school at an early age to act as caregivers to ailing parents. Formal education should be the priority for all children, except where it will be difficult to reintegrate the child into formal education. However, older children should be provided with vocational trainings.Educational activities must be arranged to cater for the following age ranges/categories:

- 0-5 - early childhood and learning stimulation
- 6-17 - in school for either primary and/or secondary education support
- 15-18 - out of school for vocational skills training support
- Life skills education for all children especially age 10 and above.

8.6 Health Care needs

Adequate access to age appropriate health care services should be ensured. Efforts should be geared towards preventive, promotive, curative and rehabilitative health care services.

8.6.1 Immunizations

The following vaccines are recommended for children: *(See also Table 8.1 for recommended immunization schedule for HIV-exposed and HIV-infected children below)*

- All children should be checked to ensure they are fully vaccinated according to the national schedule
- Asymptomatic children and those suspected to have HIV infection should be given all appropriate vaccines, including BCG, OPV, measles and yellow fever vaccines
- Children with symptomatic HIV infection should not be given live vaccines (BCG, OPV, measles, Yellow fever)
- Asymptomatic HIV-infected infants should be given Measles vaccine twice, at 6 and 9 months.

TABLE 8.1 Recommended Immunization Schedule for HIV-exposed or infected children

Vaccine	Asymptomatic HIV infection	Symptomatic HIV infection	Optimal timing of immunisation
BCG	Yes	No	At birth
DPT	Yes	Yes	6, 10, 14 Weeks
OPV	Yes	No**	0, 6, 10, 14 Weeks
HBV	Yes	Yes	Birth, 6 and 14 weeks
Measles	Yes	No	6, 9 Months
Yellow fever	Yes	No	9 months

NB: *5 doses of TT should be administered to mother as recommended in the national immunization schedule*
** Immunization of OVC against pneumoccocal and H. influenzae infections is recommended*
*** The live (oral) virus polio vaccine should not be given to HIV infected kids because it can cause disease. Inactivated polio vaccine (Intramuscular) is recommended for children with HIV*

8.6.2 Prophylaxis for Opportunistic Infections

a. ***Primary prophylaxis***

This is drug administration before onset of a disease. Due to the high susceptibility of HIV-infected children to infections, primary prophylaxis should be offered to them. In the HIV-exposed or infected child these

include co-trimoxazole preventive therapy (CPT) and isoniazid preventive therapy (IPT). The time to start the prophylaxis against these infections will be determined by:

- Age of the patient
- Time of maximum susceptibility to the infection
- Availability of laboratory support to diagnose the infection.

i. Cotrimoxazole preventive therapy (CPT)

Co-trimoxazole (CTX), a combination of trimethoprim (TMP) and sulphamethoxazole (SMX) is used as prophylaxis against PCP in HIV-exposed and infected children.

CPT lowers the risk of the following diseases

- *Pneumocystis jirovecii* pneumonia (PCP) (formerly called *Pneumocystis carinii* pneumonia)
- Toxoplasmosis
- Isosporidiosis
- *Strep. pneumoniae* infections
- Salmonella species infections.

Criteria for CPT

- All infants delivered to HIV positive mothers, from 6 weeks of age or at first contact if later until the HIV status is known
- HIV-infected infants and children regardless of $CD4^+$ % or clinical symptoms. Continue prophylaxis until they are 5 years of age regardless of symptoms, $CD4^+$ % or good immune response to ART
- Adolescents and children ≥ 5 years with $CD4^+$ count < 350 or Stage 3 or 4 regardless of $CD4^+$ cell count
- Where $CD4^+$ count is not available, WHO Stages 2, 3 and 4.

Cotrimoxazole Regimen

CTX regimen: TMP (150mg/m^2/day) and SMX (750mg/m^2/day) orally once daily. Table 8.3 gives the weight-based dosages.

Table 8.2 Weight-based Dosage in Co-trimoxazole Prophylaxis for Children

Weight of child (kg) Daily dosing	CTX tabs 20mgTMP/100mg SMX Paediatric strength (120mg)[1]	CTX suspension 40mg TMP/200mg SMX/5ml (240mg)[2]	CTX tablet 80mg TMP/480mg SMX regular strength (480mg)	CTX tablet 160mg TMP/800mg SMX double strength (960mg)
1-4	1	2.5 ml	¼	-
5-8	2	5 ml	½	¼
9-16	-	10 ml	1	½
17-50	-	-	2	1
>50	-	-	**2**	**1**

[1]= *use other options for children over 9 kg*

[2] = *use regular or double strength tablet for children over 16 kg*

Side Effects of Co-trimoxazole

Mild:

- Skin rash is most common; usually resolves spontaneously and does not require interruption of therapy.

Severe:

- Neutropaenia
- Anaphylaxis
- Stevens – Johnson Syndrome (blistering rash involving skin, mouth, red eyes)
- Liver failure.

Severe side effects constitute medical emergencies that require that drug be stopped and the child immediately referred to a tertiary hospital.
Alternative drug to CTX: Dapsone at a dose of 2mg/kg daily should be substituted. Care should be taken in G6PD deficient patients.

ii. Isoniazid preventive therapy (IPT)

The following is recommended for the prevention and control of TB among HIV-infected children:

- INH chemoprophylaxis should be started in children who have positive Mantoux test of <5mm result but normal chest radiographs and no other signs of extra-pulmonary TB
- Where Mantoux testing is not available, prophylaxis should be considered for the following categories of children:
  - Household contacts of TB patients
  - Institutionalised children.

Prophylaxis entails a 6 months course of isoniazid for children more than 12 months of age including those previously treated for TB, given at a dose of 10mg/kg/daily (not more than 300mg/day).

b. ***Secondary prophylaxis***

This is used to protect a person who has suffered from an OI, from recurrent episodes of the infection.
Indications:

- Any child with history of PCP and/or toxoplasmosis should continue with prophylaxis of CPT for life
- Post-cryptococcal meningitis should have fluconazole prophylaxis for life.

For patients on primary or secondary prophylaxis, the adverse effects of the drugs should be monitored at each follow-up visit.

c. ***Prophylaxis against malaria***

Although immuno-suppressed children are susceptible to severe forms of malaria, it is not recommended that chemoprophylaxis be given to prevent the disease. These children are also eligible to use Insecticide Treated Nets which should be provided as part of the basic care and support package (basic care kit- see below).

8.7 Home-Based Care and Palliative Care

Any form of care and support given to a chronically sick person in his/her home and community on a day to day basis. The care can either be provided by the family members, neighbors, or others outside the community members. Home based care (HBC) can take the form of medical or nursing care, material and assistance, as well as emotional, social and spiritual support.

Community care or home based care can also be defined as the provision of clinical, psychological, social or financial care for a person living with HIV/AIDS in their home/community setting and building the capacity of the PLWHA, spouse and family to cope with the HIV status.

8.7.1 HBC Providers

There are three or more categories of people involve in HBC:

- The person in need - everything done in HBC is focused on the person in need
- The care giver(s - usually family members: mother, father, wife, husband, children, sister, brother, extended family members. They may be other people around the person in need like the community members who come to do small things to help the person.
- The home based care worker (HBCW) can be a pastoral care worker, a hospital personnel, volunteer from the community, a church member etc.

8.7.2 The Role of the HBC Team

The HBC team should allocate responsibility to:

- Visit people with HIV infection in their homes in order to assess their physical psychological, social, and spiritual needs and to provide for these needs where possible.
- Offer counselling support and education within families and communities
- Provide personal support and promote sustained behavior change.
- Train families and community members to care with compassion while taking care not to be infected.
- Carry out contact tracing
- Refer clients as the need arises.

8.7.3 Expert Clients in Paediatric Care and Support

Expert clients are caregivers of HIV positive children. Expert Clients could be:

- HIV+ women who are currently pregnant or who have previously received PMTCT services
- HIV+ mothers whose children are HIV-ve
- Fathers of HIV+ children
- Adolescents living with HIV
- Caregivers of HIV+ children.

Expert Clients help establish support networks for women living with HIV in the community, increasing awareness and adherence. The addition of EC's to multidisciplinary care teams (MDTs) and home based care can increase uptake of care and treatment services, improve treatment literacy, increase adherence, reduce stigmatization and improve quality of HIV services in Nigeria.

The Role of Expert Clients

It is important to note that expert clients should be considered as official and important components of the health care team, as well as integrative part of home based care. The roles of the expert client should include:

- Serving as active members of the multi-disciplinary care team and as communication link between patients and clinicians
- Providing psychosocial support and education on topics such as HIV basics, ART, adherence, preventing OIs, PMTCT, paediatric HIV testing, safer sex and risk reduction, living positively, nutrition, and disclosure, to patients through group and one-on-one sessions, in coordination with the multi-disciplinary team
- Supporting patients come up with practical strategies for care and medication adherence, dealing with difficult social circumstances, and establishing support networks

- Promoting the family-centred model of care (asking about the patient's family members and encouraging patients to bring them for services)
- Ensuring that women enrolled in PMTCT understand their care plan and receive care as appropriate
- Helping to counsel parents whose children are exposed to HIV to have their children tested
- Providing ongoing counselling to women enrolled in PMTCT through the antenatal, labour and delivery, postnatal, and infant feeding periods
- Assist with clinic duties (weight/height measurement, appointments, etc)
- Assists patients with decision about disclosure and disclosure strategies
- Help patients with hospital HIV clinic flow with a focus on linkages amongst ANC, PMTCT, and ART services
- Keep basic records
- Track and trace patients lost to follow-up through phone calls and home visits
- Create referral linkages between facility and community-based support services
- Work with CBO's and PLWHA groups to organize and run community outreach, education, and HIV/AIDS stigma reduction activities
- Providing counselling on adherence issues
- Support Home Based Care services.

8.7.4 Other Child Health Support Interventions

a. Provision of Basic Care Kits

The following basic care items should be provided to support the domestic needs of children at enrolment into care and periodically during designated times at follow up:

- Long lasting insecticide-treated nets, ITN)
- IEC materials
- ORS and SSS educational materials
- Water vessel
- Water treatment solution
- Disposable Gloves
- Soap
- Condoms.

Additional contents could be provided as part of the basic HBC kit if desired.

a. Provider Home-Based Care Kits

The Provider Home Based Care kit may have contents that will vary depending on the cadre of the HBC provider.

8.7.5 Home Treatment of Common Medical Problems

Table 8.2 shows some common medical problems HIV infected children, their causes and management by the care provider at home.

Table 8.3: Symptoms of common illnesses, causes and their management

Symptoms	Causes	Management
Nausea, vomiting	• Drugs • Gastrointestinal infections • Fever	• Small frequent feeds, fluids between meals • Eat before taking medications, dry foods • Avoid sweet, fatty, salty, or spicy foods
Sore mouth	• Herpes simplex • Aphthous ulcers • Thrush • Gingivitis	• Keep mouth clean; use soft cloth or gauze in clean salt water. • Give clear water after feeds; avoid acidic drinks and hot food • Give pap, sour milk or porridge, crushed ice cubes may help; • Ice cream or yoghurt, if available and affordable.
Chronic Diarrhoea	• Infections • Malabsorption • Malignancies • Drug-related	• Rehydration using ORT • Diet modification (e.g. yoghurt rather than fresh milk) • Micronutrient supplements (zinc, vitamin A)
Persistent Cough	• Infections • Allergy • LIP • Bronchiectasis	Depending on the cause: • Antibiotics • Nebulization with salbutamol/saline for LIP • Physiotherapy
Dermatitis	• Infections and infestations • Hypersensitivity • Malignancies	• Emolients, corticosteroids, anti-histamines • Antiseptics • Keep nails short to minimize trauma from scratching
Convulsions	• Infections and infestations • Encephalopathy • Malignancies • Progressive multifocal leuko-encephalophathy • Metabolic disorders	• Anticonvulsants
Wounds	• Trauma • Infections • Pressure • Malnutrition	• Wound dressing, honey dressing, • Frequent turning and massage of pressure areas • Manage malnutrition

8.7.5 Pain Management

Pain takes on special significance in children because it is very common but often under-diagnosed and under-treated. A rational approach to pain management includes the following:

- Clinical evaluation to elicit potential causes and type of pain
- Classification of the pain into mild, moderate or severe
- Treatment depending on the cause, type and severity
- Reassessment to ensure that optimal pain management is achieved and maintained.

Causes of pain in children with HIV disease include:

- Severe infections
- Spasticity secondary to encephalopathy
- Procedural pain
- Non-organic pain involving parts of the body e.g. abdomen
- Malignancies.

Treatment

- Mild pain: Non-opiods e.g. paracetamol
- Moderate pain: Non-opiods e.g. paracetamol and NSAIDs
- Severe pain: narcotic analgesics like morphine, codeine.

8.7.6 Palliative Care

Palliative Care is an approach to care that improves the quality of life of patients and their families facing the problems associated with a life-threatening illness, through the prevention and relief of suffering by means of early identification, impeccable assessment and treatment of pain and other problems, physical, psychological, social and spiritual.

a) Aims of Palliative Care

Palliative care efforts are aimed at:

- Provision of relief from pain and other distressing symptoms
- Affirming life and regarding dying as a normal process
- Intention neither to hasten or postpone death
- Integration of the psychological and spiritual aspects of patient care
- Offering a support system to:
    - Help the patients live as actively as possible until death
    - Help the family cope during the patient's illness and in their own bereavement
- Utilizing team approach to address needs of patients and their families
- Enhancing quality of life and positively influencing the course of illness.

Palliative care is applicable early in the course of illness in conjunction with other therapies that are intended to prolong life, such as ART, cancer chemotherapy or radiation therapy and includes those investigations needed to better understand and manage distressing clinical complications.

b) Dimensions of Palliative Care

Effective HIV/AIDS palliative care for the patient and family consists of the following dimensions:

- ***Medical/physical aspect:*** includes pain and symptoms management, OI treatment and prevention, ART including monitoring for toxicity, end-of-life care, basic nursing care, and nutritional support

- ***Psychological aspect:*** different mental health and emotions and OI treatment and prevention and ART adherence; support for status disclosure; counseling for coping with stigma and discrimination; bereavement and grief support ; psychiatric manifestations of HIV; and care for caregivers/burnout

- ***Social/legal/ethics/Human Rights aspect:*** Includes support for material sustenance such as food; linkage to appropriate community resources; stigma and discrimination reduction schemes; issues of inheritance; poverty alleviation and income generating activities; rights to care, treatment and support; ensuring confidentiality; informed consent; autonomy; disclosure issues; documentation and management of medical records and decision to forgo therapy

- ***Spiritual:*** entails life review and assessment; and spiritual counseling to address hopes, fears, doubts, guilt and other negative feelings; dealing with issues of forgiveness and life-completion tasks; spiritual counseling for end of life support including life-review, life-closure, grief and bereavement. The mix of care dimensions required by any child and family depends on the phase of illness and its manifestation.

8.8 Adherence Counselling and Support *(see also Chapter 6, ART Adherence for additional information)*
Adherence can be particularly difficult for children and their caretakers. It requires both the commitment of a responsible adult and the involvement of an ill child. The child's developmental stage will influence the extent to which s/he can or will cooperate with medication administration, as will the parent-child relationship. Pediatric formulations are not always suited for administration to infants and young children; they may taste bad or be difficult to swallow. Pediatric antiretroviral regimens are frequently complex, requiring caretakers to measure liquid formulations, crush pills, open capsules, or dissolve tablets in water; doses will change as the child gains weight. Furthermore, children are often tended by more than one caretaker, complicating both administration and assessment of adherence, and provoking disclosure issues.

Special attention to and expertise in child adherence is an essential component of care. ARV treatment for children requires collaboration between the child and caregivers. Key to adherence is education, preparation, monitoring and ongoing support.

8.8.1 Adherence Support
The best approach towards maintaining patients in care will clearly vary from patient to patient and setting to setting. However, there are some approaches that are known to be highly effective:

- The care setting
- Communication
- Patient-provider relationships
- Confidentiality
- Patient education and peer support
- Outreach and follow-up.

a) ***The Care setting***
A welcoming and comfortable environment is an important motivation for patients to remain in care. Not all patients have experience participating in decisions about their health care, and helping patients to become involved may also help them to adhere to their treatment plans. Accessible and co-located services, convenient hours, and reimbursement for transportation costs are all inducements to return.

b) Communication

Establishing good communication with patients builds trust and is essential to effective patient care. It will also help to identify patient problems, needs, and barriers to care. Providers should check to make sure patients understand their explanations and instructions, and should provide both written and verbal instructions. They should encourage patients to share information and let them know that they are being heard. It can be difficult for patients to say what they are thinking or are concerned about. Asking specific questions that promote information-sharing rather than "yes" or "no" answers can make this easier. Restating answers can assure that patients have been understood. And no matter what patients reveal, staff should work to project concern and respect—by what they say, as well as the manner in which they say it.

c) Patient-provider relationship

Patients are more likely to stay in care if they trust their providers, participate in decision making, and understand their care plan. While coordination of care, consistency of staff, and provision of patient education programs are all important, a respectful and supportive environment will also encourage adherence with care.

d) Confidentiality

Confidentiality should be addressed with all patients upon enrollment into any HIV/AIDS care and treatment program. They will need to understand that their participation will be kept confidential and that HIV status will not be disclosed without their approval. However, they should be aware that they may meet individuals from their community who attend the program and who may guess that they are HIV-infected. Patients should be prepared for this eventuality and counseled about the importance of discretion regarding the people they encounter within the program. Patients should also be aware that information they provide to one team member may be shared with the rest of the multidisciplinary team.

e) ***Patient education and peer support***

Patient education has many benefits. For the purposes of this chapter, we stress that a patient who understands his/her illness is more likely to be adherent to care and to treatment and that all patients should have access to verbal, written, and visual information about HIV/AIDS at each visit. Peer support groups and one-on-one peer education are powerful tools for health promotion and adherence support.

f) ***Outreach and follow-up***

As noted, a strong administrative infrastructure is necessary to rapidly identify patients who miss appointments. Planning ahead is a prudent approach and it is important to gather as much contact information about a patient on enrollment as s/he will permit. Contact information should be reviewed and updated periodically, and stored in a secure and locked area.

8.9 Prevention with Positives

A priority health intervention in HIV infected children, especially in adolescents is curbing the spread of HIV infection by ensuring that children get age-appropriate effective HIV prevention messages. This is especially true for programs that target adolescents and older youth. Facilities and services should be child and youth friendly.

8.9.1 Prevention with Positives: Minimum Package

STEP 1. Assess patient adherence to ARVs and other OI medications at every visit.
STEP 2. Assess for signs and symptoms of STIs; screen and treat where indicated.
STEP 3. Assess RH/FP intentions of patient and provide or refer for appropriate services.

STEP 4: Assess risk behaviour, alcohol and other substance use
STEP 5: Provide condoms and lubricants at every visit.

8.10 Support for Orphans and Vulnerable Children (OVC)

8.10.1 Definitions and Context

The *National Plan of Action for Orphans and Vulnerable Children* (NPA) 2006-2010 (Federal Ministry of Women Affairs 2007) defines orphans and vulnerable children (OVC) as follows:

An Orphan: is a child (below the age of 18) who has lost one or both parents irrespective of the cause of death. In the context of this guideline it would be death of one or both parents due to AIDS related illnesses.

A Vulnerable Child: any child whose safety, well-being and development are for various reasons threatened. Vulnerability varies from society to society and is therefore community specific. Vulnerability in the context of HIV and AIDS is indicated in a child who as a result of HIV/AIDS affectation is:

- Infected with HIV
- Living with HIV infected parents but is not infected
- Having inadequate access to educational, health and other social support
- Having a chronically ill parent (regardless of whether parent lives in the same household as the child)
- Living:
  - In a household with terminally or chronically ill parent(s) or caregiver(s)
  - With old/ frail grandparent(s) or caregiver(s)
  - Outside of family care, i.e. lives with extended family, in an institution or on the streets.

The basic essential services identified by the National Plan of Action to be addressed for all OVC include:

- Food and Nutrition
- Psychosocial care and support
- Education and vocational training
- Health care
- Shelter
- Household economic strengthening
- Protection including Legal support.

Children should be involved as active participants in the provision of these within the family setting.

8.11 Protection and Legal Support

All HIV positive children are susceptible to having their rights abused or denied. Supportive care addressing protection issues should include efforts to ensure that a child is safe from any abuse, neglect, stigma, discrimination, or exploitation. Services should confront and minimize the reality of stigma and social neglect faced by the HIV infected child as well as abuse and exploitation (e.g. trafficking, denial of inherited property).

Protection services include: facilitating birth registration and identification documents; preventing children from being in abusive and exploitative situations, and removing children from such situations. *Refer to National OVC Guidelines and Standards of Practice 2007.*

8.11.1 Provision of Shelter

The HIV and AIDS epidemic overloads impoverished communities to the point where many children are left without suitable shelter or care. It is therefore necessary that holistic care for HIV infected children should ensure adequate living environment for the child that is free of abuse, neglect and exploitation. Institutional

care should be the last option as it is neither optimal for child development, sustainable nor cost effective. Efforts should be made to re-integrate HIV infected children back to their families/communities of orientation.

8.11.2 Economic Empowerment

The diminished productive capacity of infected parents/caregivers and increased utilization of cash resources for necessary household purchases in seeking health care, makes families affected by HIV economically unable to cater for their physical and material needs. This has adverse consequences on the growth and development of the children of such families. They should be linked to community-based groups that provide economic/household strengthening services.

The focus of household economic strengthening should be to:

- Build the socio-economic capacity of HIV affected families to support their children
- Establish micro-finance projects that benefit households caring for HIV infected children
- Improve agricultural productivity and efficiency among households with adult members who are ill or have died
- Provide apprenticeships, vocational and life skills training for young people
- Increase access to labour-saving technologies
- Strengthen social safety net to support the elderly and the infirm
- Establish effective community-based mechanism for monitoring the socio-economic security of HIV infected children and their families.

CHAPTER 9
NUTRITION FOR HIV INFECTED AND AFFECTED CHILDREN

9.0 Introduction

Nutrition is an essential component of child survival and optimizing infant and child nutrition is necessary to ensure good health and normal growth/development. Data from the 2008 DHS showed the prevalence of malnutrition as 41% stunting, 23% underweight and 14% wasting in the general population.

Malnutrition is a common condition in HIV infected children, and is a major contributor to morbidity and mortality in this population. HIV infection can result in nutritional deficiencies, growth failure and developmental delay. Malnutrition itself results in decreased immune function and greater susceptibility to infections, thus accelerating disease progression. Malnutrition makes HIV infection worse and HIV infection worsens malnutrition.

Beyond the nutritional needs of the HIV infected child, there is a complex relationship between HIV and AIDS and chronic food insecurity such that HIV affected households have long standing challenges in meeting their food and nutritional needs. HIV infected children deserve special attention because of their additional need to fight infection.

9.1 Goals of Nutritional Management

The ultimate goals of nutritional management are to:

- Provide counselling for optimal child nutrition to caregivers
- Provide nutritional care for children to maintain normal growth and development by:
  - Exclusive breastfeeding to all infants less than 6 months
  - Introduction of complementary foods for all infants beginning at 6 months
  - Continuing breastfeeding till age of 12 months or earlier (if appropriate) for uninfected infants breastfed by HIV infected women
  - Maintaining adequate nutritional support at all times and especially during periods of illness or stress.

The attainment of these goals can be ensured through the use of:

- Monitoring nutritional status, using appropriate growth charts
- Prevention or mitigation of factors associated with risk of malnutrition
- Nutritional support, supplementation and rehabilitation.

9.2 Safety of Infant Feeding in the context of HIV

Breastfeeding is one of the most important child survival strategies but the fact that HIV can be transmitted through breast milk has made infant feeding a complex, challenging and emotional aspect of infant and young child nutrition. However, evidence-based interventions that dramatically decreased the risk of MTCT through breastfeeding have been adopted and are currently recommended in Nigeria. Initiating exclusive breastfeeding from birth with use of ARV interventions and continuing to 12 months of life for has been shown to reduce risk of HIV transmission and avoids the complexities associated with replacement feeding. These interventions further provide support on the relative safety of breastfeeding over other forms of infant feeding, particularly in the first 6 months of life.

It is therefore recommended that health care providers should counsel and support mothers known to be HIV positive to breastfeed their infants and both the mother and her baby must however receive ARV drugs for prophylaxis or treatment as appropriate. This strategy will most likely give infants the greatest chance of

HIV-free survival in Nigeria. However, women who wish to avoid breastfeeding should be counselled and supported in their decision to do so. *(See further details Chapter 11, Prevention of HIV infection).*

9.3 Breastfeeding for infants of women known to be HIV positive

HIV positive mothers whose infants are HIV uninfected or of unknown HIV status should:

- Exclusively breastfeed their infants for the first 6 months of life
- Introduce appropriate complementary foods at 6 months
- Continue to breastfeed till 12 months of life but not beyond
- Receive ARV prophylaxis (or ART as indicated), while the infant also receives prophylactic NVP until 1 week after cessation of all breastfeeding.

HIV positive mothers whose infants are known to be HIV-infected should:

- Be encouraged to exclusively breastfeed for the first 6 months of life and should continue for as long as possible
- Stop breastfeeding only if a nutritionally adequate and safe diet can be provided without breast milk
- Child should be on ART from when HIV diagnosis is confirmed.

9.4 Alternatives to Breastfeeding

For infants less than 6 months of age:

- Replacement feeding (Breast milk Substitutes) with commercial infant formula milk as long as conditions for AFASS are fulfilled
- Home modified milk can be used in exceptional cases.

For children over 6 months of age:

- All children need complementary foods from six months of age
- The food should be sourced locally and prepared appropriately
- Commercial infant formula milk or home-modified full-cream milk as long as home conditions for AFASS are fulfilled and adequate micronutrients could be given
- Meals should be provided at least six times per day.

Conditions needed to safely formula feed

Replacement formula feeding should only be used when it is affordable, feasible, acceptable, sustainable and safe (AFASS). The meanings of these conditions are:

- ***Acceptability:*** mother perceives no problem in replacement feeding – cultural, social, fear of stigma and discrimination
- ***Feasibility:*** mother has adequate time, knowledge, skills, resources and support to correctly mix formula and feed up to 12 times in 24 hours
- ***Affordability:*** mother can pay the cost of replacement feeding without harming the family health and nutrition (with community or health system support if necessary)
- ***Sustainability:*** A guarantee exists for continuous supply of all ingredients needed for safe replacement feeding for up to one year of age or longer
- ***Safety:*** Replacement foods can be correctly and hygienically prepared and fed only by cup and never by feeding bottles.

9.5 Decision to stop breastfeeding by HIV positive women

Mothers known to be HIV-infected who decide to stop breastfeeding at any time should stop gradually within one month. Mothers or infants on ARV prophylaxis should continue prophylaxis for one week after

breastfeeding is fully stopped. At such time of cessation of breastfeeding, their infants should be provided with safe and adequate replacement feeds to enable normal growth and development.

9.6 Introducing Complementary Foods

After the age of 6 months, exclusive breastfeeding no longer provides adequate nutrition for infants and complementary feeds are required in addition to breastfeeding to maintain normal growth and development. The benefits of continuing breastfeeding in this period outweigh the risk of increased mortality due to early weaning, especially in the context of continuing ARV prophylaxis throughout breastfeeding until 12 months of age.

9.7 Growth Monitoring and Nutritional Assessment

Regular and careful assessment of a child's growth helps monitor HIV disease progression, identify complications early and offer the opportunity to intervene. Growth faltering may occur even before the emergence of OIs or other symptoms in almost all infected children. Growth monitoring activities include:

- **History taking:**
  - Feeding history (types and amounts of food taken, frequency of meals, problems with feeding)
  - Potential causes of malnutrition (household food insecurity, change of caregivers, child illness)
  - Assess for any major changes in the child's circumstances.
  - Checking mother's health (+ need for ART) and care of other children.
- Anthropometry**:**
  - Measuring the weight, height or length at every encounter with child and comparing with the age and sex-appropriate WHO Z Score Card *(see Appendix VIIIa and VIIIb)*, with the measurements plotted over time on the WHO sex-appropriate Z Score growth Curves *(see Appendix IXa and Xa: blue and pink coloured for boys and girls respectively).* Regular assessment and documentation of height performed every 3 months is valuable as a measure of linear growth
  - Measurement of mid-upper arm circumference (MUAC) and head (Occipito-frontal; *see Appendix IXb and Xb)* circumferences, also plotted on the appropriate graphs
  - Using the Modified Wellcome Classification (Table 9.1 below) or other growth charts.
- **Physical exam:**
  - Signs and symptoms of malnutrition (weight loss, wasting, oedema)
  - Signs of micronutrient deficiency
- **Laboratory assessment (when available)**
  - Full blood count,
  - May include protein, albumin, lipid levels, etc.

