Epidemiology of HIV/AIDS and STDs

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Outline

- Introduction
- Epidemiology
- Natural History
- Transmission
- Predisposing Factors (Drivers of Infection)
- Impact of HIV Infection
- Management of HIV Infection
- Prevention of HIV and STDs

Introduction

- Not clear how many people were infected with HIV or developed AIDS before the early 1980s.
- In 1981, cases of very rare lung diseases were found in five young previously healthy gay men in Los Angeles.
- At the same time, cases of unusually severe among a group of men in New York were reported.
- Later same year, the first cases of these lung diseases were reported among people who inject drugs
- By the end of that year, about 270 cases of severe immune deficiency among gay men were reported, leading to more than 120 deaths.
- Studies suggested that sexual, blood transfusion and injecting drugs as routes of transmission.

Introduction

- CDC first used the term AIDS to describe the disease in 1982.
- Later AIDS was reported amongst female partners of positive men, suggesting it could be passed on through heterosexual routes.
- The virus that caused AIDS was discovered in France in 1983, first called Lymphadenopathy-Associated Virus (LAV) and later in 1986, Human Immunodeficiency Virus (HIV)
- Mother to Child transmission was also recognized as a route for infecting unborn children
- Casual contacts, food, air and water were excluded as usual routes of transmission
- Over the years, increasingly more sensitive and effective reagents and drugs have been developed, making diagnosis easier, and AIDS now regarded as a chronic disease

Introduction

- The Human Immunodeficiency Virus (HIV) ***{INFECTION}*** is the cause of the **spectrum** of disease known as **AIDS**. ***{DISEASE}***

- HIV is of the retrovirus class of viruses that primarily infects components of the human immune system such as $CD4^+$ T cells, macrophages and dendritic cells. It directly and indirectly destroys $CD4^+$ T cells

- Two types of HIV have been characterized: HIV-1 and HIV-2.

- HIV-1 is the predominant and first described virus.

- In contrast, HIV 2 is mostly found in West Africa and accounts for less than 1% of infections worldwide

Brief History-Nigeria

- The first two cases in Nigeria were diagnosed in Lagos in 1985
- One of the first two cases was a young female teenager aged 13 years from one of the West African Countries
- The Nigerian public received the news of the presence of AIDS in the country with doubt and disbelief.
- AIDS was then perceived as the disease of a distant land which had no place in Nigerian society as the first case was from a foreigner.

Important Definitions

- **Window period.** Time between when a person is infected with HIV and when antibody test is positive

Antibodies usually develop in infected people between 4 to 6 weeks but may take as long as 3 months to be detectable. Retest if high index of suspicion

- **Asymptomatic HIV infection.** Occurs in a person who is HIV infected but looks and feels healthy

- **Symptomatic HIV infection.** Occurs in a person who has developed physical signs of HIV

- **Opportunistic infections.** Illnesses caused by a germ that might not otherwise cause illness in a healthy person, but will in persons with weakened immune system