Table 9.1: The Modified Wellcome Classification of Malnutrition *(Hendrickse, 1991)*

Percentage Expected Weight/Age	Oedema	
	Present	Absent
>80	Kwashiorkor	Normal weight
80 – 60	Underweight Kwashiorkor	Underweight
<60	Marasmic Kwashiorkor	Marasmus

9.8 Identifying the Undernourished and Child at Risk of Malnutrition

The health care provider should:

- ***Ask*** the parent/caregiver if:
  - The child is failing to gain weight
  - Child has a poor appetite
  - There are changes in the home or caregiver circumstances that could influence child's care.

- ***Examine*** to ascertain if the child is either:
  - Not gaining weight and his/her growth curve is flattening, or
  - Losing weight and the growth curve is dropping downwards, or
  - Has had weight loss due to some recent illness (e.g. TB, diarrhoea), or
  - Is at risk of becoming undernourished.

- ***Classify*** the child's nutritional status for the purpose of home management or referral to facility for nutritional care and support, as either having:
  - Severe malnutrition (weight loss with Z Score of -2 or -3 below the expected: Table 9.2), OR
  - Moderate (poor or no weight gain); reported weight loss, poor weight gain or static weight and weight for age Z Score of -2: Table 9.2), OR
  - Confirmed weight loss (>5%) since the last visit, OR
  - Normal weight (appropriate for age and sex). Child is gaining weight and height appropriately, and has normal Z scores by age and sex, is following an appropriate growth curve and is in a "food-secure home situation".

9.9 Diagnosis of Severe Malnutrition

The presence of any of the following (also in Table 9.2) in children aged 0-59 months is evidence of severe malnutrition:

- Weight-for-height is at or below -3 Z-Score of the WHO Growth Standards, OR
- Signs of severe visible wasting, **or**
- Bilateral pitting foot oedema is present, **or**
- The MUAC is:
  - <115mm (11.5cm) for child 6 - 59 months of age:
  - <135 mm (13.5cm)in children *5-9 years*
  - <160 mm (16.0cm) in children *10-14 years*

Table 9.2: WHO Diagnostic Criteria for Severe Acute Malnutrition in Children aged 6 – 59 months

Indicator	Measurement	Cut-off
Severe Wasting	Weight-for-height Z score	< -2
Severe Wasting	Mid Upper Arm Circumference	< 11.5cm
Bilateral Pedal Oedema	Clinical examination	

***NB**: MUAC cannot be used for infants <6 months.*

In children 5-14 **years** additional useful criteria include:

- BMI- for- age below -3 Z-score

- Pitting oedema of both feet is present
- Severe wasting.

9.10 Planning Appropriate Nutritional Care

a) Mothers of HIV infected children with mild or no symptoms of malnutrition should be offered age-appropriate nutrition information as part of on-going counselling and support, which should be commenced even in the absence of signs of malnutrition. For children whose growth parameters are within normal limits (appropriate weight and height gain, normal Z Scores for age and sex, following appropriate growth curve and living in a food secure environment), counselling should emphasize:

- Child's requirement of small amount of extra energy - about 10% of normal needs (based on actual weight rather than expected weight for age)
- Need to continue breastfeeding: if mother is well and no risk situation related to breastfeeding
- Need to give complementary feeding or replacement feeding as appropriate (considering the appropriate frequency of meals, amount and type of food per meal)
- Need to encourage and practice responsive feeding; with reinforcement and encouragement of mother/caregiver for good practices
- Feeding child with varieties of diet based on local foods i.e. sources rich in vitamin A, iron, calcium, etc.
- Safety in hygienic food preparation, hygienic food and water storage methods
- Need for personal hygiene (clean hands, utensils and food preparation; separate storage of raw and cooked foods; cooking thoroughly; keeping food at safe temperature; using safe water and food)
- Offering the child additional meals and snacks appropriate for the child's age*:
    - 6-11 months (additional 60-75 kcal = Total ~760 kcal/day)
    - 12-23 months (additional 80-95 kcal = Total ~990 kcal/day)
    - 2-5 years (additional 100-140 kcal = Total ~1390 kcal/day)
    - 6-9 years (additional 130-190 kcal = Total ~1815 kcal/day)
    - 10-14 years (additional 170-230 kcal = Total ~2200 kcal/day)
    - Review every 2-3 months (tell caregiver to return earlier if problems arise).

**See Appendix XIIa for Calorie contents of some common Nigerian foods, and XIIb for how to calculate energy deficits for children based on 24 hour dietary recall.*

b) HIV infected children who are symptomatic but with no or poor weight gain have their energy requirements increased by 20-30% of their actual weight during infections and recovery. These children may need ART and should be referred to a treatment site for evaluation. Nutrition counselling for these should include:

- Their need for additional energy, best given through additional household foods (as part of a nutritionally adequate diet that is frequently varied)
- Their age-appropriate requirement for additional meals and snacks:
    - 6-11 months (additional 120-150 kcal per day)
    - 12 -23 months (additional 160-190 kcal per day)
    - 2–5 years (additional 200-280 kcal per day)
    - 6–9 years (additional 260-380 kcal per day)
    - 10-14 years (additional 340-400 kcal per day).
- Need to administer Zinc supplements: 10mg b.d for 2 weeks for children <6 months and 20mg for children 6 months and above (after episode of diarrhoea)
- Vitamin A supplements every 6 months
- Other multivitamins (as indicated)

- Need for regular de-worming with anti-helminthic (every 6 months)
- Need for close follow up (at interval of 2 to 4 weeks) or more often if necessary
- Need for periodic review to consider changing the nutrition care plan as may be indicated by response or otherwise to a particular plan (when appropriate, e.g. child maintains normal growth).

c). Children with advanced or severe symptomatic HIV disease with moderate malnutrition

- Require supplemental feeds to recover weight gain
- Should also be referred to an ART treatment site for assessment for ART initiation and the exclusion of TB and other OIs
- If eating fairly well plan home/community-based care and prescribe the appropriate feeds
- Should be offered supplementary feeding to provide 20-30% additional calories over and above what is provided through the normal home diet
- Should be assessed to find if there have been any major changes in the child's circumstances
- Should have mother's health checked (including need for ART) plus care of other children.
- Should have vitamin A and anti-helminthics
- Be provided with RUTF (to caregiver to feed child) in adequate quantities until child recovers nutritionally (usually ~4-8 weeks)
- Have a review and change to plan (a.) or (b.) above if recovery occurs.

d). HIV infected children with acute or chronic illness with Severe Malnutrition

These children urgently need **therapeutic feeding** for severe malnutrition:

- Offer up to 50-100% increment on top of their actual weight as extra energy, in form of therapeutic feeding for rehabilitation in hospital or community nutrition rehabilitation centre continued for 4-8 weeks. This should meet the complete nutritional needs through a specifically prepared and formulated diet
- Those with medical complications should be admitted to hospital for medical care including therapeutic feeding
- Children without complication and with fairly good appetite may be admitted to a community-based therapeutic feeding program after a 7 day stabilization phase (see national guidelines on treatment of severe malnutrition)
- During stabilization phase, severely malnourished children should be fed with low protein therapeutic milk called F 75 or the locally available therapeutic food and receives 100 kcal/kg/day e.g. *Kwashipap, Action Meal*
- Feeds should be given in small amount and frequently (every 2 to 3hours)
- After the stabilisation phase, offer F100 therapeutic diet or Ready to use Therapeutic Food (RUTF) e.g. Plumpy nut or available nutritionally equivalent of food/formula; it also provides all the micronutrients required
- If child had a recent diarrhoeal illness, give zinc supplement 20 mg daily for 2-weeks
- If managed in hospital, expect weight gain of ~10-15 g/kg/d
- If managed at home: expect weight gain of ~5-10 g/kg/d.

e). Micronutrient Supplements

All HIV infected children should receive 100% of recommended daily allowances (RDA) of micronutrients in addition to:

- Single dose vitamin A supplementation every 6 months between 6 and 59 months of age, as per the guidelines for uninfected children:
  - <6 months – 50,000IU

- 6–12 months – 100,000 IU
- 12 months – 5 years – 200,000IU

- Zinc supplements if diarrhoeal occurs
  - < 2 years 10 mg b.d. x 14 days
  - >2 years 20 mg b.d x 14 days
  - Iron supplements: 3-6mg/kg/day as required
  - Folate supplements:
  - < 4 months 2.5 mg/day
  - > 4 months 5 mg/day
- Multivitamins, B6, B12,C,E
- De-worming*:*
  - Albendazole oral, 400 mg single dose every 6 months after the first year of life.

9.11 Counselling on Appropriate Feeding

The health care provider should:

1. Assess what foods are locally available in the community and what the family can afford.
2. Discuss with parent/caregiver:
   - The benefits and ways of providing a variety of foods each week
   - The use of variety of foods that could be eaten daily e.g. fish, chicken, milk (cow, goat etc.) and fermented milk, meat or eggs
   - Making the child eat plenty of vegetables and fruits every day
   - The need to offer beans, peas, lentils and soy to child regularly
   - Using salt sparingly in all meals
   - Encouraging the child to eat using a separate plate
   - Encouraging and helping the child to eat with patience
   - Drinking clean and safe water
   - Hygienic storage and preparation of food
   - Washing hands before preparing and eating food
   - Ways of increasing the energy content of foods
   - The importance of making wise decisions so that limited resources are used in the best way
   - Other local resources that may increase access to quality foods, such as garden projects or other community programmes
   - Socio-economic support such as micro credit initiatives
   - Local beliefs and practices regarding complementary feeds, foods for children with HIV and other traditional medicines or treatments.

3. Refer to a nutritionist or a dietician if possible to offer more advice.

4. Check understanding by practical demonstration.

5. Check availability of and refer to local support groups/special follow-up clinics.

9.12 Household Food Security

Household food security describes the means by which a household:

- **Produces or acquires food** throughout the year and use household resources, such as time and money, to obtain this food
- **Stores, processes and preserves the food** to overcome seasonal shortages or improve the quality and safety of their food supply
- **Shares food among the household members** to meet their specific needs.

Assessing household food and income

At every clinic visit, the health worker should check if there have been any major changes in the child's circumstances that might have affected access to food. In these situations, health providers need to be able to respond by:

- Providing skilled nutritional advice to the primary caregiver through the use of locally available foodstuffs and enhancement of skills for agricultural production
- Referral to local income generating support groups e.g. donor supported food security programs or activities of Community Based Organisations (CBOs), Faith-Based Organisations (FBOs) and facility based food banks (where available).

(For further details refer to National Guidelines and SOP for Orphans and Vulnerable Children 2010).

9.13 Maintaining Nutrition during periods of Acute Illness

During acute Illnesses appetite declines while nutritional needs increase. Efforts should therefore be directed towards the following:

a.) **Management of poor appetite:**

- Give the child small, frequent meals, e.g. every 2–3 hours
- Offer food on demand or feels like eating
- Offer foods that the child enjoys most
- On days the child feels well or is eating well, try to give extra meals
- Always assist the child while eating
- Ensure the child has adequate fluid intake including plain water separate from other meals.

b.) Management of nausea and vomiting:

- Encourage the child to chew foods and drink liquids slowly
- Encourage small but frequent feeds to avoid overfilling the stomach
- Avoid cooking smells: prepare food away from the child
- Choose foods that do not have a strong smell
- Try dry foods such as dry bread, toast or plain biscuits and keep meals dry
- Avoid large amounts of gas-containing drinks that can make child feel bloated (e.g. soft drinks)
- Increase starchy foods and reduce fatty foods.

c.) Management of vomiting when taking medications

- If the child vomits within 30 minutes of drug ingestion and the dose or pill fragments appear in the vomitus the dose should be repeated
- Nausea and vomiting may be related to the taste of the medicines. The following suggestions may be helpful to control these symptoms:
  - Take ARVs separately from other medications such as CTX, INH or anti-TBs
  - Do not mix ARV syrups together; if capsules need to be dissolved (e.g. stavudine), reduce the amount of water to use
  - To avoid unpleasant taste, mother or caregiver should carefully place the tip of a syringe containing the medication on the back of tongue
  - Advise caregivers to keep syrups refrigerated to make them more palatable (e.g. ritonavir cannot be refrigerated)
  - Reassure the mother or caregiver that nausea and vomiting are common side effects of ART especially in the first few weeks. The symptoms usually settle, but if she is concerned or the child does not respond within two days she should return to the clinic
  - Advise on use of fluids, ORS and prevention of dehydration.

d.) Management of Diarrhoea:

Diarrhoea can be a side effect of medicines or a symptom of disease. Diarrhoea is often caused by contamination of water or food related to poor hygiene and sanitation. It may also be linked with antiretroviral or antibiotic treatment.

Children with diarrhoea are at risk for becoming dehydrated and the following should be ensured:

- ORS should be used to correct mild and prevent progression to moderate dehydration
- Mothers should be instructed on proper use of ORS during episodes of diarrhoea
- An infant or young child who is unable to drink, breastfeed, is drinking poorly, or blood in the stool, or develops fever, should be seen by a health worker immediately
- Zinc supplements should be routinely administered to any child with diarrhoea (acute, persistent or dysentery) at 10-20mg b. d. for 14 days
- Vitamin A supplements - children should also receive an extra dose of vitamin A if they have **not** received their routine supplement in the previous month. This dose helps protect against serious later relapses of diarrhoea.

e.) Management of Oral sores and Oesophagitis

- If oral thrush is visible or other mouth ulcers are present then specific treatment might be required e.g. oral fluconazole and/or nystatin
- If specific treatment is not available then apply gentian violet (GV)
- Avoid giving any fluids or feeds for 20 minutes after giving oral nystatin or applying GV
- Refer children with sore mouth/mouth ulcers if mother/caregiver says that child is not eating, has lost weight in past week or is clinically dehydrated
- Clean mouth frequently, at least twice a day morning and evening, preferably after every meal. Rinse with slightly salty warm water: use clean boiled water
- Use a mouthwash (1 table spoon of oraldene diluted with 5 table spoon of clean water)
- Mash foods and add sauce or paste to moisten but not to make foods sticky
- Teach and encourage the child to use a straw to drink
- Avoid offering rough dry foods such as toast or raw vegetables
- Avoid very hot or very cold foods, spicy, salty or acidic foods that could irritate the mouth
- Suggest that the child drinks sour/fermented milk or yoghurt
- If mouth ulcers are present, local anaesthetic e.g. lignocaine 1% can be applied with a cotton wool ball onto ulcer. Can be repeated every 3-4 hours or 10 minutes prior to meals.

CHAPTER 10
HIV INFECTION IN ADOLESCENTS

10.0 Introduction

The World Health Organization defined adolescents as individuals aged 10–19 years and young people as those aged 10–24 years. It is a period of transition between childhood and adulthood characterized by major physical, emotional and cognitive changes. Significant changes also occur in the relationships between the adolescent, her/his family members and peers. Although adolescents may be physically and sexually mature, they may not be emotionally and cognitively matured enough to anticipate the undesirable effects of sexual relationships such as unwanted pregnancy and STIs, including HIV and AIDS. The period of adolescence is influenced by factors as illustrated in Figure 10.1 below.

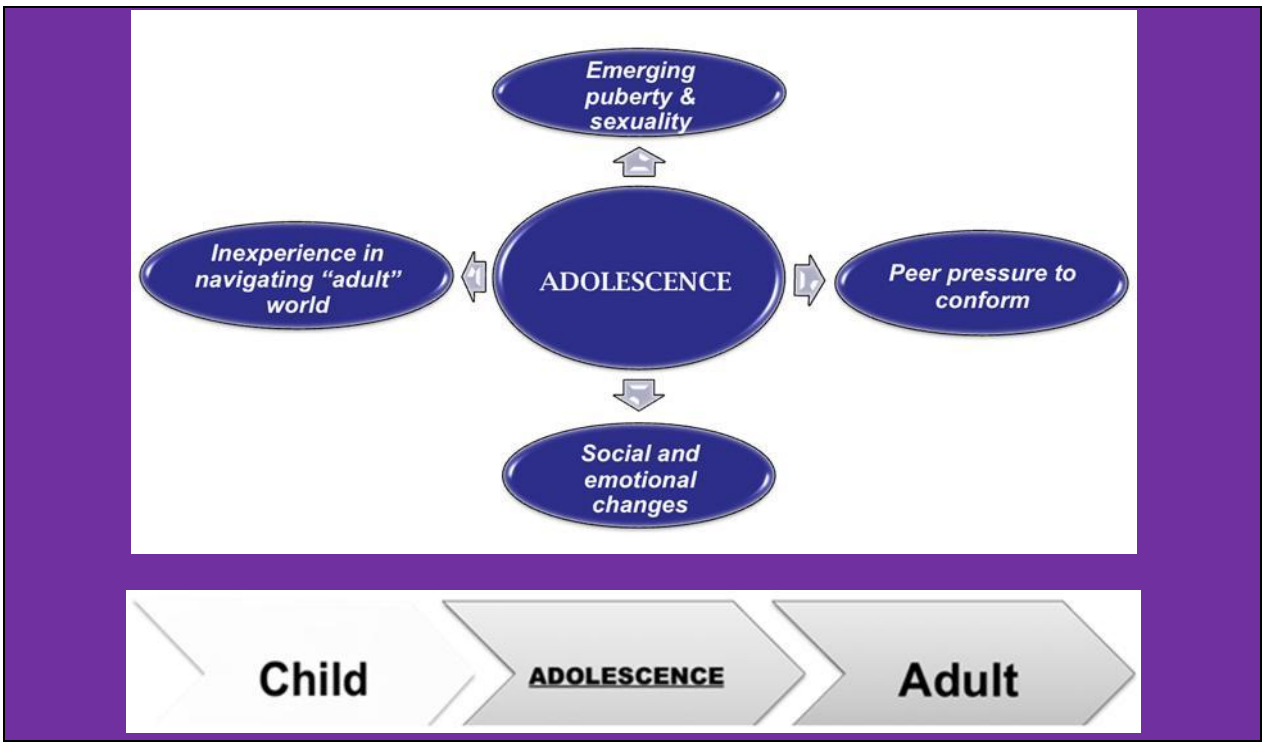


Figure 10.1: Influences on the transition period of adolescence

Adolescents and young people are a special group to consider in HIV control programmes because of the high disease burden among them, their tendency for a care-free attitude, ignorance and high risk behaviour. These include drug and substance abuse, violence, cultism, street life and early sexual exposure which may be casual, unprotected and with multiple sexual partners and they may be culprits or victims of rape.

10.1 Developmental Stages of Adolescence

Adolescents are often grouped into three overlapping developmental age groups: early - 10–15, middle - 14–17 and late adolescence - 16–19 years respectively. The overlap of ages is important because the changes are not fixed and happen at different ages for different adolescents. Table 10.1 below shows these stages in relation to

body and brain growth, cognitive and psycho-social maturity, level of family and peer group relationships and sexuality.

Table 10.1: Developmental Stages of Adolescence

Category of Change	Early 10-16 years	Middle 14-17 years	Late 16-19 years
Physical Growth	• Secondary sexual Characteristics appear • Rapid growth reaches peak	• Secondary sexual Characteristics advance • Growth slows down – reaches 96% of adult growth	• Physically mature
Brain growth (*pre-frontal cortex*)		• Brain growth occurs • Influence on social and problem-solving skills	
Cognition *(ability to get knowledge through different ways of thinking)*	• Uses concrete thinking ("here and now!") • Does not understand how a present action may have a future result	• Thinking can be mor abstract (theoritical) but goes back to concrete thinking under stress • Better understanding of results of own actions • Very self-absorbed	• Most thinking is now abstract • Plans for the future. • Understands how choices and decisions now have an affect on the future
Psychological and social	• Spends time thinking about rapid physical growth and body image (how others see them) • Frequent changes in mood	• Creates their body image • Thinks a lot about impractical or impossible dreams • Feels very powerful • Experiments with sex, drugs, friends, risks	• Plans and follows longterm goals • Usually comfortable with own body image • Understands right from wrong (morally and ethically)
Family relationships	• Struggles with rules about independence/ dependence • Argues and is disobedient	• Argues with people in authority	• Moving from a child–parent/ guardian relationship to a more equal adult-adult relationship
Peer group influence	• Important for their development • Intense friendships with same sex • Contact with opposite sex in groups • Strong peer friendships	• Peer group most important and determines behaviour • Decisions/values less influenced by peers in favour of individual friendships	• Selection of partner based on individual choice rather than what others think
Sexuality	• Self-exploration and evaluation • Preoccupation with romantic fantasy	• Forms stable relationships • Tests how he/she can attract opposite sex • Sexual drives emerging	• Mutual and balanced sexual relations • Plans for the future • More able to manage close and long-term sexual relationships

Adapted from the Orientation Programme on Adolescent Health for Healthcare Providers, WHO, 2003

The first stage, early adolescence, is characterized by separation from family and identification with a peer group. Patterns of healthy behaviour are best established at this time, before health-risk behaviours develop. The second and third (middle and late) stages of adolescence involve moving towards social and economic independence, including exploring livelihood options and secondary education. Staying in school past the primary years involves challenges for those adolescents who must pay fees or help support a family.

Brain development continues in the prefrontal cortex during adolescence and well into early adulthood. This area of the brain contributes to developing social and problem solving skills, regulating emotions and moderating moods. This is why adolescence is an important time to learn life skills. Life skills complement this phase of brain development, and can help adolescents to deal with the emotional changes and other challenges that they are experiencing and help in the transition to adulthood.

10.2 Unique Characteristics of Adolescents and implications for Prevention, Treatment, Care and Support

Adolescence is characterized by unique features that distinguish this stage of life from both childhood and adulthood. These characteristics can have an affect, both positive and negative, on HIV prevention, care, treatment and support for an adolescent living with HIV. Some examples of such characteristic include:

- Being energetic, open or inquisitive – implications here include: interest in information on HIV, open to changes to reduce risks, inquisitive about having sex and other new experiences (e.g. substance use).
- Unruly, inattentive or disobedient – implications here include: missing appointments, being prone to problems with adherence to care and ART, poor attention to their general health.
- Desiring independence – implications here include: taking responsibility, challenging authority, participating in care agreement, being active in self-care, reluctance to listen to health worker.
- Influenced by friends more than family – implications include: peer group can be an important source of HIV care and support (importance and advantages of a well informed peer group).
- Embarrassed to talk with an adult about personal issues and sexuality – implications include: being inattentive or rude.

Adolescents are not a homogeneous group but particularly differ from each other because this is a time of rapid change, and the factors that give rise to this change or the manifestations of the change differ. The differences may be physical, psychological (cognitive and emotional) or social; health workers need to understand these differences taking into consideration the situation of each individual adolescent. Their situation will also vary depending on factors such as age, gender, developmental stage, life circumstances and socioeconomic conditions. Adolescents may have social and sexual interactions with a range of subgroups, and girls in particular may be linked with older partners of unknown HIV status. It is also a period of experimentation, for example drug use.

A full evaluation of the adolescent, including a psychosocial assessment is necessary in the provision of adolescent care. The examples given in Table 10.2 illustrates some differences between adolescents highlighting some of the implications for health workers in terms of providing support and care.

10.3 Adolescent Sexuality **and Risk of HIV Transmission**

Adolescents should not be presumed as being already sexually active or not, but it needs to be recognized that some may already be sexually active. The particular age at which an adolescent becomes sexually active depends on many individual, social and cultural factors. Discussions on sexual behaviour that are appropriate for older adolescents may well be inappropriate for younger adolescents. The implications of this are that the health worker may need to counsel adolescents aged 10–14 years on abstinence and counsel 17-year-olds on safer sex, for example.

Table 10.2: Differences among adolescents and some implications for health workers

Characteristics	Unique Situational Examples
Age	• Minor (e.g. parental/guardian consent may be needed to provide treatment, issues of confidentiality), • Younger or older adolescent (sexually active or not, the need for age-appropriate prevention information)
Stage of development and maturity	Physical and cognitive growth (e.g. whether sexually active, in need of psychosocial and family support, importance of peer group, ability to understand information, understanding consequences of actions, adherence to medication)
Gender differences	Different social and cultural influences on boys and girls that affect how they view themselves and relate to others (e.g. sexuality, contraception, condom use, social acceptance of /tolerance for being sexually active, attitudes to same sex preference)
Married/unmarried	E.g. potential for couple counselling, fertility regulation, consent of partner, other sexual partners
Home situation	Living alone, living with parents/guardians, living on the street, orphan, in school or out of school (e.g. availability of support and care networks, quality and availability of peer support, access to information and services)
Education level	E.g. literacy level, how to explain health issues, future prospects).
Level of information and understanding of risk factors	For sexually transmitted infections (STIs), HIV, injecting drug use (e.g. able to understand risks of behaviour, knowledge and attitudes of peers)
Disposable income	E.g. whether the adolescent has money for health care, basic needs and transport costs for accessing health services
HIV transmission pattern	Acquired HIV perinatally or as an adolescent (e.g. how long they have known (or suspected) that they are HIV-positive, implications for mother, clinical status, timing for entering care, new diagnosis, health-risk behaviours)
Who else knows they are HIV-positive	Can they control issues of disclosure and confidentiality (e.g. support network, prevention, coping with stigma)
Health and stage of HIV disease	E.g. asymptomatic or symptomatic, opportunistic infections, needing treatment)
Personal and family experience of stigma and discrimination	Disclosure, support, fear)

Adolescents need to know that abstinence is the safest way to avoid acquiring or transmitting HIV. They need encouragement and support to delay sexual activity until they are physically and emotionally ready. When they are sexually active, they need appropriate information on safer sex (i.e. condom use) so they can protect themselves and their partners. The Joint United Nations Programme on HIV/AIDS (UNAIDS) has reported that when adolescents are provided with correct information on sex, the information does not encourage them to become sexually active, but instead it may help them make better choices about how and when to become sexually active.

Abstinence may not be possible or acceptable to all adolescents. Adolescents may be forced or coerced into being sexually active, or may be curious about sex and choose to become sexually active earlier than their peers. Some adolescents may change their sexual partners frequently while others may remain with one partner for a long time. Patterns of sexual activity vary, even among adolescents within the same peer group.

Adolescents who acquired HIV perinatally are likely to be younger and may never have been sexually active, while those who acquired HIV during adolescence are probably already sexually active. Each group will have their own concerns and questions.

10.4 Young People Living with HIV

In sub-Saharan Africa up to 3.2 million young people (15-24 years) are infected with HIV. Most of these young people have been infected through heterosexual transmission. Adolescents are vulnerable to HIV for many reasons, including a lack of access to HIV information and prevention services. Differences in prevalence between men and women are most obvious among young people – young women in some countries are more than three times as likely to be infected as young men of the same age. Many adolescents do not believe that HIV is a threat to them, and many do not know how to protect themselves from HIV, or are unable to protect themselves due to forced sex.

It is estimated that only 16% of young people living with HIV know their sero-status; the vast majority do not know their sero-status. Few young people who are engaging in sex know the HIV status of their partners. Asymptomatic adolescents living with HIV are indistinguishable from their peers. They behave similarly and are affected by the same social and cultural forces as their HIV-negative peers. They may engage in safer-sex behaviours or high-risk behaviours, as do HIV-negative adolescents.

Adolescents living with HIV are found in all sectors of society – they may live with their families or on the streets, go to work or school, be sex workers or inject drugs. They may have been tested and known their status, they may suspect that they are HIV-positive and not yet have confirmed their fears with a test, or they may be living with HIV and be completely unaware that they have acquired the virus.

To support individuals living with HIV and prevent further transmission, HIV programmes must focus on offering HIV testing to adolescents; identify adolescents who are already HIV-positive, help them access the services that will keep them healthy, and teach them the skills that will protect them and their partners. Testing can also identify adolescents who are HIV-negative and link them with prevention programmes in order to help them stay negative.

10.5 Adolescents Vulnerability to HIV

Vulnerability to HIV is a measure of an individual's or a community's ability to control their risk of HIV infection. The concept of vulnerability recognizes that there are many factors other than individual choices that influence whether or not someone engages in behaviours that put them at risk of acquiring HIV. Vulnerability increases the likelihood of negative health outcomes. The social and contextual factors that make adolescents

and young people more vulnerable to HIV infection include age and sex, social and cultural norms and value systems about sex, location (where the adolescent lives, learns and earns), economic and educational status, and sexual orientation.

Adolescents who are particularly vulnerable include those who are migrants and refugees, prisoners, in war situations, or who are socially marginalized and discriminated against. HIV itself also increases vulnerability, for example children orphaned by AIDS (many of whom are adolescents) are particularly vulnerable to HIV if they have to resort to sex work to survive. Issues that affect an adolescent's vulnerability to HIV include:

a. Lack of information about HIV

Many adolescents do not know the seriousness of HIV, and do not know how it is acquired or what they can do to protect themselves. Many adolescents do not go to school, and do not have access either to information about HIV, or to opportunities to develop the life skills necessary to turn information into action. Frequently they also do not have access to information materials or services that take their specific needs into consideration.

b. Sex work

UNAIDS has estimated that approximately one million youth worldwide become sex workers each year. In many countries, there are out-of-school youth who are often socially marginalized and exist on the fringes of society, and who are more likely to use psychoactive substances or be forced into commercial sex.

c. Gender

Gender differences in society have a big impact on adolescents' patterns of behaviour. Gender refers to the socially constructed roles, behaviours, activities and attributes that a society considers appropriate for men and women. Gender norms reflect the society's idea about "being" male or female. These are established early in life and depend on cultural and social attitudes, expectations and behaviours. How a society encourages or accepts certain attitudes and behaviours from men/boys and women/girls, may put them at risk of HIV.

d. Orphans

There are many adolescents living with HIV who have the added burden of being orphans. Adolescent orphans require different kinds of assistance than orphans who are still small children; in some ways their needs are more complex because of the physical and psychological development that takes place during puberty, and the steps that they need to take to move towards independence and adulthood. They also often have more demands placed on them to become household caretakers or income earners.

e. Homelessness

It is generally not known how many adolescents who are living on the street are also living with HIV. Studies show that high proportions are at risk of acquiring HIV, because of injecting drug use or unsafe sex, and that adolescents who have acquired HIV perinatally are at increased risk of becoming homeless. The United Nations estimates that there are more than 150 million street children worldwide. Approximately 40% are homeless, either orphaned or abandoned by their families. These young people are at risk for early and unsafe sex, violence and gang activities. Studies show that young people who are homeless are more likely to report a history of sexual abuse.

f. Not in school and school drop-outs

Adolescents not in school and those who drop out prematurely miss crucial educational opportunities. Literacy is one of the keys to making healthy choices. If young people do not have the skills necessary to read an HIV information booklet, they are at a significant disadvantage.

g. Adolescent girls and older sexual partners

A significant age difference between an adolescent girl and her sexual partner is strongly associated with unprotected sexual activity. Older partners bring a sense of importance to young women, particularly those whose self-esteem may be low because of poor school performance or lack of family support. Older partners can provide monetary resources that same-age partners cannot match, which may be considered to be important in a "consumer-oriented society". Older partners also introduce a power imbalance in the relationship that may ultimately slow down the young woman's psychosocial development, introduce her to alcohol and drug-use networks, or expose her to unwanted pregnancy and STIs.

h. Men who have sex with men

In many places, young men who are having sex with men or boys will not want to be known to the health (or any other) services. The discrimination and homophobia, which exists in many societies, can produce a disabling fear of disclosure about same sex relationships. This fear may result in sexual encounters at venues for anonymous social and sexual networking, which can remove the sense of personal responsibility. Young boys may have older sexual partners who bring a sense of importance to young men whose self-esteem may be low and who may be lacking family and peer support, similar to the relationship dynamics in young women noted above, and with similar consequences.

j. Adolescents and sexual abuse

Childhood sexual abuse has been strongly associated with numerous disturbing behavioural and psychological outcomes in adolescents and adults. These include domestic violence, adolescent pregnancy, child abuse, drug and alcohol abuse, bulimia, STIs, depression, prostitution, self-mutilation, running away from home and dropping out of school. A history of sexual abuse, physical abuse or domestic abuse is associated with engaging in risk behaviours for HIV. Childhood sexual abuse is significantly associated with injecting drugs use; exchange of sex for drugs, money or shelter; higher number of sexual partners; and having had a sexual relationship with a person at high risk for HIV.

k. Stigma

The stigma associated with HIV is particularly hard for adolescents, as they are unlikely to have the maturity or experience of adults to cope with the day-today challenges of dealing with discrimination. In addition, during adolescence, acceptance by the peer group is very important. HIV can set individuals apart, and the stigma of HIV can therefore affect the social and emotional development of adolescents. Peer support from other young people living with HIV, through groups and informal connections, can provide a vital source of information and support for the normal and healthy psychosocial development of adolescents living with HIV.

l. Adolescents and human rights

The right to health and development for adolescents needs to be fulfilled and protected for them to take the risks that are important and normal for their development but avoid those that will do them irreparable harm. This includes their rights to information and life skills, to access health services, to a safe and supportive environment, and to participate in decisions that affect their lives. Frequently, these human rights are not fulfilled. HIV flourishes where human rights are not protected.

10.6 Transmission of HIV in Adolescents

Essentially, there are two specific groups of adolescents living with HIV:

- Adolescents who acquired HIV perinatally, during pregnancy, labour and delivery, or postpartum through breastfeeding;

- Adolescents who acquired HIV during adolescence, usually through unprotected sexual intercourse or injecting drug use, or less frequently through blood transfusion or sharing instruments used for tattooing or skin piercing.

a. Adolescents who acquired HIV perinatally

According to estimates by UNAIDS and WHO, more than four million children under the age of 15 years have acquired HIV since the epidemic began. More than 90% of them were infants born to HIV-positive mothers, who acquired the virus before or during birth, or through breastfeeding. Without treatment, HIV infection in children usually quickly progresses to AIDS. Before treatment was available, most HIV-positive children did not survive into adolescence. However, there are now a growing number of adolescents living with HIV, particularly in countries where a paediatric service infrastructure exists and ART has been provided. Many of these adolescents will be living with extended families, but some will have to survive without support, living on the streets surrounded by added risks and challenges. These adolescents are often marginalized and discriminated against, and are especially vulnerable to many health and social problems. In addition, their HIV infection may have caused delayed growth and development, resulting in them looking different from their peers (at a time in their lives when they want and need peer acceptance).

b. Adolescents who acquired HIV during adolescence

Worldwide, sexual transmission (penetrative sex without a condom) is the predominant transmission route for young people acquiring HIV infection. In some regions, injecting drug use is also a major transmission route for young people, because sharing injecting equipment carries a high risk of transmitting HIV. Some young people are particularly vulnerable to HIV. But young people who have unprotected sexual intercourse (vaginal or anal), particularly those who have multiple concurrent partners, and those who inject drugs using shared needles and syringes, are most at risk of HIV. In countries where the predominant mode of transmission is by heterosexual sex, girls are more likely to be infected than boys, for both biological and social reasons. Conversely, in countries where the predominant transmission route is men having sex with men or injecting drug use, boys are more likely to be infected with HIV. Table 10.3 below illustrates some general characteristic features differentiating individuals perinatally infected and those infected later in adolescence.

10.7 Adolescents Seeking HIV and AIDS Care Services

As the HIV pandemic stabilizes in sub-Saharan Africa it is anticipated that there will be an increase in the number of surviving adolescents with HIV attending health centres. This can be attributed to four factors:

1. With successful ART and care, more children with perinatally acquired HIV are surviving into adolescence.
2. More adolescents are being tested for HIV, as a result of factors such as: provider initiated testing, increased awareness, more testing being available, and increasing availability of antiretrovirals (ARVs) providing a reason to be tested.
3. More adolescents who are pregnant are being tested, as services for preventing mother to child transmission (PMTCT) become more widely available.
4. As the stigma of living with HIV lessens and the understanding of HIV increases, more adolescents will come for testing, treatment and care. It is important to plan for this.

In general, people make contact with health services because they feel unwell. Many adolescents living with HIV are in WHO Clinical Stage 1 or 2 and may not yet feel unwell or need treatment, and therefore have no reason to visit the health centre. However, it is important that asymptomatic adolescents living with HIV attend health services, so that they can receive care and support, as well as prevention and treatment education.

Table 10.3: Some general characteristic features differentiating perinatally infected individuals and those infected in adolescence

Differences relating to:	Perinatal HIV Transmission	Adolescent HIV Transmission
AGE	• Younger: early • adolescence	• Older: usually over 15 • years
Physical development	• Delayed: shorter stature	• Normal development
Sexual and reproductive health	• Not yet sexually active • Thinking about sex • Sexual debut	• Sexually active • Need to change risk behaviour(s) • Wanting children
Relationship s/married	• No/maybe • Wanting intimate relationship	• Probably in sexual relationship • May want marriage
Disclosure	• To adolescent, if he/she does not yet know the diagnosis • Peers	• New diagnosis • Disclosure to partner, family, peers • Asymptomatic, which can reinforce denial
Family support	• Orphan • Living with caregivers	• Support depends on disclosure • Few resources (such as money, information, experience)
Antiretroviral therapy	• Yes • Adherence may be a problem as an adolescent, not as a child	• Probably not yet needed • When taking ART: adherence may be a problem
Stigma /"blame" for HIV	• Less likely	• More likely

The HIV transmission pattern can determine how and when an adolescent comes into contact with health services, and is likely to influence their feelings when they visit. Those who acquired HIV perinatally may have been referred from paediatric or adolescent services to adult services. In this case, they are familiar with the health services and may have known their diagnosis for many years. Alternatively, they may not have come into contact with any health services since childhood as they had remained asymptomatic and only recently learnt of their HIV diagnosis.

For those who acquired HIV during adolescence, there are likely to be differences between those who acquired the virus through sexual transmission compared with those who acquired it through other means such as injecting drug use. Whether an adolescent living with HIV visits a health service for care or not depends on a number of factors, some of which are unique to the adolescent, some peculiar to the health workers and/or the structure of the health service and others that relate to stigma associated with HIV.

When health workers are aware of the circumstances of adolescents, they can offer care and support that is appropriate to their needs. Health workers should encourage adolescents to include their family members,

guardians and friends in their care and support. It is important to identify and address potential barriers in the existing health services that could prevent or discourage adolescents from accessing the service so that sustainable access after the initial contact could be guaranteed.

Adolescents living with HIV need support from their peers to help them cope with their diagnosis and to offer practical and appropriate help about living with HIV. Health workers can assist in the training and supervision of peer support workers, and in providing professional backup for peer support workers and peer support groups in the event of situations arising beyond their competency. Peer support workers must be understood to be an extension of the health team and never viewed as a substitute for it. School-based peer support can offer additional support for adolescents still enrolled in schools, and community groups interacting with young people can provide support for young people living on the streets. Youth drop-in centres, often organized by young people themselves, are an excellent support network for both HIV-positive young people and those most-at-risk of HIV.

10.8 Adolescents Newly Diagnosed with HIV

When faced with a new HIV diagnosis, young people, like adults, frequently enter into a period of denial, made easier by the asymptomatic nature of early HIV infection. Denial stops them from seeking health services, thus preventing them from obtaining the care and support they need. It may also allow them to continue behaviours that put them and others at risk. Helping adolescents living with HIV to understand their individual situation, and their role in accepting personal responsibility for stopping continued transmission, is critical to stop the cycle of infection.

Young people need support to process the meaning of HIV infection in their lives because of the peculiarity of their developmental stage. Ensuring that this support is available immediately after they receive an HIV-positive diagnosis is a critically important part of providing adolescent HIV services. This support can be provided through individual or group support involving peers, although in many places peer support may not exist. Health workers should actively encourage and support young people, schools and communities to develop local peer support groups for adolescents living with HIV.

10.9 Adolescent-friendly Health Services

Adolescent-friendly health services (AFHS) should have aims that include:

- Ensuring that existing health services are able to respond effectively to the specific needs of adolescents, given the reality of the available health resources and infrastructure
- Being accessible, acceptable and appropriate for adolescents
- Being in the right place at the right time at the right price (free where necessary) and delivered in a style acceptable to adolescents
- Designed to be equitable by ensuring that they are inclusive and do not discriminate against any group of adolescents living with HIV in terms of sex, ethnicity, religion, disability, social status or for any other reason
- Reaching out to those who are most vulnerable and those who lack services
- Provision of comprehensive services with an essential package including, where appropriate, prevention, care, treatment and support for adolescents living with HIV.

AFHS are more likely to be effective if they are delivered by trained and motivated health workers who are technically competent and who know how to communicate with adolescents without being patronizing or judgemental. These providers need to be backed up by adolescent-friendly support staff and have access to the necessary equipment and supplies. They should also maintain a system of quality improvement so that staff

are supported and motivated to maintain defined standards of care. Finally, the services should record sufficient age-disaggregated information to be able to monitor and improve performance.

The gold standard for AFHS is that they are effective, safe and affordable, and they meet the individual needs of adolescents so that they will return when they need to and recommend the services to friends. However, making services adolescent-friendly is not primarily about setting up separate dedicated services. The greatest benefit comes from improving the existing health services in local communities, and the competencies of all health workers to deal effectively with adolescents. The existing cultural, social, economic and political context and the available resources must be considered in the application of the generic characteristics of AFHS (Table 10.4) in any health service system.

Table 10.4: Characteristics of Adolescent-friendly Health Services

Health Service Component	Role in Adolescent Care
Adolescent-friendly policies	• Fulfil the rights of adolescents • Take into account the special needs of different sections of the adolescent population • Give adequate attention to gender issues • Guarantee privacy and confidentiality • Make provision for services to be free or affordable.
Adolescent-friendly procedures	• Ensure privacy and confidentiality • Short waiting times and consultations with/without appointment.
Adolescent-friendly health workers	• Are trained and supervised to provide services to adolescents.
Adolescent-friendly support staff	• Are understanding and considerate, treating clients with respect, and are competent, motivated and well supported.
Adolescent-friendly health facilities	• Provide a safe environment at a convenient location with an appealing ambience • Provide information in the community to generate demand and community support.
Adolescent involvement	• Means that adolescents are well informed about services and rights, and involved in service assessment and provision.
Community involvement and dialogue	• Promotes the value of health services and encourages parental and community support.
Community based, outreach and peer-to-peer services	• Increase coverage and accessibility
Appropriate and comprehensive services	• Address each adolescent's physical, social and psychological health, and development needs and provide a comprehensive package of health care and referral.
Effective and efficient health services	• Are guided by evidence-based protocols and guidelines. • Utilizes a management information system • Provides information on the costs of resources.

Adapted from the Orientation Programme on Adolescent Health for Health-care Providers (WHO 2003),

10.10 Role of the Health Worker in Adolescent-friendly Health Services

While all th characteristics of AFHS are important, the most critical component of a health-care delivery system that is responsive to the needs of adolescents is the interpersonal relations characteristic of the provider staff. Staff providing care for adolescents should be capable of combining technical skills with sympathetic professional approach that demonstrates respect, patience and non-judgemental attitudes. It is essential that health workers who provide care for adolescents must be keen and committed to the interests of adolescents. The effort must be built into any AFHS system to bridge differences in race, culture and class, and develop competence in fully appreciating the unique challenges facing adolescents. Health workers do not need to abandon their own belief systems or values when faced with an adolescent whose behaviour they find challenging. However, they do need to understand a situation from an adolescent's point of view and not allow their own views or values to dominate the interaction and advice.

Adolescents need health workers who:

- Are technically competent in adolescent-specific areas and offer health promotion, prevention, treatment and care in consideration for each client's maturation and social circumstances;
- Have good interpersonal and communication skills;
- Are well motivated and supported;
- Are non-judgemental, considerate, easy to relate to, trustworthy and ready to devote adequate time to clients;
- Act in the best interests of their clients, while also respecting confidentiality;
- Treat all clients with equal care and respect;
- Provide information and support to enable each adolescent to make the best choices for his/her specific needs.

10.11 Communicating with Adolescents

The health worker's attitudes towards adolescents in general and their manner of communicating with them are crucial. As children transit through adolescence, their parents are still largely responsible for all aspects of their health, and the main communication is often between the health worker and the parent/guardian. By the end of adolescence, health issues will be almost entirely the responsibility of the adolescent. The challenge for the health worker is to maintain an effective and consistent clinical relationship, when the primary responsibility for issues such as adherence shifts from the parents to the adolescent. It may be important to meet adolescents alone, as well as with their parents or guardian.

Health workers need to consider how they will communicate with accompanying adults in a manner that is respectful both to the rights of the adolescent and to their parents/caregivers, who should not be excluded, but it should be made clear to them that the adolescent is the centre of the consultation. This should be done routinely as a way of respecting the adolescent's rights and maintaining their trust.

The points summarized in Table 10.6 below are some key best practices on how to communicate respectfully with adolescent clients. Many of these points apply to successfully communicating with any patient, but some are especially important when communicating with an adolescent patient.

10.12 Adolescent Life skills

An important part of normal adolescent development is learning life skills. Life skills include problem solving, critical thinking, communication, interpersonal skills, resolving conflict and coping with emotions.

Table 10.5: Communicating with Adolescents

"WHAT TO DO"	"WHAT TO AVOID"
• Be truthful about what you know and what you do not know	• Giving inaccurate information (to scare them or to make them "behave")
• Be professional and technically competent	• Threatening to break confidentiality "for their own good"
• Use words and concepts which they can understand and relate to. Assess if they understand • Use pictures and flipcharts to explain	• Giving them only the information that you think they will understand • Using medical terms they will not understand
• Treat them with respect in terms of how you speak and how you act	• Talking down to them, shouting, getting angry, or blaming them
• Give all the information/choices and then help them decide what to do	• Telling them what to do because you know best and they "are young"
• Treat all equally • Be understanding and supportive even if you do not approve of their behaviour	• Being judgemental about their behaviour, showing disapproval, or imposing your own values
• Accept that they may choose to show their individuality in dress or language	• Being critical of their appearance or behaviour, unless it relates to their health or well-being

Health workers cannot teach adolescents the full range of life skills as they neither have the time nor the capacity to do this. But, they should know where life skills are taught in the community, so that they can refer adolescents living with HIV to them and support the programmes. However teaching adolescents life skills that relate to specific health issues (e.g. how to delay sexual debut, how to negotiate safe sex, and how to use male and female condom correctly) is part of the health worker's responsibility. Such skills help adolescents deal with the difficult challenges of being an adolescent and living with HIV.

10.13 Challenges in the Prevention and Support for Adolescents Living with HIV

The special challenges in providing services for prevention, care, treatment and support for adolescents living with HIV are outlined in Table 10.6 below. These challenges depend on the mode of acquisition and course of infection in each adolescent.

10.14 Adolescent Concerns

Adolescents tend to ask questions and pass comments that reflect their common concerns *(see also Table 10.7 below)*. Such concerns are often reflected in questions that may include:

(a) "Will anyone want to have sex with me if they know I am HIV-positive?"

Adolescents need to know that it is possible to enjoy a healthy sexual life while living with HIV. For most people, sexual activity begins during adolescence, and in general sex is an important part of the lives of young people. A positive HIV test will not stop an adolescent's sexual development, so they will need:

- Practical information and support to deal with their questions, concerns and fears about being HIV-positive and having or wanting to have sexual relations.

- Have explanations to address the fear that they will be rejected as a sexual partner (unless they remain silent about their sero-status) may discourage many from disclosing their status. Health workers can help them explore the benefits of revealing their HIV status to selected people.

Table 10.6: Special Challenges in providing Adolescent HIV Prevention, Care, Treatment and Support

Challenges	Adolescents who acquired HIV perinatally *(younger age, in early adolescence)*	Adolescents who acquired HIV during adolescence *(older age: >15 years)*
Beneficial disclosure	• If not yet discussed, disclosure to adolescent • Peers	• Need support to tell chosen family and friends • Will benefit from others knowing so they can get support • Fear of stigma/blame
Positive prevention	• Not yet sexually active • Preparing for sexual activity • Wanting sexual relations and pregnancy in the future	• Already sexually active • Changes in health risk behaviour(s) • Wanting marriage and children • Need life skills, peer support
Consent and confidentiality	• Living with family/guardian • No longer a compliant child • Needs to start taking responsibility for own treatment	• Legal position on age of consent • Concern about confidentiality • Desire for independence and need for support
Developmental delays	• Delays in skeletal growth and puberty	• Normal development
Transition of care	• Paediatric to adolescent	• Adolescent to adult
ART and Adherence	• Choice of regimens • Adherence: no longer a child	• When to begin ART • Choice of regimen • Adherence
Living with a chronic condition	• May be an orphan • Acceptance of the condition may change as the adolescent develops	• New diagnosis • Depression and anger • Lack of experience and resources

Health workers may find it hard to raise and discuss these sensitive issues. However, they should provide accurate and current information on prevention for positives.

- Peer counselling and support from other adolescents living with HIV will help adolescents understand their risks, opportunities and options.
- Couple counselling - should be encouraged, although an individual's situation may make this impossible and the counsellor needs to support the client's decision.
- Promotion of consistent and correct use of male and female condoms - an essential part of counselling. The prospect of using condoms all their life can seem an impossible challenge to some adolescents, so it is important that they understand the implications of not using a condom, for themselves and their partners. Condoms are crucial to slowing the HIV epidemic and important as dual protection (i.e. prevention of STIs including HIV and prevention of unplanned pregnancy.

(b) "Will I be able to have children?"

Like all people, adolescents living with HIV have the right to choose for themselves whether they want to have children or not. To do this they need to have access to sexual and reproductive health information and services, including counselling. This will help them be aware of their reproductive choices and the possible health risks for them and their child. They can then make informed decisions. For this to be possible, sexual and reproductive health services and HIV care services need to be linked.

(c) "Will I die soon?"

Some adolescents may not understand the difference between HIV and AIDS. They may think that a positive test result means they will die soon.

- Health workers should tell them that with earlier detection, effective drug regimes and a healthy lifestyle, it is possible to remain alive and healthy for many years.
- They also need to know that without treatment and good adherence to treatment, they are not likely to live as long as they would with treatment compliance
- Emotional and spiritual support can help alleviate depression, prevent suicidal ideas and the strong emotions associated with living with a chronic and fatal condition

(d) "I am too young to have a chronic disease. My life isn't worth living anymore."

Many adolescents and young people live healthy and productive lives despite being HIV-positive. They need to meet others who are coping well with HIV, so they can understand that it is possible to live positively.

- Learning that one must live with HIV is shocking news at any age. For adolescents it can be hard to imagine how they will live their whole lives with a chronic disease, when they feel that they have only just begun to live. All dreams for relationships, family life and career are overshadowed by the news.
- The health worker plays an important role in providing hope to young people and in helping to develop the perception that life can continue, and be meaningful, even in the presence of HIV infection.
- Health workers should also provide referral to peer support groups. Adolescents living with HIV often understand each other's situation better than anyone else, and are well placed to educate, counsel and advise one another. Around the world, wherever HIV is present, young people living with HIV have established support and advocacy groups and networks. Health workers have a role in encouraging adolescents to begin, or become part of an existing network. Meaningful involvement with networks and groups can give them support and purpose. Increasingly, members of these groups are called on to participate in policy and decision-making forums.
- Health workers need to assess the mental health of adolescents living with HIV to determine if they are depressed or are considering suicide. They should also assess if adolescents are involved with substance use. If so, the adolescent should be referred to mental health or substance use programmes, where these are available, and followed up carefully in terms of their care and adherence.

(e) "I am afraid that people will reject me, shun me or be violent towards me."

Many of those living with, or affected by HIV experience stigma and discrimination. Acts of discrimination can range from inappropriate comments to violence. Support groups can help people cope by giving them practical support and personal expertise in dealing with stigma and discrimination.

- Information and education about HIV can help moderate fears and misconceptions in society about the disease, and hopefully lead to less stigma and discrimination. In places with high rates of HIV, as more people learn their HIV status, being HIV-positive may become less stigmatizing.

- Adolescents will need support and advice on disclosure and on the implications of this disclosure for their future opportunities. HIV can have an enormous impact on access to education and work opportunities.

- Adolescents living with HIV may experience stigma, discrimination and isolation. They may lose friends because they are HIV-positive. They may also be wary of revealing their status to anyone (e.g. sexual partner, peers, family members, school officials) because of the possibility that disclosure may ruin their image, or even their relationship, because of the stigma associated with HIV. Although this may be true for anyone, it may be harder for adolescents who may base their self-worth on what other people think of them. Through counselling, they can be made aware of the benefits of disclosing their HIV status to selected people who can support them to live positively.

(f) "I can't tell anyone that I am HIV-positive."

Many people are fearful of telling family, friends and sexual partners that they are HIV-positive. Friends and family can provide essential support if they know that the adolescent they love is HIV-positive, and if they themselves are adequately informed. If family and friends do not know, they will not understand the physical and emotional changes that they see.

- Adolescents should be encouraged to understand the benefits of revealing their HIV status to family and friends, as they need their support to help them cope with living positively.
- They will also benefit from the support of other young people living with HIV, through peer support and group counselling. However, adolescents will need support to do this, and all concerned must be aware that there may be a risk associated with disclosure of HIV status in unsupportive settings.

(g) "I am afraid you will tell my parents: will you?"

This raises issues of consent to treatment and confidentiality with minors, which are discussed in Section 7.5. Health workers should know what they are obliged to do by law, how existing laws and policies are translated into practice and, if necessary, how they can work with the adolescent to help them understand the value of engaging parents and guardians in their long-term care.

(h) "How was I born with HIV?"

Adolescents with perinatally acquired HIV may feel anger and resentment towards their mothers and/or fathers, and blame them for transmitting HIV (and to complicate things, the parents may also blame themselves). Health workers can advise parents or guardians that the outcome is likely to be better if these issues are raised and discussed when the child is still young, using plain language and with an absence of blame.

10.15 Beneficial disclosure

All people living with HIV need support to cope with living positively. Support from family and close friends can be particularly important for adolescents who may lack the maturity, experience or resources to cope with their diagnosis by themselves. They will only be able to access this support if trusted family members and close friends know their HIV status. Having people who know their HIV status, and who can support them to live positively and help them to cope with their diagnosis, is an essential part of positive prevention. This support is likely to be especially important for adolescents living with HIV.

Counselling can help them understand the benefits of disclosing their HIV status. They may be reluctant to tell anyone, and often need help to think this through, and to practice, using role play for example, how to tell trusted people who can provide support, and how to deal with negative responses if these arise. They can also

benefit from joining peer support groups and sharing experiences with other adolescents who have disclosed to parents and/or friends.

Table 10.7: Adolescent Concerns and Responsive Health Worker Responses

Adolescent Concerns and Responsive Health Worker Responses
1. Adolescents living with HIV have many concerns and questions that relate to: • Acceptance of their diagnosis • Disclosure of their diagnosis • Feelings of isolation and stress • Coping With HIV in addition to the normal challenges of adolescence. 2. The health worker should: • Listen carefully to their questions and answer them respectfully • Provide them with support and appropriate information • Assist them to access existing sources of support through linkages and referrals • Encourage them to learn life skills that will help them live positively • Help set up new support groups and services.

However, health workers need to be aware that there is a risk for adolescents in disclosing their HIV status in an unsupportive setting, in particular for young women who are married and who may be at risk of domestic violence. Adolescents also need to consider how revealing their HIV status can impact their future opportunities for training and employment.

10.16 Positive Prevention

Prevention by HIV-positive young people includes all strategies that increase their self-esteem, motivation and confidence, with the aim of protecting their own health and avoiding transmission of HIV to others, or becoming re-infected. There are three key components to positive prevention:

1. Healthy living
2. Healthy sexual activity, and
3. Involvement of people living with HIV.

People who are living with HIV do not lose their desire to have sex and have children. Health workers need to provide clear information and respond frankly to the sexual and reproductive health needs of adolescents living with HIV.

Peer support groups can help adolescents to access practical and appropriate information on living with HIV, and provide them with the support that they need to live positively. Health workers have a role in helping to start new peer support groups, and in training and supporting existing groups.