Natural History of HIV

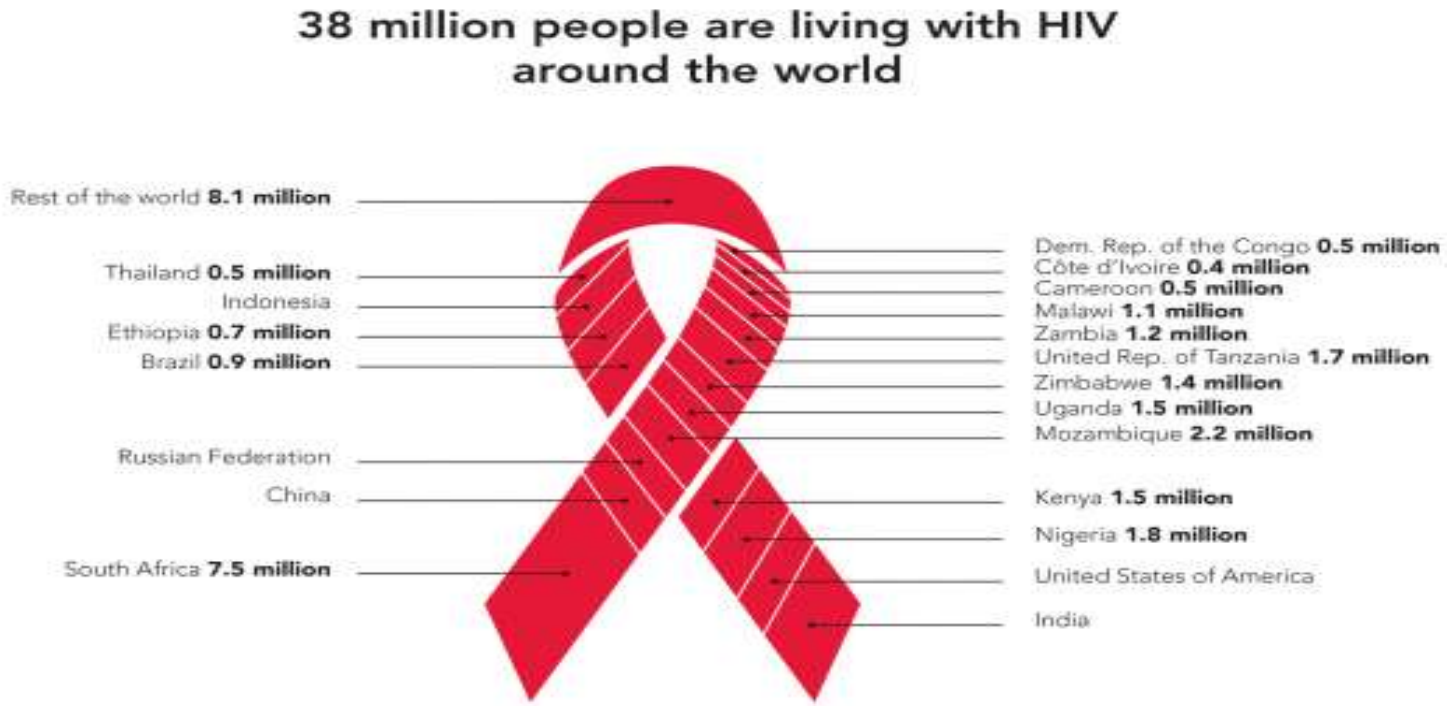
- Natural history relates to the possible course a disease would take if no interventions like treatment are instituted

- Virus can be transmitted during **each** stage
  - Seroconversion. Infection with HIV and antibody development
  - Asymptomatic. No signs yet of HIV. Immune system controls virus production
  - Symptomatic. Physical signs of HIV infection with some immune suppression
  - AIDS. Opportunistic infections and end stage disease.

Natural History of HIV

- **Immune Suppression**
  - The Virus attacks white blood cells (CD4 cells) that are protective
  - Over time, the body looses its immune defence system
  - Opportunistic Infections then occur