There are many social and cultural factors that influence whether adolescents use condoms; it is not just non-availability or lack of knowledge that prevents their use. Studies show that young people assess a potential partner's disease risk, and the need to use a condom, by their appearance and how well they know them socially. Health workers need to address this during condom counselling, as well as help adolescents learn and practice using a condom correctly and developing condom negotiation skills.

Age difference (of more than five years) between adolescent girls and their older sexual partners is significantly associated with unprotected sexual activity. Health workers should reinforce the importance of correct and consistent condom use during every sexual encounter.

Adolescents may enter health services with poor self-esteem and no belief that they will be able to master the skills that will be required to stay healthy. It is important that adolescents have the opportunity to learn how to discuss prevention behaviour, such as abstinence, sex and condom use, through interaction with health workers or through discussions in peer groups.

Prevention is especially important for adolescents living with HIV who are using psychoactive substances. Adolescents need counselling to help them understand that drinking alcohol increases the risk of unplanned and unprotected sex, and that injecting drugs carries a high risk of HIV transmission, unless sterile needles and syringes are used every time. Adolescent injectors need access to harm reduction programmes, including needle–syringe programmes, opioid substitution therapy and counselling, and information on safer sex.

During adolescence, nutrition patterns can change and become chaotic. As adolescents begin to make more independent decisions about the food they eat, and are influenced by their peers and advertising, the quality and regularity of their eating can result in a poor diet. This can be the same for adolescents living with HIV. The health worker should be aware of this, and should regularly make a nutritional assessment and provide guidance on good nutrition.

Prevention by HIV-positive adolescents requires the meaningful involvement of adolescents living with HIV in the planning and implementing of HIV strategies and policies.

Health workers need to consider that the two groups of adolescents (those that are perinatally infected and those that acquire HIV during adolescence) may have different concerns about sex and HIV. Health workers must be respectful, not assume that the adolescent is or not sexually active, and ask the adolescent's permission to talk about these sensitive issues.

Adolescents with perinatally acquired HIV may not yet be sexually active but may be planning to be, or have questions related to having sex. The health worker may not know if a particular adolescent is or is not sexually active. Many adolescents say that their first sexual experience is unplanned, so it is important to talk with the adolescent about sex and condom use before that first sexual encounter, if this is possible.

They should be informed that everyone has the right to refuse unwanted sexual advances. They may need support and assistance on how to negotiate and say "no" to unwanted sex. They should also be informed that if they are uncomfortable with the sexual attention of another person they have a right to refuse any advances from them.

Adolescents who acquired HIV during adolescence may already be sexually active and are now considering the implications of the diagnosis on their sexual activity. Health workers must be prepared to discuss sexual and reproductive health options with adolescents.

(for more information on positive prevention for all people living with HIV, including adolescents, refer to (a.) *Section 11 of the IMAI-IMCI Basic HIV care with ART and prevention guidelinece;* (b.) *WHO Reproductive choices and family planning for people living with HIV: Counselling tool).*

It is important that health workers discuss the following points (Table 10.8) with adolescents when talking about sex.

Table 10.8: Discussion Points on Sexuality for Adolescents Living with HIV

Discussion points on Adolescent Sexuality
1. Do not feel rushed into having sex. 2. If you have not yet had sex, consider delaying it. Do not begin a sexual relationship until you are ready. Talk together and agree on the limits of your physical intimacy. 3. If you are with a new partner, find other safer ways of giving each other pleasure until you are ready to have sex in this relationship. Enjoy other activities together. 4. When you have sex, use a condom correctly every time, even if your partner is also HIV-positive. Condoms prevent HIV transmission and also prevent unplanned pregnancy. 5. Drinking alcohol and substance use increase the risk of unplanned and unprotected sex. 6. Avoid situations or people that may put you at risk of unwanted sex. 7. Reduce the number of people with whom you have sex. **8.** Consider disclosing to trusted people that you are living with HIV, so that they can support you.

1. Condom Use

The major transmission route for HIV globally is sexual intercourse. Abstinence and condoms are the only dependable ways of avoiding sexual transmission of HIV during penetrative sex. For sexually active adolescents living with HIV, condoms are the surest way to prevent the transmission of HIV and other sexually transmitted diseases to sexual partners and loved ones (apart from secondary abstinence). When used correctly and consistently, condoms provide an effective barrier, blocking the pathway of HIV by preventing the exchange of body fluids during sexual activity. Condoms also prevent unplanned pregnancy.

Many young people report consistent condom use with casual sexual partners, but often do not use a condom with steady partners. Factors influencing condom use include risk perception, social support and accessibility. Risk perception (whether the adolescent thinks that their behaviour puts them at risk of a negative outcome) is difficult to change in adolescents. Accessibility to condoms is more easily changed than attitudes towards condoms. Use of condoms is higher in countries where condoms are easily available in youth friendly establishments than in countries with limited condom availability.

Many adolescents, despite having adequate knowledge about HIV transmission, do not have the negotiating skills to demand condom use, and may be placed at risk of acquiring or transmitting HIV despite their best intentions. They may feel embarrassed or fearful to demand or insist on condom use with their partner. If they say that they do not like using condoms, the health worker should ask them their reasons for not liking condoms (e.g. smell, sensation) and ask them to seriously consider the consequences of not using them (e.g. HIV transmission, STIs, pregnancy).

Adolescents need information on the importance of using a condom correctly every time they have penetrative sex, on how to negotiate condom use, and on how to use a condom correctly. They need this information in words that they can understand and to which they can relate, they need a demonstration and they need an opportunity to practice. They also need easy access to condoms from a source that is reliable and adolescent friendly.

Health workers should encourage adolescents living with HIV to return for counselling with their sexual partner. Couple counselling can strengthen the support for the individual who is living with HIV, reinforce

prevention for positives and help avoid the situation where the partner who receives a positive test result is blamed for the result. It is also an opportunity to discuss condom use and, in discordant couples, to provide support to the HIV-negative partner to cope with the situation. However, it is also important to recognize that there are situations when couple counselling is not possible.

2. Confidentiality

The General Comment on Adolescent Health and Development within the context of the United Nations Convention on the Rights of the Child (CRC) states that:

> "In order to promote the health and development of adolescents, States parties are also encouraged to respect strictly their right to privacy and confidentiality, including with respect to advice and counselling on health matters (art. 16). Health-care providers have an obligation to keep confidential medical information concerning adolescents, bearing in mind the basic principles of the Convention. Such information may only be disclosed with the consent of the adolescent, or in the same situations applying to the violation of an adult's confidentiality. Adolescents deemed mature enough to receive counselling without the presence of a parent or other person are entitled to privacy and may request confidential services, including treatment".

This applies equally to adolescents living with HIV. Unfortunately, confidentiality for adolescents is not always respected. Maintaining confidentiality is an essential skill for all health workers (and other clinic staff) and should be addressed in training. In general, people are entitled to expect that health workers will not disclose information about them to other people. However, adolescents can face many legal and informal restrictions to accessing confidential healthcare, including testing and counselling for HIV.

The importance of preserving confidentiality is greatly influenced by culture. However, an adolescent who has shown the initiative to seek out services for HIV prevention, care and treatment should have their confidentiality respected. A reputation for being an "adolescent-friendly" service will develop only when clients trust the service. Unfortunately, many adolescents do not seek care because they do not think that the services will treat information about them in a confidential way.

3. Privacy

Privacy is primarily about a person's entitlement to limit access by others to aspects of their lives that they do not wish to share with others. Privacy is connected with confidentiality. Concerns by adolescents about privacy can prevent them from accessing health services, can affect which health centre adolescents visit and can influence whether or not they communicate openly with health workers. All health facilities should have a space where adolescents can be assured of privacy in their interactions with health workers. This may be particularly important for adolescents living with HIV.

10.17 Treatment and care for Adolescents Living with HIV

Clinical status when entering care

The HIV transmission pattern of the two groups of adolescents living with HIV (those who acquire HIV perinatally and those who acquire HIV during adolescence) is an important factor in determining:

- When the adolescent enters clinical care
- Their clinical status when they enter care
- The health problems which they present with when they enter care.

The health problems that adolescents with HIV may have when they present for care also depend on:

- Their general health

- Their nutrition
- The socioeconomic conditions in which they live
- Other infectious diseases prevalent in their community (e.g. tuberculosis, STIs).

Adolescents with perinatally acquired HIV are likely to have been receiving treatment and care from an early age. However, those who acquired HIV as adolescents are likely to visit the health centre either because they are unwell and experiencing the symptoms of immune dysfunction, or because they have been referred or have concerns following a positive HIV test, in which case they may still be asymptomatic.

10.17.1 Perinatally acquired HIV

Adolescents who acquired HIV perinatally are emerging in increasing numbers where paediatric services exist and ART for children has been rolled out. As treatment becomes more widely available there will be a steady growth in numbers of those surviving into adolescence.

Regarding the clinical presentation and status when entering care:

- They may present with delays in growth and sexual maturation, which may also have an impact on their psychosocial development.
- They may have begun ART during early childhood because of rapid progression of HIV disease, and may have experienced various ARV regimens by the time they reach adolescence.

A small number of "slow progressors" who are born with HIV will remain asymptomatic and survive to adolescence without any treatment, although they are likely to experience developmental delays.

10.17.2 HIV acquired during adolescence

Those who acquire HIV as adolescents are generally asymptomatic for many years following infection, and many may remain unaware of their HIV status. They visit health services for problems common to their age group, although these problems may have been occurring more frequently or more severely than expected for example respiratory tract infections.

Regarding their clinical presentation and status when entering care:

- The infection can remain asymptomatic for a longer period of time in adolescents than in adults. There appears to be an inverse correlation between age at infection and the length of the asymptomatic period (i.e. the younger the age at infection after puberty, the longer the virus remains asymptomatic). Studies suggest that HIV-positive adolescents have a greater immunologic reserve than adults. There may also be comparatively more capacity in adolescents than in adults to expand or regenerate immune cells.
- Those who acquired HIV as adolescents usually enter care without symptoms. They are more likely to be in WHO Clinical Stage 1 or 2, not requiring ART but requiring prevention, care, support and preparation for future treatment.

10.18 Transition of Care

Adolescents who acquired HIV perinatally will usually have attended paediatric clinics for many years. These clinics may not be able to provide care for them after they reach a certain age, and this transition from the care with which they are familiar to an adult care setting may be a difficult time for an adolescent. There are differences between paediatric and adult care models, and in resource-poor settings there are few health facilities that are set up specifically to serve adolescents living with HIV. However, it is possible for adolescents to receive adolescent-friendly services within adult or paediatric clinics. The success of such services depends on the attitudes of health workers towards adolescents, their understanding of adolescents' special needs and the organization of the clinic.

Table 10.9: Differences in Adolescent HIV Care Models: Paediatric vs. Adolescent vs. Adult

PAEDIATRIC	ADOLESCENT	ADULT
• Family-centred medical model of care with paediatric expertise • Health worker has a more long-standing relationship with parent/guardian • HIV care integrated into primary care approach • May or may not address issues of HIV disclosure to child • Parent or guardian usually available for right to consent.	• Adolescent-centred and multidisciplinary care; • HIV care integrated into primary care approach; • Adolescent is the client and may choose whether to disclose HIV status to family; • Issues of confidentiality and consent are addressed if the patient is still legally a minor; • Care should be offered in an adolescent-friendly setting; • Comprehensive adolescent services available (including STI diagnosis and treatment, reproductive health and family planning); • Frequent contact and networking with adolescent peers at the clinic.	• Adult-oriented care based on medical model; • Adolescent's transitional issues will usually not be given any systematic specialized focus; • Clinics tend to be large and it is easy for transitioning patients to "slip through the cracks" unless very motivated health workers are involved.

Frequently, adolescents receive their HIV care, support, treatment and prevention through either paediatric services or adult services.

10.18.1 Transition from Paediatric Care

The following points can assist health workers in planning a successful transition from paediatric to adolescent care:

1. Discuss future transition of care early: during childhood and as the young person grows up.
2. Acknowledge the issues and concerns of adolescent patients and their parents, guardians and caregivers.
3. Identify colleagues who have an interest in adolescents and young adults.
4. Select a health worker who can supervise the transfer and provide continuity of care.
5. Organize a meeting when the adolescent can meet with the new health-care team and visit the clinic.
6. Secure a follow-up plan.
7. Identify other adolescents already in the new clinic who can provide support.

Key points on transition of care:

- Adolescents may not feel comfortable visiting either paediatric or adult clinics. There are few places where adolescent specific HIV clinics are available. However, it is possible for adolescents to receive adolescent-friendly services within adult or paediatric clinics, depending on the attitudes of health workers towards adolescents, their understanding of adolescents' special needs and the organization of the clinic.
- HIV-positive adolescents who were infected perinatally need adequate preparation and support from health workers while transitioning from the paediatric clinic to the adolescent or adult clinic.

10.19 Antiretroviral Therapy

10.19.1 Initiating ART

As with all other age groups, there are seven requirements for initiating ART for the adolescent:

1. Confirmation of HIV infection (laboratory) with written documentation
2. Medical eligibility by clinical and laboratory evaluation
3. Fulfilling the criteria for commencement of ART at the first-level facility
4. Treatment/stabilization of any identifiable opportunistic infection
5. Readiness of client for ART (issues of caregiver, adherence, etc)
6. Supportive clinical team prepared for chronic care
7. Reliable drug supply.

(*Source: IMAI-IMCI Basic HIV care with ART and prevention, 8.1, pages H25-26*).

It is also important to review previous prescriptions and the adolescent's adherence record as a way of identifying personal strengths or weaknesses. The health worker needs to become aware of the circumstances of an adolescent's life and discuss which regimen could provide the "best fit", based on dosage requirements and the side effects profile.

When the health worker and the adolescent have decided to start therapy, a period of actual drug-taking skills-building begins. The adolescent can try tasting the agents in the proposed regimen first and be advised on how to mask the flavour. Some adolescents may need training to learn how to swallow the larger pill sizes of some medications. Letting the adolescent try a "surrogate pill regimen" made up of pills or tablets, such as calcium carbonate, can help the adolescent determine the specific difficulties involved in the real regimen. The surrogate pill regimen should contain the same number of pills and in the same schedule, with the same provisions (e.g. refrigeration) as the ARV regimen will require. During this trial period, the adolescent can keep a journal to identify the specific difficulties encountered.

Special calendars and pillboxes may be used as reminders for pill taking. For adolescents needing more support, a treatment supporter or family member can provide the necessary encouragement.

10.19.2 Dosing and choice of ARV regimen

WHO recommends using the Tanner staging to determine the adolescent's physical maturity when deciding whether he/she should receive an adult or paediatric ARV regimen and dosage. The Tanner staging (see Appendix Xia and XIb) outlines stages of physical genital growth and development in adolescence. The stages are based on observing the development of breasts in girls, development of genitalia in boys, and the growth of pubic hair in both sexes. Adolescents who are at Tanner scales 1, 2 and 3 are pre-pubertal, and should be treated with paediatric doses of ARVs. These patients require careful monitoring because this is the time of hormonal changes associated with the growth spurt. Adolescents who are at Tanner scales 4 and 5 are post-pubertal (considered to be adults), and should be treated with an adult ARV dose, with the same recommendations and special considerations that apply to adults.

Adolescents with perinatally acquired HIV may have delayed development and stunting or wasting caused by progressive HIV illness, frequently exacerbated by malnutrition. For this reason Tanner staging, rather than only weight or height, should be used to determine whether to follow adult or paediatric ARV treatment guidelines.

In choosing an appropriate regimen, there is a need to go beyond considering maturity; simplification and anticipated long-term adherence are additional important criteria for selecting an appropriate first-line regimen

for adolescents. Support from peers and family are especially important for adolescents who are beginning this lifelong treatment.

The following key issues must be recalled while considering the use of ARVs in adolescents:

- Efavirenz should not be used in adolescent girls who are at risk of pregnancy (i.e. sexually active and not using adequate contraception) or in the first trimester of pregnancy
- Symptomatic NVP-associated hepatic or serious rash toxicity, while uncommon, is more frequent in females than males, and is more likely seen in ARV-naïve females with higher absolute CD4 counts (>250 cells/mm^3). NVP should therefore be used with caution in adolescent girls with absolute CD4 counts between 250 and 350 cells/mm^3. If used in such adolescent girls, careful monitoring is needed during the first 12 weeks of therapy, preferably including liver enzyme monitoring
- In situations where it is decided that both EFV and NVP should not be included in the first-line regimens for adolescent girls, the use of a triple nucleoside reverse transcriptase inhibitor regimen may be indicated
- Tenofovir is not approved for use in individuals under the age of 12 years due to potential to cause skeletal growth problems.

10.19.3 Challenges in Adherence to ART

Adherence to ART is important for adolescents living with HIV, but there are certain unique challenges in maintaining adherence. Some of these relate to the adolescent (individual characteristics, including their stage of development) while others relate to their environment (family, peers and community). The discipline of taking ARVs in the way that they are prescribed every single day represents a profound behaviour change for adolescents.

Adverse drug reactions or side effects of ARVs may cause adolescents to stop taking the drugs. These types of temporary failures can have an intense and disproportionate affect on adolescents' sense of self-confidence. The healthcare team needs to help adolescents understand that they have actually learned a great deal from the experience, and can benefit from the experience in being more successful next time.

Adolescents often report that their treatment interferes with their lifestyle. Similarly, changes in daily routines or spontaneous changes in their activities may interfere with the routine for taking ARVs. They need assistance in understanding and planning for these changes to avoid adherence problems.
Table 10.9 below gives an overview of factors that could influence adherence from the perspective of the adolescents and their environment.

10.20 Living with HIV as a Chronic Condition

Health workers often find that young people who have been managing well with a chronic condition (such as diabetes, asthma or haematological conditions such as sickle cell anaemia) in childhood, when they were more compliant and under the care of their parents, become "out of control" during adolescence. It can be the same for children who acquired HIV perinatally; when they reach adolescence their adherence to care and treatment can deteriorate. As with any chronic condition, HIV may also continue to influence the adolescent's development, for example their growth and pubertal changes, and their psychological development and socialization processes. This can affect the course and management of their condition, resulting in poor drug adherence, poor nutrition and an increase in health-related risk behaviours. Adolescents who have recently acquired HIV have the challenge of coping with both their new HIV diagnosis and the normal developmental challenges of adolescence. The management of any chronic condition during adolescence constitutes a major challenge for the individual, their family and the health-care team.

Table 10.10: Factors that Influence adherence to ART for adolescents living with HIV

	Factors that Improve Adherence	Factors that Contribute to Non-adherence
The adolescent *(individual characteristics and stage of development)*	• **A**ccess to information that corresponds to the adolescent's maturational stage; • **T**reatment tailored to the adolescent's stage of development; • **I**nformation communicated in a straightforward way; • **A** relationship of trust and respect with health workers; • ART adapted to the adolescent's lifestyle (e.g. will the adolescent take medication at school?); • **A**dolescents involved with and consulted on changes in treatment (therapeutic alliance).	• Cognitive development (inability to understand the consequences of their actions) • Not understanding HIV or the medications and regimens • Inclined to live in the present rather than plan the future • Desiring their independence, feeling rebellious • No disclosure, coping alone with the burden of HIV • Influenced by their HIV-negative peers, and wanting to be like them.
The adolescents' environment *(family, peers, health services, community)*	• Support of siblings, parents/guardians, peers, support group, treatment supporter; • Consistent care and support from a range of sources over time; • Regular assessment for side effects and adherence in an appropriate manner; • Simplified therapeutic regimen; • Access to support groups led by peers who have successfully implemented and adhered to ART themselves.	• How the family functions • Peer influence • No treatment supporter • Unsupportive or unsafe environment where they live • Poor relationship with the health-care team; feel they are being "told what to do" • Complex treatment regimen • Treatment interferes with adolescent's needs and lifestyle.

10.21 The 5 "A"s for Care of Adolescents Living with HIV

The **5 "A"s** (**A**ssess, **A**dvise, **A**gree, **A**ssist, **A**rrange) are a key part of good chronic care. They are a series of steps used in the approach to chronic HIV care with ART, to guide health workers at each consultation. Here the 5 "A"s are presented with a particular focus on issues that are important for an adolescent patient living with HIV. It is important to understand what is legally required of the health worker in terms of informed consent, bearing in mind the best interests of the adolescent and their evolving capacities.

When providing treatment, care, support and prevention for adolescents, use of appropriate language and attitudes facilitates effective service delivery. The preliminary approach before application of the steps is to assure the adolescent client of confidentiality.

- **ASSES the adolescent's**
  - Goals for the consultation: they may be different from those of the health worker

- Physical and mental status, understanding that HIV may progress more slowly in adolescents than in adults.
- Current treatments and adherence
- Sexual activity - whether sexually active or not (or planning to become sexually active), and whether they are using condoms and/or other contraception.
- For the possibility of pregnancy for young women
- For other risk behaviours/factors for HIV transmission (e.g. injecting drug use, alcohol use, orphan, sex worker).
- For knowledge, beliefs, concerns, and daily behaviours related to HIV.
- Existing support structures/systems and who knows about their HIV status (e.g. partner, family, friends).

- **ADVISE**
  - Using plain, neutral and non-judgemental attitudes and language
  - To Include parents or guardians in discussions, if the adolescent is agreeable
  - To correct any inaccurate knowledge and fill gaps in the adolescent's understanding of his/her condition
  - On the implications of being young and living with HIV (relationships, sex, alcohol/drug use).
  - On appropriate sexual activity, condom use, contraception and other aspects of positive prevention.
  - And discuss couple counselling and the benefits of disclosing HIV status to chosen people, in order to develop support structures
  - On peer support from other adolescents living with HIV
  - On adherence

If developing a treatment plan give further advise on:

- Options available to the adolescent (risk reduction, positive prevention, prophylaxis and treatment).
- On the simplest regimen possible and evaluate the patient's confidence and readiness to adopt and adhere to treatment
- Take the adolescent's developmental phase into consideration in prescribing ART (using the Tanner scale).
- Patient's specific concerns

- **AGREE**
  - Where the adolescent should choose to receive treatment and support
  - To whom the adolescent chooses to disclose their HIV status
  - On how and when they wish to disclose their status, and the support they may need
  - On the roles that the adolescent and others will play in their care and treatment
  - On the treatment plan that has been developed.
  - Upon goals that reflect the adolescent's priorities. Ensure that the negotiated goals are:
    - Clear
    - Measurable
    - Realistic
    - Under the adolescent's direct control
    - Limited in number.

- **ASSIST**
  - To provide a written or pictorial summary of the plan

- To provide referrals to adolescent-friendly health workers and services in the community, as required.
- To provide links to support services for young people living with HIV in the community.
- To provide treatments and other medications (prescribe or dispense).
- To provide condoms and contraception, as required
- To provide skills and tools to assist with self-management and adherence, including adherence equipment (e.g. pill box organized by day, a calendar or other ways to remind and record the treatment plan).
- In addressing obstacles to adherence (e.g. side effects, weight gain, medication as a constant reminder of HIV status).
- By offering help to predict possible barriers to implementing the treatment plan and to identify strategies to overcome them.
- With the patient's physical, mental and social health, including the provision of psychological support as needed; if an adolescent patient is depressed, treat for depression.
- By strengthening the links with available support:
  - Friends, family
  - Peer support groups
  - Community services
  - Treatment supporter/buddy or guardian.

- **ARRANGE**
  - What the adolescent will do in the time between visits to you.
  - For the next appointment date: reinforce the importance of attending even if they feel well and have no problems.
  - For referral for group counselling or relevant support group.
  - To record what happened during the visit.

CHAPTER 11
PREVENTION OF HIV INFECTION

11.0 Introduction

There is ample evidence globally that well-designed prevention programmes can reduce the incidence of HIV infection. There four major sources of infection in children are:

- Transmission from mother to child during pregnancy, labour/delivery or through breastfeeding
- Transfusions of blood or blood products, or transplanted tissue or organs obtained from HIV-infected donors
- Using contaminated skin piercing instruments or sharps
- Sexual transmission.

Since most paediatric HIV infections are vertically acquired, reduction in the prevalence of the infection will require specific efforts to prevent the disease in the adult population.

11.1 Specific Strategies for Prevention of HIV Infection in Children

11.1.1 Prevention of transmission of mother-to-child transmission (PMTCT)

HIV among children is a growing problem, particularly in the countries hardest hit by the AIDS pandemic. MTCT accounts for over 90% of infections in children. PMTCT programmes provide opportunities not only to prevent infections but also to identify and provide care for HIV exposed and infected children, their mothers and families. PMTCT of HIV is now a high priority and has been the rallying point for enhanced prevention efforts in children.

The *National Policy on HIV and AIDS* has strategies that include:

- Primary prevention of HIV
- Prevention of unintended Pregnancy among HIV positive women
- Prevention of HIV transmission from HIV infected mother to newborn babies and infants:
  - Use of ARVs for prophylaxis or treatment in pregnancy, labour or during breast feeding
  - Safer delivery practices
  - Safer infant feeding practices (see chapter 9 Infant feeding options in the context of HIV)
  - Use of prophylaxis in exposed infants
  - Providing care and support to HIV infected women, their infants and their families

HIV-infected mothers should exclusively breastfeed their infants for the first 6 months of life, introduce complementary feeds at 6 months and continue breastfeeding until 12 months. The *National Guidelines on PMTCT* recommend the following ARV prophylactic options for women who breastfeed but are not on ART for their own health:

1) If a woman received AZT during pregnancy, daily NVP is recommended for her child from birth until one week after cessation of breastfeeding
   OR
2) If a woman received a triple ARV drug regimen during pregnancy, the same regimen is continued throughout the duration of breastfeeding and is only discontinued one week after all exposure to breast milk has ended. Daily NVP is recommended for her infant from birth until six weeks of age.

Some HIV-infected mothers will independently decide not to breastfeed despite national recommendations. These mothers should be able to do so without discrimination or prejudice. Health workers should provide

support where possible such as counseling and practical demonstration on how to make up nutritionally adequate feeds.

i. Management of HIV exposed infant

Immediate newborn care:

Wipe baby's mouth and nostrils with gauze at delivery of the head of all babies, regardless of HIV status of mother should be handled with gloves until maternal blood and secretions are washed off

- All babies, irrespective of their HIV status should be kept warm after delivery
- Immediately after birth, baby should be washed with warm chlorhexidine solution or wiped dry with a towel or surgical cloth to remove maternal body fluids
- There should be no suction of the newborn with a nasogastric tube unless indicated e.g. meconium stained liquor. Where suctioning is required, it is better to use a mechanical suction unit (at a pressure below 100mmHg) or bulb suction if possible, rather than mouth operated suction
- Vitamin K and BCG should be administered, ensuring injection safety.
- Find out from the mother her feeding choice and support her. For mothers who are not aware of their HIV status, encourage breastfeeding
- Commence daily NVP. (Dose of 2mg/kg) At 2 weeks of life increase dose to 4mg/kg

(See Table 11.1 simplified extended NVP for prophylaxis in HIV exposed infants).

Table 11.1: Simplified Extended Nevirapine Prophylaxis for HIV Exposed Infants*

A. Birth-6 weeks
- **Birth weight <2,500gm = 10mg/day = 1ml**
- **Birth weight ≥2,500gm = 15mg/day = 1.5ml**

B. ≥6 weeks-6 months = 20mg/day = 2mls
C. ≥6 months-9 months = 30mg/day = 3mls
D. ≥9 months-end of BF = 40mg/day = 4mls

Visit	Infants Wt/Age	Time to cover	NVP Syrup (mls/day)	Supply (mls)	Syringes (mls)	NVP Suspension
ANC		15-20 days			2	20 ml bottle
Maternity	Birth weight <2,500gm	45 days	1	45	2	3 x 20 ml
Maternity	Birth weight ≥2,500gm	45 days	1.5	68	2	4 x 20 ml
Postnatal visit (if home delivery		45 days				Follow Maternity schedule
6 week visit	6 weeks – 6 months	30 days/4 weeks	2	60	3	3 x 20 ml
10 week visit	6 weeks – 6 months	30 days/4 weeks	2	60	3	3 x 20 ml
14 weeks visit	6 weeks – 6 months	70 days/10 weeks	2	140	3	1 x 240 ml
6 months visit	6-9 months	90 days/12 weeks	3	180	3	1 x 240 ml
9 month visit	9 months – end of BF	90 days/12 weeks	4	270	5	1 x 240+ 1 x 100 ml
12 month visit	9 months – end of BF	90 days/12 weeks	4	270	5	1 x 240+ 1 x 100 ml

**Calculation based on NVP 10mg/ml*

ii. Follow-up of the exposed infant

All mothers should be instructed to come for follow up along with their infants at regular intervals outlined. The following Checklist contained in Table 11.2 below should be completed at each visit.

The follow-up care recommended for HIV exposed or infected children are as follows:

- All HIV-exposed babies should be seen within one week of birth including those delivered outside health facilities.
  - Check feeding practice and give support where needed
  - Check mother's and infant's health status (see checklist above)
  - Establish monthly follow up schedule for the infant for the first year of life.

- For all infants, follow up every two weeks for the first 6 weeks, then monthly thereafter till HIV diagnosis is confirmed;
  - For those that are DNA-PCR positive, monthly follow up
  - For those that are negative, three monthly follow up until 18months of age
  - Monitor and plot/document weight, length, and head circumference in all infants at every visit
- Refer HIV-infected children for appropriate services (ART, Psychosocial care etc).

11.1.2 Universal precautions

Universal precautions are simple standards of infection control practices to be observed in the care of all patients at all times, to reduce the risk of transmission of blood borne infections, they include:

- Careful handling and disposal of sharps in sharp containers
- Hand washing with soap and water before and after all invasive procedures
- Use of protective barriers such as gloves, gowns, aprons, masks, goggles for direct contact with blood and other body fluids
- Proper disinfection of instruments and other contaminated equipment
- Proper handling of soiled linen.

Proper planning and management of supplies and other resources are essential in reducing occupational risks of HIV infection. Such measures should include risk assessment, post-exposure follow-up protocols and first aid. In addition, introducing measures to prevent or reduce stress, maintain an optimum workload, orientate new staff and provide education and supervision can reduce occupational risks.

11.2 Post-exposure prophylaxis **(PEP) for children**

11.2.1 Assessment of exposure and need for referral

Following an exposure, the health care provider should ascertain whether the exposure is associated with a potential risk of HIV transmission and whether it has occurred within the previous 36 hours. Potential exposures that may pose a risk of HIV transmission include:

- Break in skin by an object that is visibly contaminated with blood or that has been in a blood vessel
- Bite wounds that result in bleeding in the person bitten or the person biting
- Splash of blood, visibly blood-stained fluids, or other potentially infectious body fluids to a mucosal surface
- Exposure of non-intact skin to blood or blood-stained body fluids
- Exposure of mucous membranes or of non-intact skins to semen or blood during sexual exposure/abuse.

Table 11.2 Infant Follow-up Checklist

INFANT	History of present illness	Fever
		Cough
		Difficulty in breathing
		Ear discharge
		Weight loss of failure to thrive
		Vomiting
		Diarrhoea
		Skin rash
	Physical examination	Pallor
		Jaundice
		Nutritional status
		Oral sores
		Hepatomegaly
		Splenomegaly
MOTHER	Breast conditions	Insufficient milk
		Mastitis
		Nipple fissure
		Swelling/engorgement/abscess
		Excessive discomfort
		Abnormal discharge
		Abnormal finding/lesion
LABORATORY TESTS	Result of DNA-PCR at 6 weeks	Negative
		Positive
	If positive, enrol; if negative, continue follow up	
	Rapid test from 9-18 mo, if positive do DNA-PCR to confirm	Positive
		Negative
	If DNA-PCR positive enrol into care	
	Check PCV/Hb	
MEDICATION	Cotrimoxazole prophylaxis	Ensure CPT from age 6weeks
	Adverse drug reaction (ADR)	Look for recent onset of rash
		Look for recent onset jaundice
IMMUNISATION	Ensure that infant's immunisation is up to date	
Next Appointment	Book appointment	

11.2.2 Assessment of risk of transmission

Assessment of risk of transmission and decision- making about treatment should include consideration of the following factors:

- Nature of exposure – HIV transmission is only known to occur after exposure to blood, visibly blood-stained body fluids, or other infectious body fluids, including semen during sexual exposure
- Time of exposure: If the exposure occurred greater than 72 hours before presentation, PEP is unlikely to be beneficial in reducing transmission. Early administration of PEP correlates with greater efficacy.

Based on this assessment of risk, the health care provider should discuss with the child or parent(s)/caregiver(s) the potential risk of HIV exposure. When the risk of exposure is not significant, the provider should reassure the family and not initiate PEP. If the risk is sufficient to warrant PEP, a careful discussion of the PEP regimen and follow-up care should take place.

11.2.3 Factors Determining use of ARVs following Exposure to Infected Body Fluid

Depending on the results of the HIV tests the following actions should be taken:

- If the source person is HIV negative, no further PEP is necessary for the child
- If the child is HIV positive,
  - No further PEP is necessary
  - Refer for further counselling and management on a long-term basis
- If the child is HIV negative and the source person is HIV positive,
  - Commence ARVs for a period of four weeks
  - Repeat child's HIV test at 3 and 6 months after the initial test; if child sero-converts during this period then provide appropriate care and counselling and refer for expert opinion and long term management.
- If it is not possible to determine the HIV status of the source person, assume that source person is positive and proceed according to guidelines for PEP.

11.2.4 ARVs to be used in PEP

The exposure should be classified as "low risk" or "high risk" for HIV infection as below:

Low risk:

- Solid needle, superficial exposure on intact skin
- Small volume (drops of blood) on mucous membrane or non-intact skin exposures
- Source is asymptomatic or VL <1500 copies/ml.

High Risk:

- Large bore needle, deep injury, visible blood on device, needle in patient artery/vein
- Large volume (major blood splash on mucous membrane or non-intact skin exposures)
- Source patient is symptomatic, acute sero-conversion, high viral load.

Immediately after exposure all exposed individuals should take PEP according to the assumed risk. Those of low risk should take 2-drug combination and those with high risk should take a 3-drug combination. Where the risk cannot be ascertained, a 2-drug combination should be used.

11.2.5 Initiation of PEP

Key issues about PEP should be discussed with the family and the child as soon as possible. Issues to discuss will include:

- Potential benefits
- Potential toxicities associated with medications
- Potential side effects associated with medication

- Instruction on how and when to give the medication
- Importance of adherence to medication regimen
- Nature and duration of medication regimen and monitoring schedule.

Table 11.3 gives the recommended ARV drug combinations for HIV post-exposure prophylaxis depending on the relative risk of exposure, while Table 11.4 gives weight-appropriate dosages for EFV.

Table 11.3: Recommended drug regimen for Post-exposure prophylaxis

Recommended 2-Drug Combinations	*Recommended 3-Drug Combinations*
• ZDV (180 mg m ^{2}/ dose twice daily) + 3TC (4 mg/kg/dose twice daily) • d4T (1 mg/kg/dose twice daily) + 3TC (4 mg/kg/dose twice daily)	• Any of the 2-drug combinations + EFV* 1 mg/kg/dose or a Protease Inhibitor (*EFV should be avoided if pregnancy is suspected or if child is less than 3 years.)* • Preferred combination is: + EFV (15 mg/ once daily) or LPV/RTV (230mgm ^{2}/57.5mg/m ^{2}/dose twice daily).

NB: NVP should not be used for PEP
**See Table 11.2 for weight –based dosing of EFV.*

Table 11.4: Dosing of Efavirenz for children >3 yrs and >10kg

Body weight	**Dosing**
10 - <15 kg	200 mg PO daily at bedtime
15 - <20 kg	250 mg PO daily at bedtime
20 - <25 kg	300 mg PO daily at bedtime
25 - <32.5 kg	350 mg PO daily at bedtime
32.5 - <40 kg	400 mg PO daily at bedtime
≥ 40 kg	600 mg PO daily at bedtime

The chosen regimen is continued for 28 days or until the results of HIV tests for the exposed child and contact person are known to be negative. The schedule for laboratory evaluation during the follow-up care of HIV-exposed clients is shown in Table 11.5 below.

11.3 Post-sexual exposure prophylaxis (PEP)

There is not enough evidence to recommend prophylaxis against infection following casual sexual exposure. However in the event that there has been sexual abuse or rape then it is recommended that the victim be counseled and provided with the PEP drugs. It is important to try and determine the HIV status of the perpetrator. If this is not possible then it may be assumed that the perpetrator is HIV positive and the victim is provided with treatment for high risk exposure as discussed above. In the event of rape it is important to

arrange for counselling and support to be provided to the victim. The victim needs to be provided with information regarding STIs, pregnancy and legal matters.

Children should be instructed in school and at home about potentially risky exposures and how to avoid them. All health workers should discuss reduction of potentially risky behaviours in all children in a manner that is appropriate to their age and developmental stage as a routine component of paediatric care.

Table 11.5: Recommended Schedule of Investigations following exposure

Period	Recommended Investigations
Baseline	- Age-appropriate HIV test - FBC - LFTs - Serum E/U, creatinine
Two weeks	- FBC - LFTs - Serum E/U, creatinine
Six weeks	- HIV screening
Three months	- HIV screening
Six months	- HIV screening

CHAPTER 12
LEGAL AND ETHICAL ISSUES

12.0 Introduction

Issues for legal and ethical consideration in paediatric HIV infection include the following:

- Consent for HIV testing
- Confidentiality and disclosure of HIV status; children have a right to confidentiality and to be consulted according to their maturity and capacity to understand issues that pertain to their health
- Discrimination/ stigmatisation
- Respect for the human rights and dignity of those afflicted
- Consent for medical research
- Access to care and support.

12.1 Children and the Law

There are limited national documents on ethical and legal issues related to HIV infection in children. Although Nigeria's constitution does not specifically mention the rights of the child on HIV infection, its importance is expressed in the *Child's Right Act 2003*.

12.1.1 The National Child Health Policy (2005)

This has the general goal of reduction of mortality attributable to HIV and AIDS in children. The specific objectives are:

- Ensure survival of infants of HIV-infected mothers
- Reduce Paediatric HIV and AIDS infections particularly through PMTCT
- Ensure optimal care, support and treatment of HIV-infected and affected children.

The Strategic/Policy thrusts of the policy to achieve these objectives are:

- Government shall promote screening of all pregnant women for HIV infection in all health facilities (public and private) through voluntary counselling and testing (HCT)
- Government shall promote the delivery of HIV prevention messages during antenatal care and post-partum visits in all facilities
- Government shall ensure that obstetric and medical care for pregnant HIV positive women is appropriately modified and strengthened in order to reduce the risk of MTCT
- Government shall promote PEP for the infants of HIV sero-positive mothers
- Government shall provide affordable ARVs to children infected with HIV and AIDS in line with the National ART programme
- Government shall work in collaboration with partners and related agencies to build capacity of health workers in counselling HIV-infected mothers on infant feeding options
- Government shall ensure that the use of BMS does not spill over to the majority of mothers who are HIV-negative or of unknown status. In that regard, commercial formula used for infants of HIV-positive mothers shall not be displayed and health workers shall be the only ones to demonstrate feeding with BMS to HIV positive-mothers.

12.1.2 The UN Convention on the Rights of the Child

This is applicable to all children irrespective of their HIV infection status. The convention enjoins all nations to take necessary measures to protect children from all forms of physical and mental violence, abuse or negligent treatment.

12.1.3 The UNAIDS International Guidelines on HIV and Human rights

This has as its aim, ensuring that the creation of positive rights based response to HIV and AIDS is guaranteed. These represent the collective recommendations of experts from the health, human rights, government and civil society, including people living with HIV and AIDS on how human rights should be protected and promoted, respected and fulfilled in the context of HIV and AIDS. These recommendations, which also serve as guidelines are:

- Based on existing human rights principles translated into concrete measures that should be taken as part of an effective HIV and AIDS strategy
- Not a formal treaty, but are based on international human rights treaties that must be observed by all states that have ratified them
- Welcomed by the UN Commission on Human Rights and by human rights, development and health organizations around the world.

The recommendations are as follows:

1. States should establish an effective national framework for their response to HIV and AIDS which ensures a co-ordinated, participatory, transparent and accountable approach, integrating HIV and AIDS policy and programme responsibilities across all branches of government.

2. States should ensure, through political and financial support that community consultation occurs in all phases of HIV and AIDS policy design, programme implementation and evaluation and that community organizations are enabled to carry out their activities, including in the field of ethics, law and human rights, effectively.

3. States should review and reform public health laws to ensure that they adequately address public health issues raised by HIV and AIDS, that their provisions applicable to casually transmitted diseases are not inappropriately applied to HIV and AIDS and that they are consistent with international human rights obligations.

4. States should review and reform criminal laws and correctional systems to ensure that they are consistent with international human rights obligations and are not misused in the context of HIV and AIDS or targeted against vulnerable groups.

5. States should enact or strengthen anti-discrimination and other protective laws that protect vulnerable groups, people living with HIV and AIDS and people with disabilities from discrimination in both the public and private sectors, ensure privacy and confidentiality and ethics in research involving human subjects, emphasise education and conciliation, and provide for speedy and effective administrative and civil remedies.

6. States should enact legislation to provide for the regulation of HIV-related goods, services and information, so as to ensure widespread availability of qualitative prevention measures and services, adequate HIV prevention and care information and safe and effective medication at an affordable price.

7. States should implement and support legal support services that will educate people affected by HIV and AIDS about their rights, provide free legal services to enforce those rights, develop expertise on HIV-related legal issues and utilise means of protection in addition to the courts, such as offices of ministries of justice, health complaint units and human rights commissions.

8. States, in collaboration with and through the community, should promote a supportive and enabling environment for women, children and other vulnerable groups by addressing underlying prejudices and inequalities through community dialogue, specially designed social and health services and support to community groups.

9. States should promote the wide and ongoing distribution of creative education, training and media programmes explicitly designed to change attitudes of discrimination and stigmatisation associated with HIV and AIDS to understanding and acceptance.

10. States should ensure that government and the private sector develop codes of conduct regarding HIV and AIDS issues that translate human rights principles into codes of professional responsibility and practice, with accompanying mechanisms to implement and enforce these codes.

11. States should ensure monitoring and enforcement mechanisms to guarantee the protection of HIV-related human rights, including those of people living with HIV and AIDS, their families and communities.

12. States should co-operate through all relevant programmes and agencies of the United Nations system, including UNAIDS, to share knowledge and experience concerning HIV-related human rights issues and should ensure effective mechanisms to protect human rights in the context of HIV and AIDS at international level.

12.1.4 Guiding Principles

The guidelines and standards of practice outlined in this document are based on the following guiding principles:

- **Best interests of the child:** All programme activities and interventions must always put the best interests of the child first by promoting and protecting their well being.
- **Equal opportunities with other children***:* All services to orphans and vulnerable children should be provided at the same level with other children in the communities. This will ensure that orphans and vulnerable children receive equal treatment with other children in the community, and at the same time interventions do not create disparities between programme beneficiaries and other children in the community.
- **Family-centred approach:** Children should be reached through a family-centred approach to minimize friction, stigma, and disharmony in their households, while at the same time maintaining focus on children who are most in need, and at risk of falling through the cracks, through improved targeting**.**
- **Rights-based approach**: Programmes and interventions should adopt a rights-based approach. This recognizes that any support to orphans and vulnerable children is not a favour, but an effort to enhance attainment of their fundamental human rights.

12.1.5 Child Participation

Programmes and interventions shall be based on meaningful participation of children in planning, implementation, monitoring and evaluation. Children's opinions should be heard, respected and considered equally for girls and boys.

12.1.6 Community participation and ownership

Community participation, empowerment and ownership should be emphasized as key elements in mitigating the social impact of HIV/AIDS, and other causes of vulnerability on children.

12.1.7 Life cycle approach

A young person's age and stage of development should be considered in determining the kinds of care, support and protection he or she needs for a healthy and productive life.

12.1.8 Gender and Diversity

There should be equal opportunities for boys and girls, with proper gender sensitivity and mainstreaming in all OVC programming.

12.1.9 Targeting the most vulnerable

During the implementation of interventions, priority should be given to the most vulnerable households, rather than targeting the children alone. Singling out orphans runs the risk of perpetuating and exposing them to further stigma and discrimination.

12.1.10 Sustainability

Efforts to care, support and protect vulnerable children should not only focus on their immediate survival needs such as food, water, shelter and clothing, but also on long-term development needs that reduce children's vulnerability (e.g. education, life skills, vocational training, health care, food security, child protection, legal support and household economic strengthening).

12.1.11 Linkages and Partnerships

Programmes should develop strategic partnerships and linkages with other stakeholders and actors, including community responses, to ensure that children receive the continuum of care and support needed for optimal development and attainment of their full potential. This will in turn enhance synergy, enlarge each partner's key competencies, and increase the number of children and households reached, as well as scale of interventions.

12.1.12 Integration and Holistic Approach

Activities to care, support and protect the most vulnerable children should be integrated and harmonized with other interventions and services relating to the care and welfare of the children.

12.1.13 Reducing stigma and discrimination

No child shall be discriminated against or segregated in the provision of services on the basis of HIV sero-status. Programme activities should as much as possible also not single out selected children, for instance, in schools and communities for special attention, as this can mark them as "different."

12.1.14 Quality of services

Programmes should continually monitor and assess the progress and trends in their efforts, by focusing on type, quality and quantity of services provided to orphans and vulnerable children and their families so that ineffective efforts can be amended and effective efforts scaled up in a timely fashion.

12.1.15 Enabling environment

An enabling environment should be created for OVC programming at all levels –federal, state, local government and community.

12.1.16 Registration

The Federal Ministry of Women Affairs shall maintain a directory of CBOs or NGOs for the care, support and protection of vulnerable children. All such organizations shall be required to register with the Social Welfare Department at the State and Local Government levels.

12.2 Minimum Package of Services and Rights

The minimum package of services and rights are the services and rights that must be provided to each child in order to count him or her among those served by a programme or intervention. The following constitute the minimum package of services and rights to be provided by any programme to care, support and protect orphans and vulnerable children:

- Education
- Food/Nutrition
- Psychosocial support
- Health
- Shelter
- Child protection (protection from exploitation, abuse and neglect)
- Clothes
- Household economic strengthening.

It is not expected that any one programme will be able to directly provide all these services. Therefore, programmes should ensure timely referrals and linkages with other organizations and service providers, to enable the children and their households receive the recommended minimum package of services and rights.

12.3 Child Protection

Child protection entails all initiatives carried out by children, families, communities, CSOs, development partners, government and the private sector that prevent violation of the rights of children in relation to abuse, exploitation and neglect. Orphans and vulnerable children need dedicated interventions to protect them from harm, to assist them when affected, and to promote their overall development. They also need the opportunity to develop their own responses to exploitation, neglect and abuse, either alone or in partnership with adults.

The focus of child protection interventions should be to:

- Strengthen the protective systems, networks and other mechanisms that can prevent, address and remedy the harm children face as a result of abuse, neglect and exploitation
- Strengthen the capacities of children, families and communities to protect and care for orphans and vulnerable children.
- Establish/strengthen family and community child protection structures that involve children as a means of implementing child protection services at grassroots level
- Build children's resilience and support their participation in their own protection, including child to child support
- Build the capacity of government to deliver effective care and protection
- Design and develop appropriate sets of policy, administrative, and programmatic interventions to protect children with different needs
- Mainstream sectoral programs and existing services i.e. health, education and social services so that they reach and serve vulnerable children
- Revitalize/strengthen the registration of all births and deaths in the communities
- Establish/strengthen family and community mechanisms to prevent loss of inheritance of widows and orphans

- Increase knowledge, understanding and implementation of child protection laws and statutes by all stakeholders
- Improve data, monitoring and evaluation systems at national, district and community levels to support appropriate planning of child protection interventions.

12.4 Legal Support

Many children and young people in developing countries who have been made vulnerable by HIV face problems when their parents die. They may have their property taken away by relatives. They also face stigma, and violation of their fundamental human rights. Due to limited knowledge or ignorance of the provisions of the law, such as fundamental human rights and inheritance laws, people rarely seek redress when violations occur. Therefore, legal protection must be provided to ensure the rights of orphans and other vulnerable children.

The focus of legal support should be to:

- Strengthen the administration of justice through improved child-friendly legal protection systems, procedures and facilities
- Ensure access of children and their households to legal representation, and other community support organisations. Whenever possible, programmes should establish formal linkages with legal support organizations, for instance FIDA, Legal Aid Council, National Human Rights Commission, and Citizen's Rights Mediation Centre
- Provide legal education and increase awareness of rights to vulnerable and their families, and community members
- Provide appropriate rehabilitation services of orphans and other vulnerable children who are in conflict with the law
- Increase community awareness, understanding and use of legal protection systems, procedures and facilities for children
- Provide safe spaces for communities to talk about HIV and AIDS. This will help combat lack of knowledge and misinformation about HIV, and negative attitudes towards persons living with HIV
- Ensure existing laws, especially those that protect the rights of orphans and other vulnerable children are implemented
- Review and address gaps in the existing laws
- Collaborate with legal organizations to support orphans and vulnerable children
- Increase children's awareness of their rights, particularly older children.

The priority target groups will include but not be limited to:

- Children denied their inheritance rights
- Children in conflict with the law
- Children in armed conflict situations
- Exploited and abused children.

CHAPTER 13
PROGRAMME MONITORING AND EVALUATION

13.0 Introduction

The Paediatric ART programme aims to provide universal access to HIV treatment including antiretroviral therapy to all children in Nigerian that require it. Specifically it aims to:

- Provide antiretroviral therapy to all eligible children in Nigeria
- Ensure adequate treatment, care and support services to HIV infected children who are not ART eligible
- Build up Capacity within country for the management of children with HIV infection.

13.1 Indicators to track the Paediatric ART programme

The indicators defined in Table 13.1 below should be used to monitor the Paediatric ART programme.

13.2 Paediatric ART Management Information System (ART MIS)

The objective of the Paediatric ART programme is to reduce HIV and AIDS related morbidity and mortality in children. The ART Management Information System (ART MIS) was developed to provide programme level information to guide and improve the delivery of Paediatric ART services. The information from the ART MIS also will be used to generate a number of the core indicators that will be calculated at national level annually.

These programme level information (also called service statistics) are reported on monthly basis using the monthly summary form and the cohort analysis sheet. Data on these statistics will be collected by the Data Clerk in accordance with the ART MIS guidelines. The essential service statistics elements of the Paediatric ART Programme are listed in the table in *Appendix XIII*.

13.3 Tools For and Methods of Monitoring

The ART MIS system includes the following tools:

1. The Care/ART Card
2. PMM forms including:
   a. Paediatric clinical evaluation and follow up forms
   b. Laboratory request and result forms
   c. Pharmacy order forms
   d. Adherence strategy work plan
3. Pre-ART register
4. ART register
5. ART monthly summary forms
6. Cohort analysis forms.

13.4 Data Flow

At each ART site, the ART monthly summary form should be completed and forwarded to the Local Government, where the data are collated and in turn forwarded to the state Ministry of Health. At the state level, all HIV data should be collated, analyzed and forwarded to the NASCP FMOH *(see Appendix XIV)*.

The respective health authorities at the various levels will have responsibility for reporting to the HIV and AIDS coordinating authorities at the level (i.e. Primary Health Care coordinator to Local Government Area Action Committee on AIDS; the State AIDS Programme to the State Action Committees on AIDS; and the National AIDS and STI control Programme report to the National Agency for the Control of AIDS.

Table 13.1 Paediatric ART Programme Core indicators

Code	Indicator	Periodicity of reporting	Source
ART 1	**Core 1**: Existence of up-to-date Paediatric national policies, strategy, and guidelines for ART programmes	Annually	Informant survey
ART 2	**Core 2**: Percentage of Local Government Areas with at least one health facility providing Paediatric ART services in-line with national guidelines	Annually	Mapping/ listings/ Health facility survey
ART 3	**Core 3**: Percentage of health facilities with systems and items to provide Paediatric ART services	Biannually	Health facility survey
ART 4	**Core 4**: Number of health workers trained on Paediatric ART delivery in accordance with national standards	Annually	Programme records
ART 5	**Core 5**: Percentage of ARV storage and delivery points experiencing stock-outs in the previous 6 months	Annually	Drug tracking system, programme reports
ART 6	**Core 6**: Percentage of children with advanced HIV infection receiving ARV combination therapy	Annually	Review of programme monitoring data and estimates
ART 7	**Core 7**: Number of HIV-infected children Continuing first-line regimens at 3, 6, 12, 18 and 24 months after initiation	Annually	ART register
ART 8	**Core 8**: Number of children surviving at 3, 6, 12, 24, 36, etc. Months after initiation of treatment	Annually	Review of patient registers/Cohort Analysis Form
ART 9	Functional status of HIV positive children on ART at 6, 12, 24, 36, etc. Months after initiation of treatment	Annually	Review of patient registers/Cohort Analysis Form
ART 10	Percentage of infected infants born to HIV-infected women	Annually	Estimates

13.5 Data Analysis and Reporting

Data collected will be analysed at the national level and findings will contribute to programme planning and implementation. It will also be NACA to fit into the NNRIMS. The FMOH will design feedback mechanisms to ensure that each level of service, the management, partners and stakeholders are informed on a quarterly basis on service statistics of HCT services in the country.

13.6 Project Management Meeting

The Paediatric HIV Clinical Management Team comprising of the medical officer, pharmacy staff, adherence counsellors, nurses, record officer, laboratory scientist social workers and nutritionist, should meet at least once a month. The essence of this meeting is to share insights, discuss issues pertaining to patient care and participate in care updates on topics of interest. During this meeting the service statistics of the previous months should be shared and discussed to provide insight into the successes and challenges in Paediatric HIV service delivery and proffer solutions.

13.7 Paediatric ART Quality of Care Monitoring

Data should be used to identify the areas for improvement that can be achieved with the available staff and resources of the health facility. Each facility must have paediatric HIV quality of care team comprising all members of the clinical management team (medical officer, pharmacy staff, adherence counsellors, nurses, record officer, laboratory scientist, nutritionist, social workers and representative of the community etc). This team will meet regularly to discuss issues that relate to improving the quality of service. Simple checklist can be incorporated into a child health chart to remind the health care providers on necessary interventions that child needs to receive.

CHAPTER 14
COMMODITY SUPPLY CHAIN MANAGEMENT

14.0 Introduction

The HIV and AIDS commodity supply chain management system is an essential component of successful ART and HIV preventive services. Securing a dependable, regular supply of HIV test kits, reagents, ARVs and drugs for treatment of opportunistic infections, to service delivery points is pivotal to the success of the treatment programme since any interruption of supplies will endanger the lives of the patients as a result of emergence of drug resistance viruses.

14.1 Commodity Supply Chain Management

The overall aim of commodity supply chain management is to have supplies available at service delivery points (facilities) in the right quantity and quality, at the right time, in the right condition, at the right cost, and delivered to the right place *(See Figure 14.1 below)*.

14.1.1 HIV/AIDS Commodities

HIV commodities include the following:

i) ARV drugs
ii) Drugs for Treatment of OIs
iii) Rapid Test kits and consumables
iv) PCR reagents and Dried Blood Spot collection kits
v) Equipments, reagents and consumables for haematology and chemistry laboratory tests and molecular diagnostic facilities
vi) Nutritional supplements (Ready to use therapeutic foods).

14.1.2 HIV/AIDS Commodities Selection

Since the emergence of the HIV/AIDS pandemic, there have been significant advances in the development of diagnostics tools and treatment regimens. This has led to stiff competition with various diagnostics and HIV treatment medicines produced by different pharmaceutical companies. Selection depends on factors such as the pattern of prevalent opportunistic infections, capacity to diagnose and manage the diseases and availability of finances.

14.1.3 HIV/AIDS Commodities Forecasting and Procurement

Once the commodities to be procured are determined, the next step is to ascertain the quantities required for procurement. The process of determining those quantities to procure is what is called forecasting. Forecasting is usually done at project level and covers a period of more than one year. The following data sources are used to forecast:

1. Logistics data - applied in availability of consumption and stock position.
2. Epidemiologic data - takes into account the prevalence of the HIV/AIDS in the states and informs on the percentage coverage.
3. Service statistics - important in forecasting because it helps inform the project managers whether there is the need to recruit more staff to achieve the goals of the forecast or to reduce on expected consumption due to limited staff in the field

Targets - projects work towards achieving certain objectives and targets, it becomes imperative to forecast to achieve the targets. Once the forecast has been discussed and approved, then a procurement plan is developed.

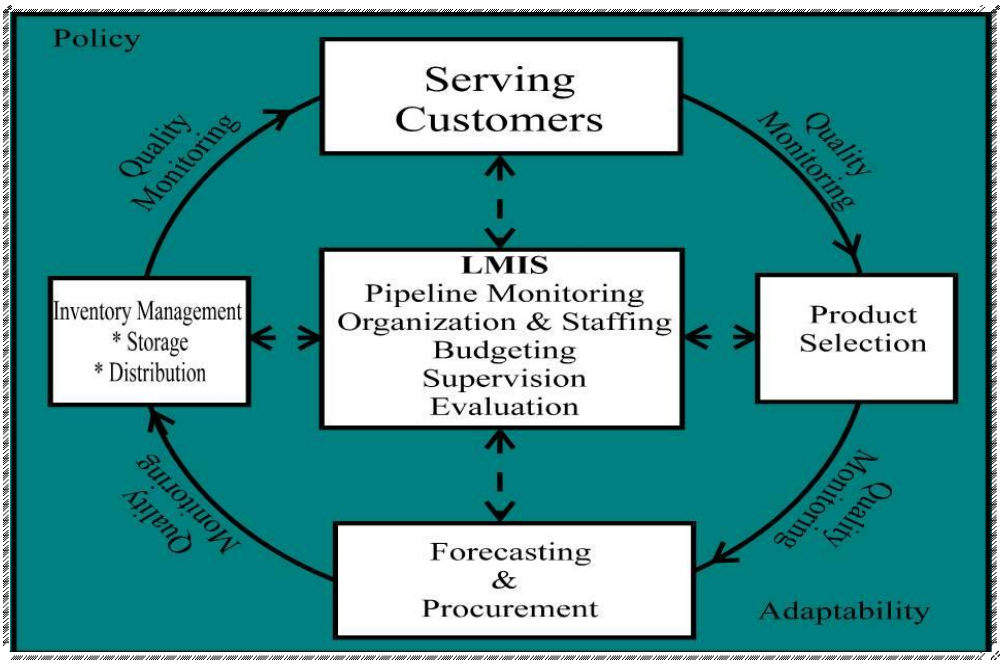


Figure 14.1: The HIV/AIDS Commodities Logistics Cycle

14.1.4 HIV/AIDS Commodities Distribution and Storage

The commodities distribution process begins when the commodities are sent from the manufacturers or suppliers and ends when the commodity consumption information is sent to the Central Medical store, with a feedback mechanism to the health facilities. An effective distribution system is the pillar of HIV/AIDS commodity logistics management system. Such a system should not only maintain a constant supply of the commodities but also keep the commodities in good conditions throughout the distribution process, minimise losses due to spoilage and expiry, maintain accurate records, reduce theft and fraud and provide information for forecasting future commodity needs.

14.1.5 HIV/AIDS Commodity consumption

The HIV/AIDS commodity logistics management system delivers the correct medicines to the service delivery point. However, efforts in selection, procurement and distribution would be wasted if the commodities are not used rationally. Rational use of the commodities requires that PLWHA receive medicines appropriate to their clinical needs, in doses that meet their own individual requirements, for the adequate period of time, at the lowest cost to them and their community.

14.1.6 Management support

The HIV/AIDS commodity logistics management cycle is driven by factors that must be in place for the system to operate smoothly. These factors include competent human resources, sufficient finances to fund the activities and purchase the commodities, a functional logistics management information system that provides vital information for planning, and managerial support in form of supervision and evaluation.

14.2 The National HIV and AIDS Commodities Logistics System

HIV and AIDS program operates successfully with continuous, reliable supplies of relevant commodities. Functional supply chains are critical to achieving HIV and AIDS commodity security, which exists when every person is able to obtain and use the commodities whenever they are needed. This is the essential purpose of the commodities logistics system.

Logistic pipeline is the entire chain of storage facilities and transportation links through which supplies move from the manufacturer to the consumer, including the port facilities, central warehouse, regional warehouses, district warehouses, all service delivery points and transport vehicles.

14.2.1 Flow of Commodities and Information for HIV and AIDS (See Figure 14.2)

When the inventory control system described above is implemented, commodities will move from the stores down to the health facility and then specifically to the point at which the customer or user receives and/or uses the products. At the same time, information will move up the system to inform re-supply and program monitoring activities. The timely submission of reports containing accurate logistic data is critical to the timely re-supply of products, ensuring that products are always available to meet the clients' and users' needs. The diagram below outlines the flow of commodities and information for HIV and AIDS services.

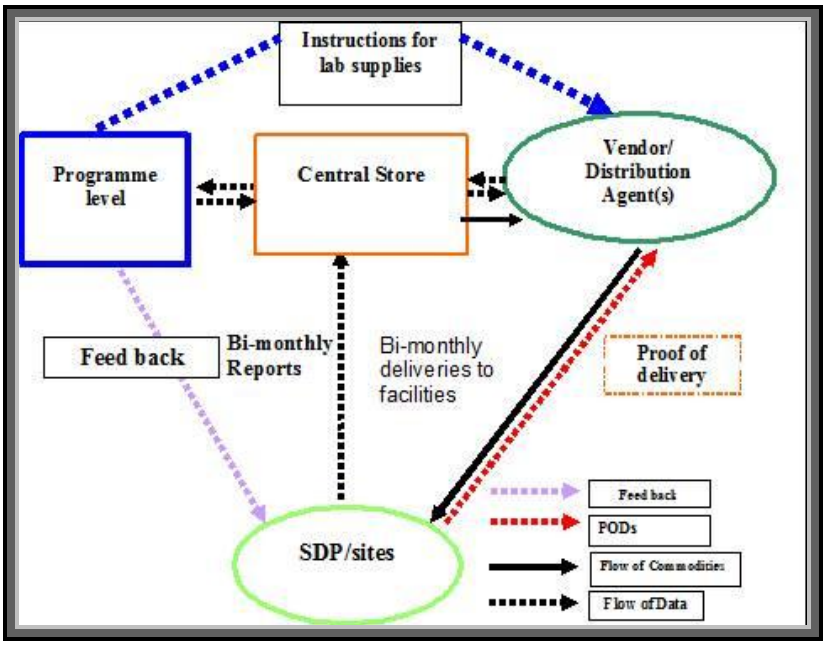


Figure 14.2: Flow of commodities and information for HIV/AIDS Commodities

The responsibility of maintaining appropriate stock levels rests on the facility logistic team. Facility's replenishment for consumed stock comes up bi-monthly in response to submission of copies of the ordering Combined Report and Request forms. The reports are directly transmitted to the Central Medical Stores and then to the Logistics Unit in the National Programme where they are analyzed for various decisions – ranging from routine re-supply to strategic decisions such as quantification and forecasting. Feedback on reports from the facilities is processed by the Logistics Unit of NASCP and communicated to the facilities.

Ordering is done bimonthly on a requisition system and quantities to be ordered are based on consumption and quantities of stock on hand at the time the order is placed. When orders are ready for pick-up, distribution agents are notified and the commodities are transported and delivered directly to the service delivery points.

14.2.2 Key features of Nigerian HIV/AIDS commodities' logistics system

1. **Integrated inventory control system**
   - The forced ordering Maximum/Minimum type, i.e. service delivery points are "forced" to order at the end of the review period (2 months in FMOH program)
   - The maximum stock level is set high enough to guarantee adequate supply at all times during the ordering cycle, but low enough to prevent overstock and waste

- The minimum stock level is set as low as possible but includes a safety margin to prevent stock-outs
- The quantity of ARV drugs logistics system is tracked in months of stock. This is a measure of how long stocks will last. The stock level in the facility has to be assessed frequently as this will alert the storekeeper in case of the need to place emergency order.
- The emergency order is done when stock levels drop to 2 weeks of stock; it disregards the review period. The quantity to order is calculated to top up the stock on hand to maximum level.

2. Logistics Management Information system (LMIS)

One of the primary components of any logistics system is a functional Logistics Management Information System (LMIS) that ensures availability of timely and accurate data for decision-making. These essential data must always be collected for products at all levels.

The three essential data elements include:

1. **Stock on Hand:** Describes the quantities of usable stock of ARV drugs available at a particular point in time. Stock-on-hand information guides us when to place an order and how much of each item is in stock. It also guides redistribution decisions. Aggregate data on stock-on-hand is an important input and guide to one of the key and fundamental functions in supply chain management forecasting and quantification. In addition, a well functioning LMIS provides us information on how long existing stock-on-hand will last.
2. **Consumption:** Describes the quantity of ARV drugs used during the report and order cycle. The rate of consumption is the link between the customer and the supply chain.
3. **Losses/Adjustments**: Losses include the quantity of ARV drugs removed from the distribution system for any reason other than usage (e.g., losses, expiry, and damage). Adjustments may include receipt or issue of supplies to/from one facility to another that is not their usual supplier (e.g., a transfer) or a correction to account for a difference between what was counted during a physical inventory and what was recorded on the inventory control card. Losses/adjustments may therefore be a negative or positive number. In order to collect and report the above mentioned data items, a number of forms described below were designed for the management of these commodities.

14.2.3 The LMIS Forms

These include:

1. Inventory Control Card

This tracks the quantity of ARVs in a facility's storage area. This record collects two essential data items, stock on hand and the losses/adjustment data. The Inventory Control Card should be kept in a facility's storage area.

2. Daily Consumption Record for ARV drugs

This collects the number of ARV drugs that have been used in the facility over a defined period of time. This information is called the Dispensed-to-user data and is one of the essential data items. The Daily Consumption Record for ARV drugs should be kept with the person(s) who dispenses the ARV drugs.

3. Record for Returning/Transferring Commodities

This is used in the event that ARV drugs may be required to be returned to the CMS or transferred to another facility at the same level for various reasons ranging from expiry, damage, change in the treatment guidelines, or over-stocking.

4. Combined Report – Requisition and Issue Form (ARV drugs)

This captures all the information that is collected on the Inventory Control Card and the Daily Consumption Record for ARV drugs. The report is used to capture this data, to calculate the facility order quantities and to

monitor whether the facilities are maintaining stock according to plan, i.e. no overstock, shortages, or stock outs. This report is also a transaction record and the information on this it is what runs the logistics system.

14.3 Roles and Responsibilities of Logistics personnel

1. **Central Level/Program level Logistics officers**
   - Receives, reviews and analyses summary logistics performance reports (regular updates of stock status)
   - Reviews requisition and issues reports to determine which sites need supervisory support to ensure regular, accurate and timely reporting
   - Monitors the Central Warehouse to ensure that orders are sent to reporting sites timely and efficiently
   - Monitors the Central Warehouse to ensure good distribution and warehouse management practices
   - Communicates stock status reports regularly to the FMOH and other relevant stakeholders to ensure that information collected are used for logistics decision making
   - Liaises with the procurement agent and procurement supply management staff to perform all relevant supply chain management functions geared towards ensuring commodity security
   - Shares logistics reports periodically with the procurement agents and other programme stakeholders on commodities usage, stock levels at the warehouse and service delivery points.

2. **Central Warehouse Manager**
   - Supervises the management of the commodities in the warehouse
   - Approves and document all receipts and issues of Commodities Flowing through the pipeline
   - Monitors the Inventory Control Cards and stock levels of commodities
   - Coordinates activities of distribution agents
   - Coordinates all warehouse operations and ensure that all clients to the warehouse derive maximum value for their time
   - Submits Bi-monthly stock reports to the logistics units.

3. **Central Store Pharmacist**
   - Receives and issues commodities
   - Updates inventory control card when commodities are issued or received
   - Ensures the storage of commodities according to the storage standards
   - Monitors commodities management in the warehouse.

4. **Central Store Officer**
   - Ensures the storage of commodities according to the storage standards
   - Updates inventory control cards.

5. **Facility Pharmacists/Lab Scientist**
   - Completes the daily usage forms for commodities used in the facility
   - Documents all transaction in the inventory control cards maintained in the unit
   - Orders commodities and issue commodities to the various point of service in the facility
   - Completes the combined reports, requisition and issue forms at the end of review period
   - Collects the daily usage register from other locations where commodities are dispensed e.g. PMTCT units and feeder sitesSends back unusable commodities that must be returned to the CMS after filling out the record for returning commodities
   - Aggregates all usage data from the daily usage register for commodities and enter in the Combined Reports-requisition and Issue Forms and send to the Central Warehouse

- Monitors the management of commodities in the store.

6. Facility ART Team Leader

- Endorses order/requisition to be sent to the central Warehouse
- Facilitates the meeting of all the focal team leaders (Paediatrics, PMTCT, HCT, Pharmacists and Laboratory scientists).

14.4. Summary of Logistics System in the FMOH program

- Distribution System of Two-levels Pull
- Maximum/Minimum stock levels, with Max 4 MOS/Min 2 MOS
- Emergency order point – 2 weeks of Stock
- Ordering and reporting cycle – Every 2 Months.

Appendix I: Score Chart for use as a Screening Tool for Tuberculosis in Children

SCORE IF SIGN OR SYMPTOM IS PRESENT *A score of 7 or more indicates a high likelihood of tuberculosis*						
	0	**1**	**2**	**3**	**4**	**Score**
GENERAL FEATURES						
Duration of illness	< 2 weeks	2-4 weeks		> 4 weeks		
Failure to thrive or weight loss	Weight gain		No weight gain		Weight loss	
TB contact	None	Reported not proven		Proven Smear+ /EP	Proven Smear+	
Tuberculin test				Positive		
Malnutrition				Not improved after 4 weeks		
Chronic infant disease		Recurrent		No response to antibiotics		
LOCAL FEATURES						
Chest x-ray				TB suggestive feature like infiltration, cavity or hilar lymph nodes		
Lymph nodes				Cervical, sub-mandibular		
Swelling of bone or joint				Suggestive feature on X-ray		
Ascites			Without abdominal mass	With abdominal mass		
Meningitis				Chronic C.N.S. signs		
Angle deformity of the spine					X-ray feature	
TOTAL SCORE						

Appendix II
Clinical manifestations, possible offending drug(s), laboratory derangements and management of toxicities and ADRs

Possible clinical manifestations (most common ARV associated with toxicity)	Possible laboratory abnormalities[a]	Implications for ARV drug treatment
Acute, symptomatic hepatitis (NNRTI class, particularly NVP, more rarely EFV; NRTIs or PI class		
• **Jaundice** • **Liver enlargement** • Hypersensitivity component o Rash, fever, systemic symptoms), o Usually occur within 6−8 weeks • Lactic acidosis (see below) if secondary to NRTI	• Elevated transaminases, hyperbilirubinaemia	• Discontinue all ARVs until symptoms resolve • If possible, monitor transaminases, bilirubin • If receiving NVP, it should NOT be re-administered • Once symptoms resolve, either: o Restart ART with substitution to alternative ARV (if on NVP regimen, this is required); or o Restart same ART regimen with close observation; if symptoms recur, substitute an alternative ARV [b]
Acute pancreatitis (NRTI class, particularly d4T, ddI; more rarely 3TC)		
• Severe nausea and vomiting • Severe abdominal pain • Lactic acidosis	• Elevated pancreatic amylase • Elevated lipase	• Discontinue all ARVs until symptoms resolve • If possible, monitor serum pancreatic amylase, lipase • Once symptoms resolve, restart ART with substitution of an alternative NRTI, preferably one without pancreatic toxicity [b]
Hypersensitivity reaction (NNRTI, especially NVP)		
NVP: Systemic symptoms of fever, myalgia, arthralgia, hepatitis, with or without rash usually occurs within 6−8 weeks	• Elevated transaminases • Eosinophilia	• Immediately stop all ARVs until symptoms resolve; NVP should NOT be re-administered in future • Once symptoms resolve, restart ART & substitute NVP[b]

Appendix II...*cont*...

Possible clinical manifestations (most common ARV associated with the toxicity)	Possible laboratory abnormalities [a]	Implications for ARV drug treatment
ABC Hypersensitivity		
• Acute onset respiratory and gastrointestinal symptoms after starting ABC: • Progressive worsening of symptoms soon after receiving ABC dose, usually occurs within 6−8 weeks o Fever, fatigue, myalgia o Nausea, vomiting, diarrhoea, abdominal pain o Pharyngitis, cough, dyspnoea o Rash (usually mild) may or may not occur	• Eosinophilia	• Immediately discontinue all ARVs until symptoms resolve • ABC should NOT be re-administered to the patient in future • Once symptoms resolve, restart ART with substitution of an alternative ARV[b]
Lactic acidosis (NRTI class, particularly d4T)		
• Can occur at any time on ART • Generalized fatigue and weakness • Gastrointestinal features (nausea, vomiting, diarrhoea, abdominal pain, hepatomegaly, anorexia, sudden unexplained weight loss ± hepatitis or pancreatitis • May also have: o Respiratory features: tachypnoea, dyspnoea) o Neurological symptoms (including motor weakness)	• Increased anion gap • Lactic acidosis • Elevated aminotransferase • Raised creatine phosphokinase (CPK) • Raised LDH	• Discontinue all ARVs until symptoms resolve • Symptoms associated with lactic acidosis may continue or worsen despite stopping ART • Once symptoms resolve, restart ART with substitution of an alternative NRTI with lower mitochondrial toxicity risk (e.g. ABC or AZT[b])
Severe life-threatening anaemia (AZT)		
• Severe pallor, tachycardia • Significant fatigue • Congestive heart failure	• Low haemoglobin	• Refractory to symptomatic treatment (e.g. transfusion), discontinue AZT only and substitute with an alternative NRTI [b]
Severe neutropenia (AZT)		
• Severe sepsis	• Neutropenia • Bacteraemia	• If refractory to symptomatic treatment (e.g. transfusion), discontinue AZT only and substitute an alternative NRTI [b]

Appendix II...*cont*...

Possible clinical manifestations (most common ARV associated with the toxicity)	Possible laboratory abnormalities [a]	Implications for ARV drug treatment
Severe rash/Stevens – Johnson syndrome (NNRTI class, particularly NVP, less common EFV)		
• Rash usually occurs during 1st 6−8 weeks o Mild-to-moderate: erythematous, maculopapular, confluent, most often on the body and arms, with no systemic symptoms o Severe: extensive rash with moist desquamation, angioedema, or serum sickness-like reaction; or rash with systemic features e.g. fever, oral lesions, blistering, facial oedema, conjunctivitis • Life-threatening Stevens-Johnson syndrome or toxic epidermal necrolysis (TEN)	• Elevated transaminases	• For severe rash, TEN and Stevens-Johnson syndrome: o Discontinue all ARVs until symptoms resolve o Offending NNRTI should NOT be re-administered o Once symptoms resolve, restart ART with substitution of NNRTI (note: most experts would not change to another NNRTI drug [b]
Chronic late serious adverse reactions		
Lipodystrophy/metabolic syndrome (d4T; PIs)		
• Fat accumulation and/or fat loss in distinct regions: o Increased fat around the abdomen, buffalo hump, breast hypertrophy o Fat loss from limbs, buttocks, face • Insulin resistance, including diabetes mellitus • Potential risk for later coronary artery disease	• Hyper-triglyceridaemia • Hypercholesterolaemia; • Low high-density lipoprotein (HDL) levels • Hyperglycaemia	• Substitution of ABC or AZT for d4T may prevent progression of lipoatrophy • Substitution of an NNRTI for a PI may decrease serum lipid abnormalities
Severe peripheral neuropathy (d4T, ddI; more rarely 3TC)		
• Pain, tingling sensations, numbness of hands or feet; inability to walk, distal sensory loss • Mild muscle weakness and areflexia	None	• Stop suspected NRTI only and substitute NRTI with no neurotoxicity [b] • Symptoms may take several weeks to resolve

[a] *All laboratory abnormalities may not be observed.*

[b] *See Table _ __ for recommended ARV drug substitutions.*

Appendix III

Severity grading of clinical and laboratory parameters occurring as toxicities and ADRs

GENERAL GUIDANCE ON ESTIMATING SEVERITY				
PARAMETER	**MILD (Grade 1)**	**MODERATE (Grade 2)**	**SEVERE (Grade 3)**	**LIFE-THREATENING (Grade 4)**
Characterization of symptoms and general guidance on management	Symptoms causing no or minimal interference with usual social and functional activities: [a] no therapy needed but monitoring	Symptoms causing greater than minimal interference with usual social and functional activities: may Requires minimal intervention and monitoring	Symptoms causing inability to perform usual social and functional activities: May require admission	Symptoms causing inability to perform basic self-care functions: [c] Requires medical/surgical care to prevent permanent impairment, disability or death
***HAEMATOLOGICAL**				
Absolute neutrophil count (x 10^9/L)	0.75 – <1.00	0.5 – 0.749	0.25 – 0.5	<0.250
Hb g/dl (child >60 days)	8.5 – 10.0	7.5–<8.5	6.5 – <7.5	<6.5, Or severe symptoms due to anaemia (e.g. CCF), refractory to supportive Rx
Platelets x 10^9/L	100 – 125	50 – <100	25 – <50	<25, Or spontaneous bleeding
***BIOCHEMICAL**				
ALT (SGPT) x ULN	1.25 – 2.5	2.6 – 5.0	5.1 – 10.0	>10.0
AST (SGOT) x ULN	1.25 – 2.5	2.6 – 5.0	5.1 – 10.0	>10.0
Bilirubin x ULN (>2 weeks of age)	1.1 – 1.5	1.6 – 2.5	2.6 – 5.0	>5.0
Lipase x ULN	1.1 – 1.5	1.6 – 3.0	3.1 – 5.0	>5.0
Amylase x ULN	1.1 – 1.5	1.6 – 2.0	2.1 – 5.0 x ULN	>5.0

a Values are provided for children in general except where age groups are specified.

b Usual social and functional activities in young children include those that are appropriate for their age and culture (e.g. social interactions, play activities, learning tasks).

c Activities that are appropriate for age and culture (e.g. feeding self with culturally appropriate eating implement, walking or using hands).

Appendix III…..*cont*…

PARAMETER	MILD (Grade 1)	MODERATE (Grade 2)	SEVERE (Grade 3)	LIFE-THREATENING (Grade 4)
		CLINICAL		
Diarrhoea ≥1 year of age	Transient or intermittent episodes of unformed stools OR increase of ≤3 stools over baseline/day	Persistent episodes of unformed to watery stools OR increase of 4 – 6 stools over baseline per day	Grossly bloody diarrhoea OR increase of ≥7 stools per day OR, IV fluid replacement indicated	Life-threatening consequences (e.g. hypotensive shock)
<1 year of age	Liquid stools (more unformed than usual) but usual No. of stools	Liquid stools with increased No. of stools OR mild dehydration	Liquid stools with moderate dehydration	Liquid stools + severe dehydration with rapid rehydration needed OR shock
Nausea	Transient (<24 hours) or intermittent nausea with no/ minimal interference with oral intake	Persistent nausea resulting in decreased oral intake for 24 – 48 hours	Persistent nausea resulting in minimal oral intake for >48 hrs OR aggressive rehydration indicated (e.g. IV fluids)	Persistent nausea with no/minimal oral intake resulting in dehydration with rehydration indicated
Pancreatitis	Not applicable	Symptomatic AND admission not indicated (other than emergency treatment)	Symptomatic AND hospitalization not indicated (other than emergency treatment)	Life-threatening outcome (e.g. circulatory failure, haemorrhage, sepsis)
Vomiting	Transient or intermittent vomits with no or minimal interference of oral intake	Frequent episodes of vomiting with no or mild dehydration	Persistent vomiting resulting in orthostatic hypotension OR Requiring rehydration (e.g. IVF)	Life-threatening consequences (e.g. hypotensive shock)
		ALLERGIC/DERMATOLOGICAL		
Acute systemic allergic reaction	Localized urticaria (wheals) lasting a few hours	Localized urticaria with medical intervention indicated OR mild angioedema	Generalized urticaria OR angioedema with medical intervention indicated OR symptomatic mild bronchospasm	Acute anaphylaxis OR life-threatening bronchospasm or laryngeal oedema

Appendix III…..*cont*….

PARAMETER	MILD (Grade 1)	MODERATE (Grade 2)	SEVERE (Grade 3)	LIFE-THREATENING (Grade 4)
Cutaneous reaction	Localised macular rash	Diffuse macular, macula[popular or morbilliform rash OR target lesions	Diffuse macular, macula[popular or morbilliform rash with vesicles OR superficial mucosal ulcerations limited to a site	• Extensive or generalized bullous lesions, OR • Stevens Johnson syndrome, OR • Mucosal ulceration of ≥2 sites, OR • Toxic epidermal necrolysis (TEN)
NEUROLOGICAL				
Alteration in personality, behaviour or mood[b]	Alteration causing no or minimal interference with usual social and functional activities[b]	Alteration causing moderate interference with usual social and functional activities[b]	Alteration causing inability to perform usual social and functional activities[b] AND intervention indicated	Behaviour potentially harmful to self or others OR life-threatening consequences
Altered mental status	Changes causing no/minimal interference with usual social and functional activities[b]	Mild lethargy or somnolence, moderate interference with usual social and functional activities[b]	Onset of confusion, memory impairment, lethargy, or somnolence; inability to perform usual social/functional activities[b]	Onset of delirium, obtundation or coma
Neuromuscular weakness (myopathy and neuropathy)	Asymptomatic with lethargy OR minimal muscle weakness; no/minimal interference with usual social/ functions[b]	Muscle weakness, moderate interference with usual social and functional activities[b]	Muscle weakness with inability to perform usual social and functional activities[b]	Disabling muscle weakness; inability to perform basic self-care OR respiratory muscle weakness impairing ventilation

[b] *Usual social and functional activities in young children include those that are appropriate for their age and culture (e.g. social interactions, play activities, learning tasks).*

Appendix III……*cont*….

PARAMETER	MILD (Grade 1)	MODERATE (Grade 2)	SEVERE (Grade 3)	LIFE-THREATENING (Grade 4)
Neuro-sensory alteration (including painful neuropathy)	Asymptomatic with sensory alteration on examination OR minimal paraesthesia with no/ minimal interference with usual social/ functions	Sensory alteration or paraesthesia with greater than minimal interference with usual social and functional activities	Sensory alteration or paraesthesia with inability to perform usual social and functional activities	Disabling sensory alteration or paraesthesia causing inability to perform basic self-care functions[c]
***OTHER LABORATORY PARAMETERS**				
Cholesterol mmol/L (fasting, <18 years old)	4.40 – 5.15	5.16 – 7.77	>7.77	Not applicable
Glucose (serum, high: non-fasting) mmol/L	6.44 – <8.89	8.89 – <13.89	13.89 – 27.75	>27.75
Glucose (serum, high: fasting) mmol/L	6.11 – <6.95	6.95 – <13.89	13.89 – 27.75	>27.75
Lactate x ULN	<2.0 without acidosis	≥2.0 without acidosis	Increased lactate with pH <7.3 with no associated life-threatening event or related condition	Increased lactate with pH <7.3 with life-threatening event (e.g. coma, neurological deficits) or related condition
Triglycerides, mmol/L (fasting)	Not applicable	5.65 – <8.49	8.49 – 13.56	>13.56

[b] *Usual social and functional activities in young children include those that are appropriate for their age and culture (e.g. social interactions, play activities, learning tasks).*

[c] *Activities that are appropriate for age and culture (e.g. feeding self with culturally appropriate eating implement, walking or using hands).*

Appendix IV: Important ARV Drug Interactions

ARV/ARV	Non-ARV/ARV	Others
Zidovudine		
• With d4T - "antagonistic" - causes additional side effects; contraindicated • With other AZT containing ARVs e.g. Combivir or Trizivir • With PIs e.g. ATV and TPV – blood levels of AZT and these PIs are decreased if used together; contraindicated	• With ribavirin – makes AZT less effective and more toxic. • With anti-TB, anti-MAC drugs e.g. rifampicin and rifabutin – lower levels of AZT and makes it less effective.	
Lamivudine (3TC)		
• With FTC or Truvada – no added advantage; contraindicated • With other 3TC containing FDCs (Combivir, Epzicom or Trizivir) – additive side effects; contraindicated	• Cotrimoxazole increases 3TC blood levels. However, it is not necessary to change the doses of either.	
Didanosine		
• With regimens consisting of EFV or NVP plus ddI – causes premature treatment failure • With TDF, ddI levels increased, causing more side effects: pancreatitis, peripheral neuropathy, lactic acidosis • Combination with TDF should be avoided; but if must be used together, ddI dose should be reduced to 40% O.D (usual adult daily dose = 400mg).	• With ribavirin, intracellular ddI levels increase. Should be avoided • With other drugs that can also cause pancreatitis (e.g. IV pentamidine and TMP/SMX, hydroxyurea) – risk of additive side effects • With oral ganciclovir – can decrease ddI blood levels and ddI can increase ganciclovir blood levels.	Antacids present in tablet formulation may affect absorption of other drugs

Appendix IV...*cont...*

ARV/ARV interactions	Non-ARV/ARV interactions	Other interactions
Stavudine		
• With AZT – see AZT interactions above; contraindicated • With ddI – risk of lactic acidosis and peripheral neuropathy increased; contraindicated	• Cotrimoxazole can increase blood levels 3TC. However, it is not necessary to change the doses of either. • Should not be combined with ribavirin	
Abacavir		
• With FDCs containing ABC (e.g. trizivir) – risk of additive side effects • With TPV (a PI) - decreased serum ABC. Appropriate doses for this combination not been established.		
Emtricitabine		
• No significant drug interactions • With FDCs containing it (Atripla, Truvada, Epivir, Epzicom, Combivir, or Trizivir) – risk of additive side effects		

Appendix IV...*cont...*

ARV/ARV interactions	Non-ARV/ARV interactions	Other interactions
Efavirenz		
• Reduces PI levels in blood (ATV, SQV, IDV, LPV/r, and FPV) – their doses may need to be increased or they may need to be combined with a low dose of RTV (e.g., 100 mg) to help maintain blood levels • Increases levels of LPV/r, NFV and RTV • With RTV, EFV levels are also increased • Decreases blood levels of ETV and maraviroc; dose increment of these two required	• With rifampin – decreased EFV blood levels by (25%); insufficient information on dose adjustments in young children but rifampicin may be used with EFV after age of 3 years • Decreases rifabutin levels (but dose should be increased) • Decreases clarithromycin levels; alternative recommended • Reduces blood levels of itraconazole, ketoconazole; alternative recommended • Decreases levels of diltiazem, nicardipine, nifedipine, and verapamil. Increasing the doses of these calcium channel blockers may be necessary	• With oral contraceptives (estradiol), increases their blood levels; barrier contraception required. • Not to be taken with grape fruit joice
Nevirapine		
• Reduces blood levels of PIs (ATV, SQV, IDV, LPV/r); their doses may need to be increased or they may need to be combined with a low dose of RTV (e.g., 100 mg) to help maintain necessary drug levels • With ATV or IDV, blood levels of NVP increased – increases chance of NVP toxicity and cause treatment failure (ATV decreased); either of the two should not be used with NVP • Increases levels of NFV, DTV and RTV.	• Rifampin, rifampin and rifapentine decreases NVP by (37%) • Rifabutin also decreases NVP levels but no dose change is necessary • NVP decreases clarithromycin levels & clarithromycin increases NVP levels (alternative to clarithromycin recommended) • NVP can decrease ketoconazole levels and ketoconazole can increase NVP blood levels - These two drugs should not be co-administered • Flucanazole increases NVP levels; caution is needed and careful monitoring must be ensured for NVP toxicity • Carbamazepine, clonazepam and ethoxusimide levels decreased: no dose adjustments are recommended; but poor efficacy of these drugs may occur.	• Decreases blood levels of estradiol with increased risk of pregnancy. Alternative contraception should be used • Warfarin levels decreased, but no dose adjustments needed; poor efficacy may occur

Appendix IV...*cont...*

ARV/ARV interactions	Non-ARV/ARV interactions	Other interactions
Lopinavir/r (LPV/r)		
• PIs may lower blood levels of DRV, while it increasing the levels of ATV, IDV, NFV and SQV. These PIs can also affect LPV levels thus: o LPV/r should not be combined with DRV, FPV or TPV o If used with IDV or SQV, their dose should be lowered o Dosing recommendations for LPV/r combined with either ATV or NFV have not been established • With NVP and EFV, blood levels of LPV are decreased; LPV/r dosage should be increased to two 200/50 mg tablets plus one 100/25 mg tablet b.d. • With ETV, LPV blood levels decreased; dose of LPV/r may require adjustment if both are used together. • TDF can decrease LPV/r levels just as LPV/r increases its levels; it is important to watch out for potential side effects of TDF (e.g., kidney problems)	The following drugs interact adversely with LPV/r and should not be taken along: o Anti-migrane: ergotamine/dihydroergotamine o Antihistamines: astemizole or terfenadine o Anti-arrhythmics: flecainamide and propafenone o Anticonvulsants: carbamazepine, phenobarbitone, and phenytoin o Flagyl • Rifampin and rifapentine can decrease LPV/r levels and LPV/r can increase rifampicin levels – should not be used together or used with additional RTV boosting • LPV/r raises clarithromycin levels; its dose may need to be decreased • With ketoconazole and voriconazole - may increase levels of these; maximum dose of ketoconazole is 200mg daily while on LPV/r • LPV/r decreases theophylline levels; plasma levels monitoring of theophylline required to detect need for dose adjustment. • Inhaled Fluticasone used with LPV/r could lead to Cushing's syndrome – should be avoided • Blood levels of Salmeterol, a long-acting inhaled beta2-adrenergic receptor agonist is increased by LPV/r and can cause arrhythmias - use is not recommended.	• Decreases blood levels of estradiol contraception - alternative should be used
Ritonavir – *see LPV/r interactions above*		

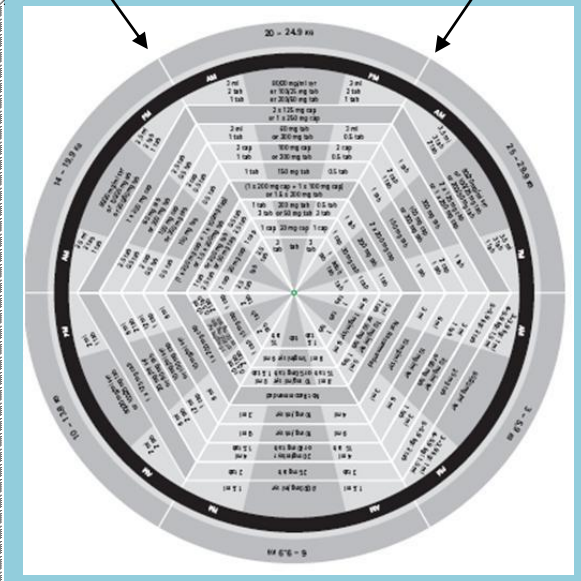
Appendix IV...*cont...*

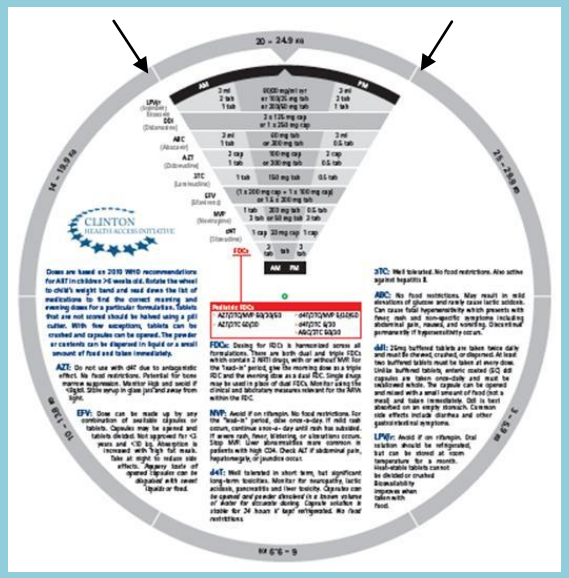
ARV/ARV	Non-ARV/ARV	Other
Nelfinavir		
• PIs can interact with NFV o With RTV - *see LPV/r interactions above* o NFV increases APV and FPV levels but no dose has been recommended o With SQV, levels of both drugs are increased; doses of both should be reduced and no RTV boosting may be needed o NFV also increases IDV levels, but no dose has been confirmed. • NNRTIs can also interact with NFV: o EFV, NVP and DLV can all increase NFV levels, although it's probably not necessary to change the doses.	The following other medications should not be taken along with NFV: • Rifampin, rifapentine and Rifampin can significantly alter NFV levels • Antimigraine medications: ergotamine or dihydroergotamine • Anticonvulsants: carbamazepine, phenobarbitone and phenytoin, may decrease NFV. It might be necessary to increase dose of NFV with any of these drugs • NFV decreases oral contraceptives; barrier protection (e.g., condoms) should be used	

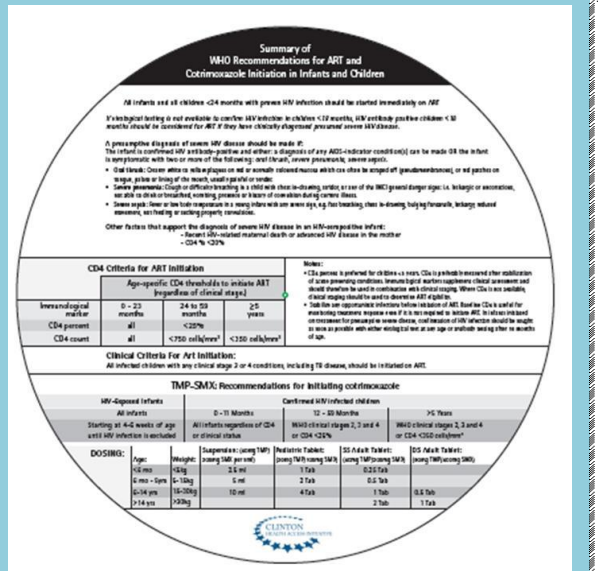
Appendix V: The FDC Drug Dosing Wheel

Weight band area for FDC

Corresponding FDC Doses







Side A1: Covered

Side A2: Superimposed but movable wheel over A1

Side B:

Appendix VI

The National Pharmacovigilance Reporting Form

NATIONAL PHARMACOVIGILANCE CENTRE (NPC) NIGERIA

National Agency for Food and Drug Administration & Control (NAFDAC), Headquarters Office
Plot 2032 Olusegun Obasanjo Way
Wuse Zone 7 Abuja

Tel: 08066899571 or Fax: 09-5241108

FORM FOR REPORTING OF SUSPECTED ADVERSE DRUG REACTIONS

IN STRICT CONFIDENCE

1. * PATIENT'S DETAILS

Full Name or Initials: _____ Patient Record No: _____

AGE/DATE OF BIRTH: _____ SEX: M ☐ F ☐ WEIGHT (kg): _____

HOSPITAL/Treatment Centre: _____

2. * ADVERSE DRUG REACTION (ADR)

A. DESCRIPTION

DATE Reaction Started	DATE Reaction Stopped

C. OUTCOME OF REACTION
TICK AS APPROPRIATE

☐ Recovered fully ☐ Recovered with disability (Specify) _____

☐ Congenital Abnormality (Specify) _____ ☐ Life Threatening (Specify) _____

☐ Death ☐ Others (specify) _____

B. Was Patient Admitted Due to ADR Yes ☐ No ☐

If Already Hospitalised, Was it Prolonged Due to ADR Yes ☐ No ☐

Duration of Admission (days) _____

Treatment of Reaction: _____

3. * SUSPECTED DRUG (Including Biologicals Traditional/Herbal Medicines & Cosmetics)

A. DRUG DETAILS (State name and other details if available / Attach product label / Sample (if available)

Brand Name: Generic Name: Batch No:

NAFDAC No: Expiry Date:

Name & Address of Manufacturer: _____

B. Indications for Use	Dosage	Route of Administration	Date Started	Date Stopped

4. * CONCOMITANT MEDICINES (All medicines taken within the last 3months including herbal and self medication)

Brand or Generic Name	Dosage	Route	Date Started	Date Stopped	Reason for Use

5. * SOURCE OF REPORT:

Name of Reporter: _____

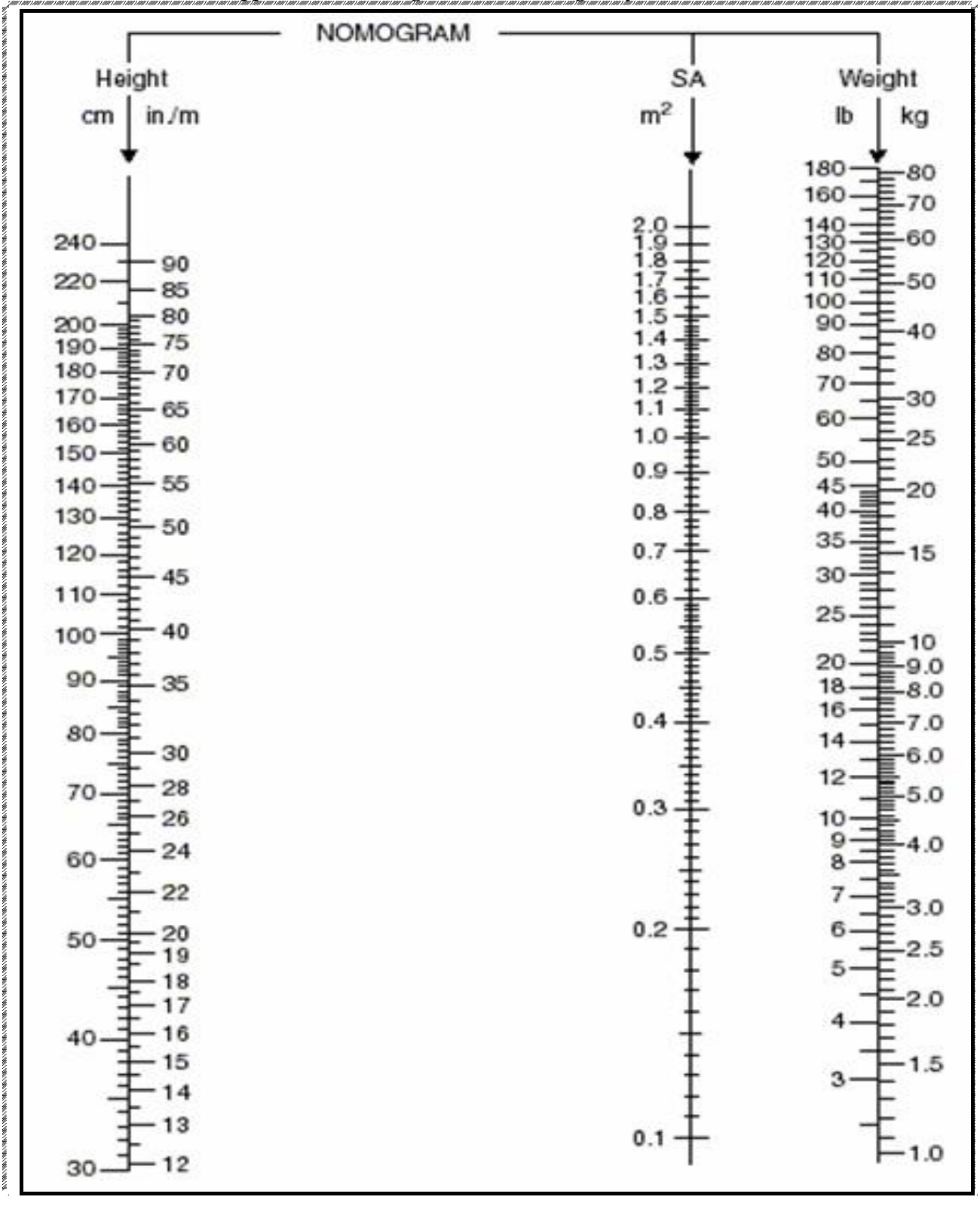
Address: _____

Profession: _____

Signature: _____ Tel No/E-mail: _____

*: MANDATORY FIELDS

Appendix VII: Nomogram for calculating Body Surface Area



Appendix VIIIa: WHO Weight-for-Length Reference Z Scores

Weight-for-Length Reference Card (below 87 cm)

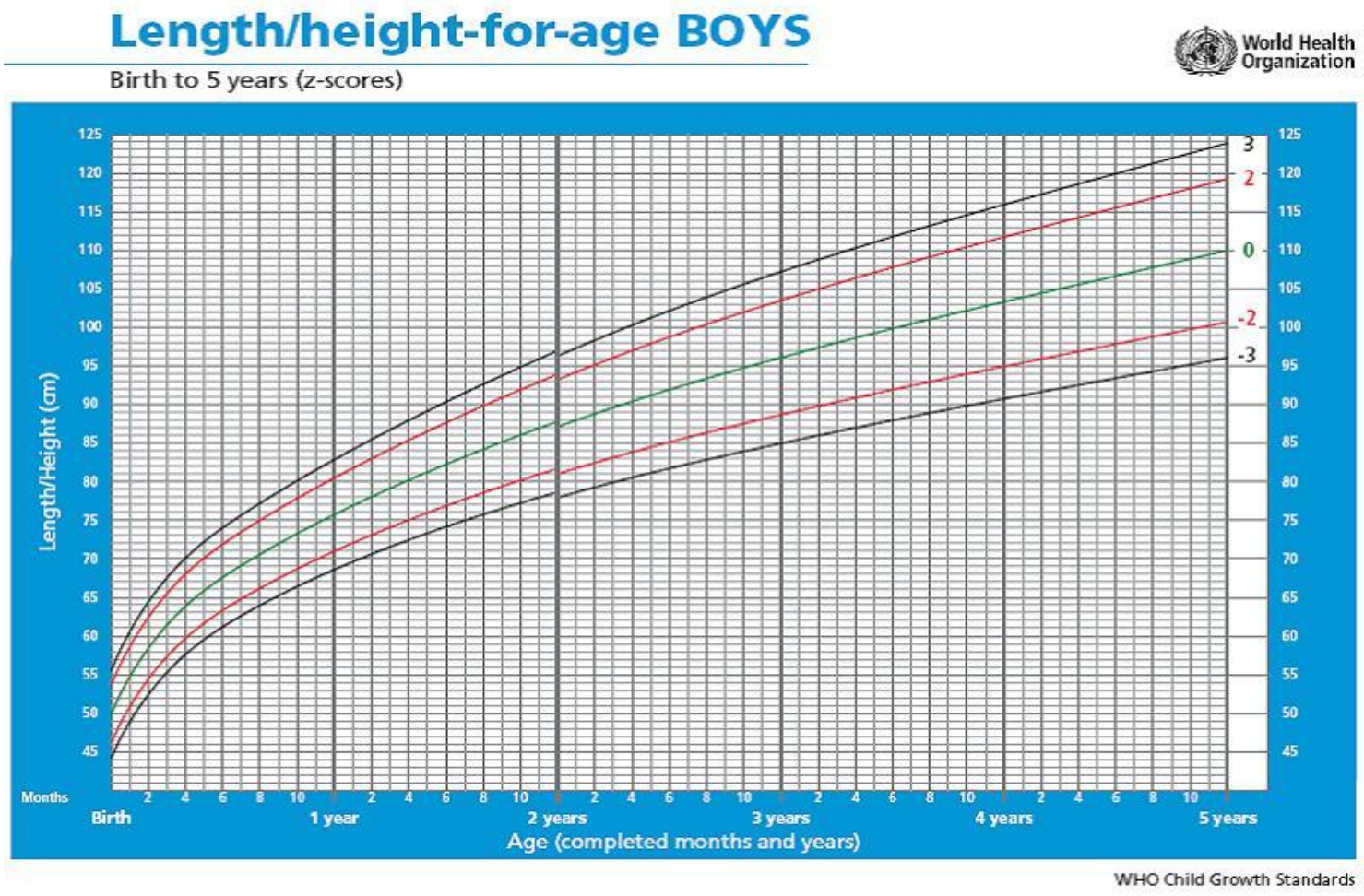
Boys' weight (kg)					Length	Girls' weight (kg)				
-4 SD	-3 SD	-2 SD	-1 SD	Médian	(cm)	Médian	-1 SD	-2 SD	-3 SD	-4 SD
1.7	1.9	2.0	2.2	2.4	45	2.5	2.3	2.1	1.9	1.7
1.8	2.0	2.2	2.4	2.6	46	2.6	2.4	2.2	2.0	1.9
2.0	2.1	2.3	2.5	2.8	47	2.8	2.6	2.4	2.2	2.0
2.1	2.3	2.5	2.7	2.9	48	3.0	2.7	2.5	2.3	2.1
2.2	2.4	2.6	2.9	3.1	49	3.2	2.9	2.6	2.4	2.2
2.4	2.6	2.8	3.0	3.3	50	3.4	3.1	2.8	2.6	2.4
2.5	2.7	3.0	3.2	3.5	51	3.6	3.3	3.0	2.8	2.5
2.7	2.9	3.2	3.5	3.8	52	3.8	3.5	3.2	2.9	2.7
2.9	3.1	3.4	3.7	4.0	53	4.0	3.7	3.4	3.1	2.8
3.1	3.3	3.6	3.9	4.3	54	4.3	3.9	3.6	3.3	3.0
3.3	3.6	3.8	4.2	4.5	55	4.5	4.2	3.8	3.5	3.2
3.5	3.8	4.1	4.4	4.8	56	4.8	4.4	4.0	3.7	3.4
3.7	4.0	4.3	4.7	5.1	57	5.1	4.6	4.3	3.9	3.6
3.9	4.3	4.6	5.0	5.4	58	5.4	4.9	4.5	4.1	3.8
4.1	4.5	4.8	5.3	5.7	59	5.6	5.1	4.7	4.3	3.9
4.3	4.7	5.1	5.5	6.0	60	5.9	5.4	4.9	4.5	4.1
4.5	4.9	5.3	5.8	6.3	61	6.1	5.6	5.1	4.7	4.3
4.7	5.1	5.6	6.0	6.5	62	6.4	5.8	5.3	4.9	4.5
4.9	5.3	5.8	6.2	6.8	63	6.6	6.0	5.5	5.1	4.7
5.1	5.5	6.0	6.5	7.0	64	6.9	6.3	5.7	5.3	4.8
5.3	5.7	6.2	6.7	7.3	65	7.1	6.5	5.9	5.5	5.0
5.5	5.9	6.4	6.9	7.5	66	7.3	6.7	6.1	5.6	5.1
5.6	6.1	6.6	7.1	7.7	67	7.5	6.9	6.3	5.8	5.3
5.8	6.3	6.8	7.3	8.0	68	7.7	7.1	6.5	6.0	5.5
6.0	6.5	7.0	7.6	8.2	69	8.0	7.3	6.7	6.1	5.6
6.1	6.6	7.2	7.8	8.4	70	8.2	7.5	6.9	6.3	5.8
6.3	6.8	7.4	8.0	8.6	71	8.4	7.7	7.0	6.5	5.9
6.4	7.0	7.6	8.2	8.9	72	8.6	7.8	7.2	6.6	6.0
6.6	7.2	7.7	8.4	9.1	73	8.8	8.0	7.4	6.8	6.2
6.7	7.3	7.9	8.6	9.3	74	9.0	8.2	7.5	6.9	6.3
6.9	7.5	8.1	8.8	9.5	75	9.1	8.4	7.7	7.1	6.5
7.0	7.6	8.3	8.9	9.7	76	9.3	8.5	7.8	7.2	6.6
7.2	7.8	8.4	9.1	9.9	77	9.5	8.7	8.0	7.4	6.7
7.3	7.9	8.6	9.3	10.1	78	9.7	8.9	8.2	7.5	6.9
7.4	8.1	8.7	9.5	10.3	79	9.9	9.1	8.3	7.7	7.0
7.6	8.2	8.9	9.6	10.4	80	10.1	9.2	8.5	7.8	7.1
7.7	8.4	9.1	9.8	10.6	81	10.3	9.4	8.7	8.0	7.3
7.9	8.5	9.2	10.0	10.8	82	10.5	9.6	8.8	8.1	7.5
8.0	8.7	9.4	10.2	11.0	83	10.7	9.8	9.0	8.3	7.6
8.2	8.9	9.6	10.4	11.3	84	11.0	10.1	9.2	8.5	7.8
8.4	9.1	9.8	10.6	11.5	85	11.2	10.3	9.4	8.7	8.0
8.6	9.3	10.0	10.8	11.7	86	11.5	10.5	9.7	8.9	8.1

Appendix VIIIb: WHO Weight-for-Length Reference Z Scores

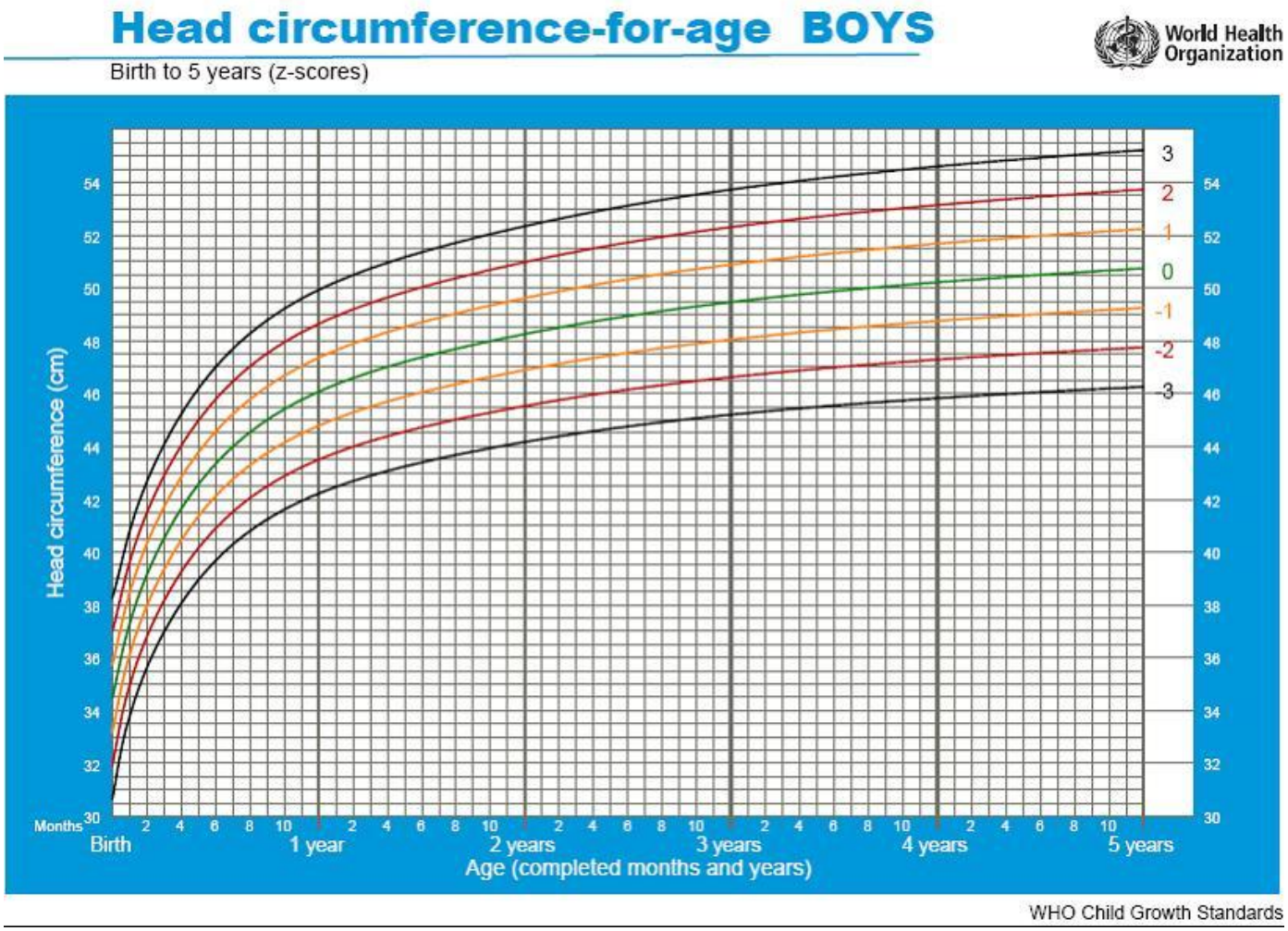
Weight-for-Height Reference Card (87 cm and above)

Boys' weight (kg)					Height	Girls' weight (kg)				
-4 SD	-3 SD	-2 SD	-1 SD	Médian	(cm)	Médian	-1 SD	-2 SD	-3 SD	-4 SD
8.9	9.6	10.4	11.2	12.2	87	11.9	10.9	10.0	9.2	8.4
9.1	9.8	10.6	11.5	12.4	88	12.1	11.1	10.2	9.4	8.6
9.3	10.0	10.8	11.7	12.6	89	12.4	11.4	10.4	9.6	8.8
9.4	10.2	11.0	11.9	12.9	90	12.6	11.6	10.6	9.8	9.0
9.6	10.4	11.2	12.1	13.1	91	12.9	11.8	10.9	10.0	9.1
9.8	10.6	11.4	12.3	13.4	92	13.1	12.0	11.1	10.2	9.3
9.9	10.8	11.6	12.6	13.6	93	13.4	12.3	11.3	10.4	9.5
10.1	11.0	11.8	12.8	13.8	94	13.6	12.5	11.5	10.6	9.7
10.3	11.1	12.0	13.0	14.1	95	13.9	12.7	11.7	10.8	9.8
10.4	11.3	12.2	13.2	14.3	96	14.1	12.9	11.9	10.9	10.0
10.6	11.5	12.4	13.4	14.6	97	14.4	13.2	12.1	11.1	10.2
10.8	11.7	12.6	13.7	14.8	98	14.7	13.4	12.3	11.3	10.4
11.0	11.9	12.9	13.9	15.1	99	14.9	13.7	12.5	11.5	10.5
11.2	12.1	13.1	14.2	15.4	100	15.2	13.9	12.8	11.7	10.7
11.3	12.3	13.3	14.4	15.6	101	15.5	14.2	13.0	12.0	10.9
11.5	12.5	13.6	14.7	15.9	102	15.8	14.5	13.3	12.2	11.1
11.7	12.8	13.8	14.9	16.2	103	16.1	14.7	13.5	12.4	11.3
11.9	13.0	14.0	15.2	16.5	104	16.4	15.0	13.8	12.6	11.5
12.1	13.2	14.3	15.5	16.8	105	16.8	15.3	14.0	12.9	11.8
12.3	13.4	14.5	15.8	17.2	106	17.1	15.6	14.3	13.1	12.0
12.5	13.7	14.8	16.1	17.5	107	17.5	15.9	14.6	13.4	12.2
12.7	13.9	15.1	16.4	17.8	108	17.8	16.3	14.9	13.7	12.4
12.9	14.1	15.3	16.7	18.2	109	18.2	16.6	15.2	13.9	12.7
13.2	14.4	15.6	17.0	18.5	110	18.6	17.0	15.5	14.2	12.9
13.4	14.6	15.9	17.3	18.9	111	19.0	17.3	15.8	14.5	13.2
13.6	14.9	16.2	17.6	19.2	112	19.4	17.7	16.2	14.8	13.5
13.8	15.2	16.5	18.0	19.6	113	19.8	18.0	16.5	15.1	13.7
14.1	15.4	16.8	18.3	20.0	114	20.2	18.4	16.8	15.4	14.0
14.3	15.7	17.1	18.6	20.4	115	20.7	18.8	17.2	15.7	14.3
14.6	16.0	17.4	19.0	20.8	116	21.1	19.2	17.5	16.0	14.5
14.8	16.2	17.7	19.3	21.2	117	21.5	19.6	17.8	16.3	14.8
15.0	16.5	18.0	19.7	21.6	118	22.0	19.9	18.2	16.6	15.1
15.3	16.8	18.3	20.0	22.0	119	22.4	20.3	18.5	16.9	15.4
15.5	17.1	18.6	20.4	22.4	120	22.8	20.7	18.9	17.3	15.6

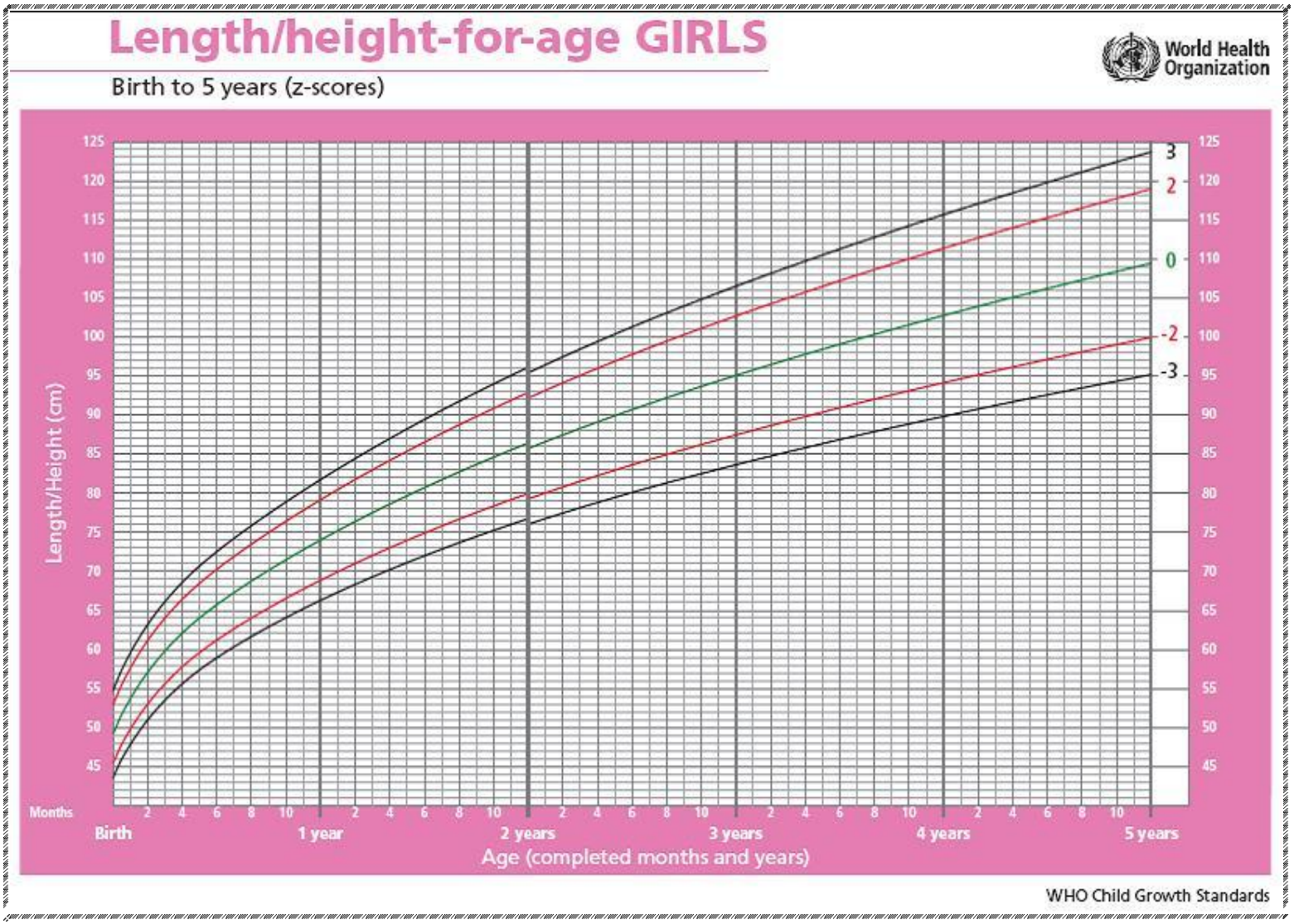
Appendix IXa: WHO Standard Z Score Growth Curves for Boys from Birth to 5 years



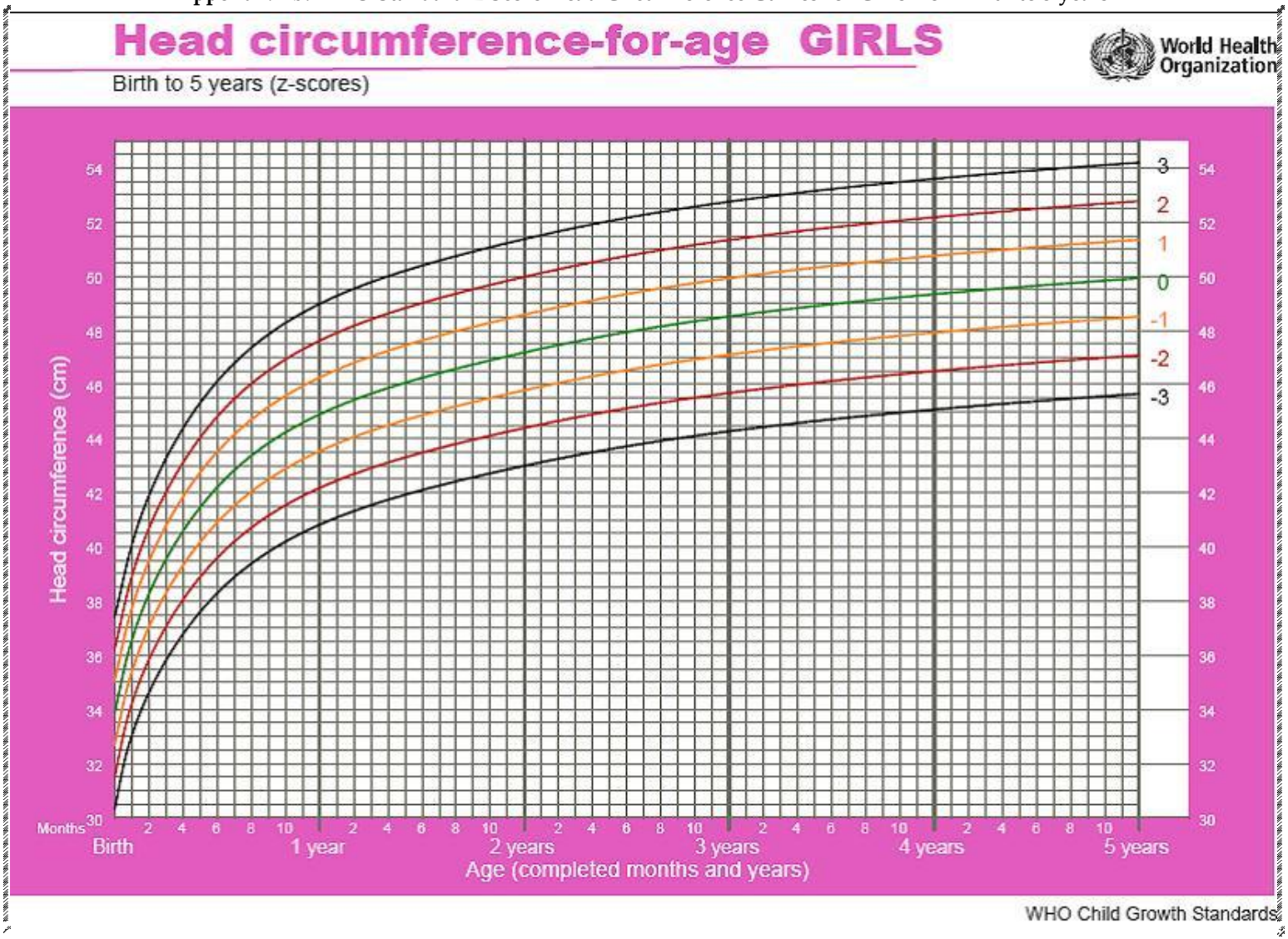
Appendix IXb: WHO Standard Z Score Head Circumference Curves for Boys (Birth to 5 years)



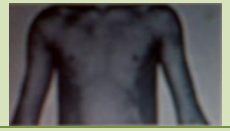
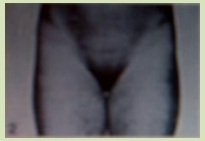
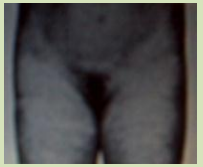
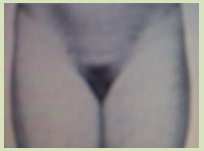
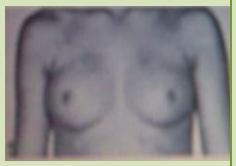
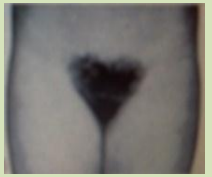
Appendix Xa: WHO Standard Z Score Growth Curves for Girls from Birth to 5 years


Length/height-for-age GIRLS
Birth to 5 years (z-scores)
World Health Organization
Length/Height (cm)
125
120
115
110
105
100
95
90
85
80
75
70
65
60
55
50
45
3
2
0
-2
-3
Months
2 4 6 8 10 2 4 6 8 10 2 4 6 8 10 2 4 6 8 10 2 4 6 8 10
Birth
1 year
2 years
3 years
4 years
5 years
Age (completed months and years)
WHO Child Growth Standards

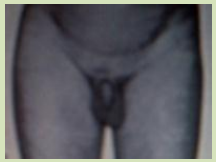
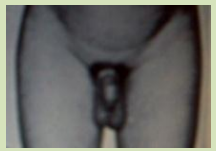
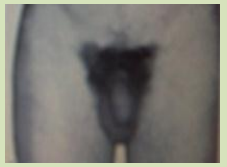
Appendix Xb: WHO Standard Z Score Head Circumference Curves for Girls from Birth to 5 years



Appendix XIa: Sexual maturity rating (Tanner staging) for adolescent females

Tanner Stage	Age (yrs)	Breast Growth	Breast growth		Pubic hair growth	Pubic Hair growth	Other changes
I	0−15	Preadolescent			None		Preadolescent
II	8−15	Breast budding (thelarche); areolar hyperplasia with small amount of breast tissue			Long downy pubic hair near the labia, often appearing with breast budding or several weeks or months later		Peak growth velocity often occurs soon after stage
III	10−15	Further breast tissue enlargement and areola, with no separation of contours			Increase in amount and pigmentation of hair		Menarche occurs in 2% of girls late in stage III
IV	10−17	Separation of contours; areola and nipple form secondary mound above breast tissue			Adult in type but not in distribution		Menarche occurs in most girls in stage IV, 1−3 years after thelarche
V	12.5−18	Large breasts with single contour			Adult in distribution		Menarche occurs in 10% of girls in stage V

Appendix XIb: Sexual maturity rating (Tanner staging) for male adolescents

Tanner Stage	Age range (years)	Testicular growth	Penile growth	Pubic hair growth	External appearance	Other changes
I	0−15	Pre-adolescent testes (≤2.5 cm)	Pre-adolescent	None		Pre-adolescent
II	10−15	Enlargement of testes; pigmentation of scrotal sac	Minimal or no enlargement	Long downy, often appearing months after testicular growth; variable pattern noted with puberche		Not applicable
III	10.5−16.5	Further Enlargement	Significant enlargement, especially in diameter	Increase in amount; curling		Not applicable
IV	Variable: 12−17	Further enlargement	Further enlargement, especially in diameter	Adult in type but not in distribution		Development of axillary hair and some facial hair
V	13−18	Adult in size	Adult in size	Adult in distribution (medial aspects of thighs; linea alba)		Body hair continues to grow and muscle tissue continues to increase in size for months to years; 20% of boys reach peak velocity in this period.

Appendix XIIa: Caloric Contents of Some Common Nigerian Foods

Food serving	Quantity	Approx. calories
Corn pap	1 cup	280
Millet pap	1 cup	320
Accha	½ cup	471
Agidi (maize)	1 wrap	135
Couscous	½ cup	80
Rice cooked (white or brown)	½ cup	80
Whole egg	1	73
Banana	1 medium	75
Apple	1 medium	44
Orange juice	1 cup	110
Sugar	1 tablespoon (tsp)	60
Beans cooked	1 cup	64
Fish, meat and chicken	1 piece	73
Moinmoin	½ cup	153
Akara (bean cake balls)	2 medium balls	151
Carrot	2 small	40
Oil	1 tsp	135
Whole milk	1 cup (3 tsp)	152
Eba + okro + meat/fish	1 cup + 2 pieces meat/fish	537
Plantain ripe fried (dodo)	1 piece	133
Plantain green boiled	1 piece	122
Potato Irish boiled	6 (medium)	408
Mango	1 (medium)	110
Tangerine	1 (medium)	35
Yam	1 medium slice	40
Bread (white, whole-wheat)	1 (avg. slice)	80
Agidi + bean balls (akara)	2 wraps + 4 pieces	648
Yam + Beans + stew	1 ½ cups	531
Pounded yam + vegetable soup + meat	1 cup + 2 pieces of meat	645
Rice + Beans	1 ½ cups	529
Eba + vegetable soup + meat/fish	1 cup + 2 pieces meat/fish	702
Beans +bread	1 cup + 4 medium slices	568

Note: tsp = teaspoon, 1 cup = standard 240 g cup;
This will enable the care giver approximate what the patient has eaten when assessing 24 – hour dietary recall, calculate the deficits if any, and then recommend appropriate therapeutic diet.

Appendix XIIb: How to Calculate Energy Deficits based on 24 hour Dietary Recall

Daily energy requirements for children

In HIV-positive children, energy requirements are **50-100**% higher than normal. This can be calculated from Table I below.

Table I: Daily energy requirements for non-infected children

Age	Weight (kg)	KCAL
0 – 6 months	4	Kg x 120=480
7 – 12 months	7- 9	Kg x 100=700-900
13 – 24 months	12	1,100
25 – 36 months	14	1,250
37 – 48 months	16	1,400
49 – 60 months	19	1,600
6 – 8 years	23	2,000
9 – 10 years	28	2,200

The expected weights and daily energy requirements for infant and children from 0 months to 10 years old. Examples are given below:

Table II: Typical menu (liquid) for infants and young children

Menu 1	Menu 2	Menu 3
2 cups of Akamu + 3 tbsp of milk + 2 tbsp of Oil + 2 tbsp of sugar made up to 1 Litre.	2 cups of millet pap + 3 tbsp of milk made up to 1 Litre	3 cups of akamu + 1 whole egg + 2 tbsp of milk + 2 tbsp of sugar made up to 1 Litre
Total = 634 Kcal/L	**Total = 792 Kcal/L**	**Total = 758 Kcal/L**

Example 1

Ada is a 7 month-old asymptomatic HIV-positive child weighing 4 kg. She consumed half of Menu 1 of Table II in the previous 24 hours; she had just 317 Kcals/day, which is lower than the expected 1,050 Kcals daily energy requirement (Table I). Her energy requirement deficit is calculated as:

RDA = 700 + 350 (RDA + 50%) = 1,050Kcals/day

Deficits for Ada is 1,050 – 317 kcals/day =733 Kcals/day.

The health care provider should offer Ada's caregiver the quantity of therapeutic food enough to make up to this deficit to ensure that Ada gets her recommended daily energy allowance, e.g. 2 sachets of *Plumpy Nuts* (500 Kcal/sachet), or 2 packets of *ACTION meal* (483 Kcals/100 gm).

Table III: Typical Menu for older children (900 kilocalories/day)

Breakfast	Lunch	Dinner
1 cup of milk and tea + 1 slice of bread + 1 boiled egg + piece of pawpaw	½ cup of beans porridge + dodo + 1 banana + Water	1 cup of spaghetti + 1 piece of fish with stew + 1 orange + Water
1 cup of akamu + 2 balls of bean cake (akara) + Water	½ cup of tuwo + 1 piece of meat + okro soup + 1 cup of fruit juice	1 wrap of agidi + 1 cup of moinmoin + water
2 medium boiled potatoes + 1 fried egg + Tea + milk	½ cup of rice + 1 piece of meat +vegetable soup + Water	½ cup of yam pottage + 1 piece of fish + 1 orange

Example 2

Demian is 10 years old with Stage 3 AIDS. If he consumes just 900 Kcals/day of any of the meals shown in Table III, he will require supplements to get the balance. He will require:

2,200 Kcal + (75% of 2,200) Kcals = 3,850

His Deficits = RDA – amount consumed, is 3,850–900 = 2,950 Kcals/day (Table I).

He should therefore be given at least six 500 Kcal sachets of a therapeutic diet (e.g. *Plumpy nuts),* or about 7 sachets of a meal with caloric value of 450 Kcal (e.g. *ACTION meal*) to consume as snacks in between his regular meals to meet his daily energy requirement for optimal nutrition addressing the extra demands of his advanced disease.

Appendix XIII: Service Statistics for Paediatric ART

Indicator Type	Indicator	Periodicity of reporting	Source
Input	Core 1: Existence of up-to-date Paediatric National policies, strategy, and guidelines for ART programmes	Annually	Informant survey
Input	Core 2: Percentage of Local Government Areas with at least one health facility providing Paediatric ART services in-line with national guidelines	Annually	Mapping/ listings/ Health facility survey
Input	Core 3: Percentage of health facilities with systems and items to provide Paediatric ART services	Biannually	Health facility survey
Input	Core 4: Number of health workers trained on Paediatric ART delivery in accordance with National Guidelines	Annually	Programme records,
Process	Core 5: Percentage of ARV storage and delivery points experiencing stock-outs in the previous 6 months	Annually	Drug tracking system, programme reports
Process	Core 6: Percentage of children with advanced HIV infection receiving ARV combination therapy	Annually	Review of programme monitoring data and estimates.
Process	Core 7: Number of HIV-infected children continuing first-line regimens at 3, 6, 12, 18 and 24 months after initiation	Annually	ART register
Process	Percentage of facilities that have CD4 testing services available	Annually	Review of programme monitoring data and estimates.

Appendix XIII:....*cont*...

Indicator Type	Indicator	Periodicity of reporting	Source
Process	Percentage of health facilities that provide virological testing services for infant diagnosis, on site or through DBS		Review of programme monitoring
Outcome	Functional status of HIV positive children on ART at 6, 12, 24, 36, etc. months after initiation of treatment	Annually	Review of patient registers/Cohort Analysis Form
Impact	HIV infection rate in children (%)	Biennially	National Surveys
Outcome	Percentage of children living with HIV and AIDS receiving standard ART services returning to schools and other productive activities after one year on treatment.	Annually	Review of patient registers/Cohort Analysis Form
Impact	Death rate among children with HIV and AIDS who are on treatment and or care (%)	Annually	Review of patient registers/Cohort Analysis Form
Process	Proportion of Children with HIV who had CD4 assessed within the past six months	Quarterly	
Process	Proportion of children receiving antiretroviral therapy who were assessed for adherence at last clinic visit	Quarterly	
Output:	Number of children cumulatively enrolled into the ART programme for HIV care before this reporting period (month)	Monthly	Patient registers
Output:	Number of children newly enrolled into the ART programme for HIV care during the last month	Monthly	Pre-ART register

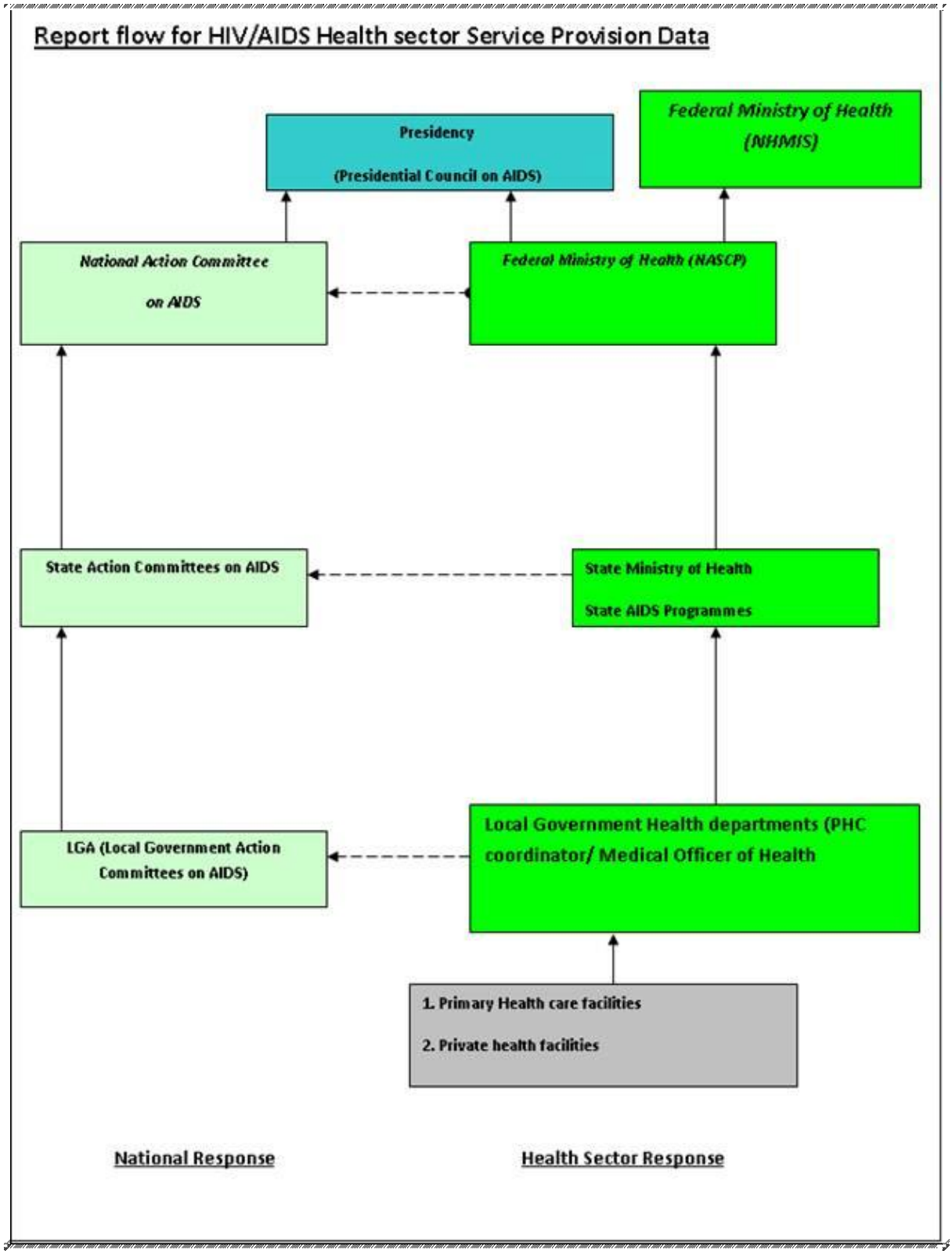
Appendix XIII....*cont..*

Indicator Type	Indicator	Periodicity of reporting	Source
Output:	Number of children cumulatively enrolled into the ART programme for HIV care since the beginning of the programme	Monthly	Pre-ART register
Output:	No of children eligible for ART but yet to commence ART	Monthly	Pre-ART register
Output:	Number of children cumulatively started on ART before this reporting period (month)	Monthly	ART register
Output:	Number of children newly started on ART during the last month	Monthly	ART register
Output:	Number of children cumulatively started on ART since the beginning of the programme	Monthly	ART register
Output:	Number of children cumulatively transferred in for ART from other health facilities	Monthly	ART register
Output:	Number of children newly transferred into the ART programme for ART from other facilities during the month	Monthly	ART register
Output:	Number of children who restarted ART therapy after stopping therapy for more than 3 months	Monthly	ART register
Output:	Number of children who did not pick up their ARV regimens in the month	Monthly	ART register
Output:	Number of children newly enrolled for HIV care who were screened for TB this month.	Monthly	Pre-ART register

Appendix XIII....*cont..*

Indicator Type	Indicator	Periodicity of Reporting	Source
Output:	Number of children newly enrolled for HIV care who were placed on CTX prophylaxis this month	Monthly	Pre-ART register
Output:	Number of children currently on 1st-line ART regimen this month	Monthly	ART register
Output:	Number of children currently on 2nd line ART regimen this month	Monthly	ART register
Output:	Number of children on Salvage drug regimen this month	Monthly	ART register
Output:	Number of children newly enrolled for ART who were screened for TB	Monthly	ART register
Output:	Number of children who were offered PITC	Monthly	PITC Register
Output:	Number (%) of children whose caregivers accepted to be tested for HIV	Monthly	PITC Register
Output:	Number (%) of children who tested positive for HIV	Monthly	PITC Register
Output:	Number (%) of children who tested negative for HIV	Monthly	PITC Register

Appendix XIV: ART Data Flow



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