Global Picture: 38 million living with HIV-2020



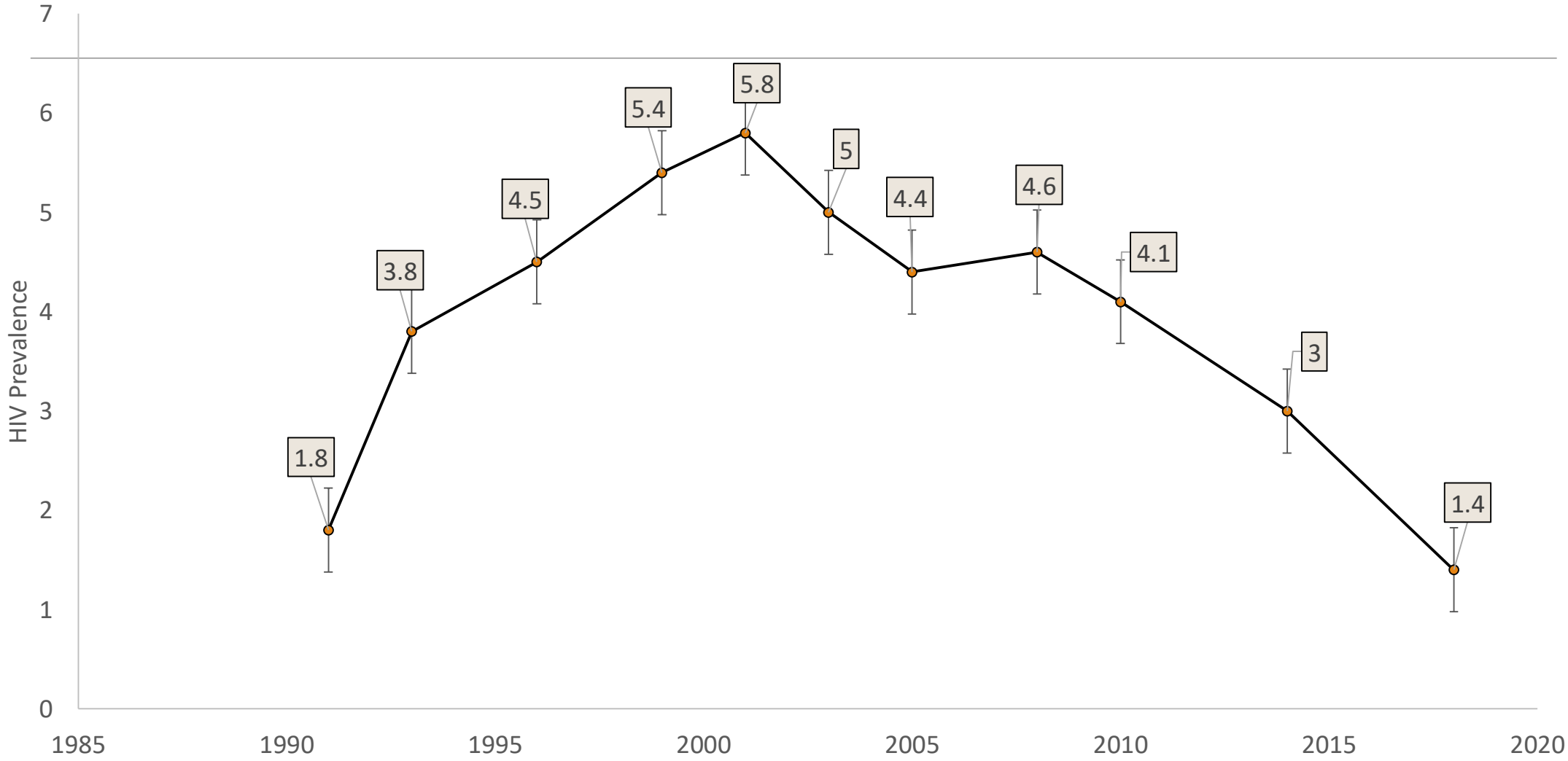
Current Epidemiology (2020)

- 38 million people globally were living with HIV.
- 1.7 million people became newly infected with HIV.
- 81% of all people living with HIV knew their HIV.
- 26 million people were accessing antiretroviral therapy
- 67% of all people living with HIV were accessing HIV treatment
- Among people accessing treatment, three out of five (60%) were virally suppressed.
- 76 million cumulative infected with HIV since the start of the epidemic

Epidemiology-Nigeria

HIV Estimates 2019 (Source- UNAIDS)		
	Indicators	**Numbers or %**
1.	Number of Nigerians living with HIV	1,800,000
2.	Number of annual new infections	100,000
3.	Number of Anti Retroviral Drugs (ART)	1,141,064*
4.	Percentage Knowing their status	73%
5.	Percentage of HIV Patients on ART	65%
6.	Percentage of HIV patients who are virally suppressed	80%

Nigeria HIV Prevalence

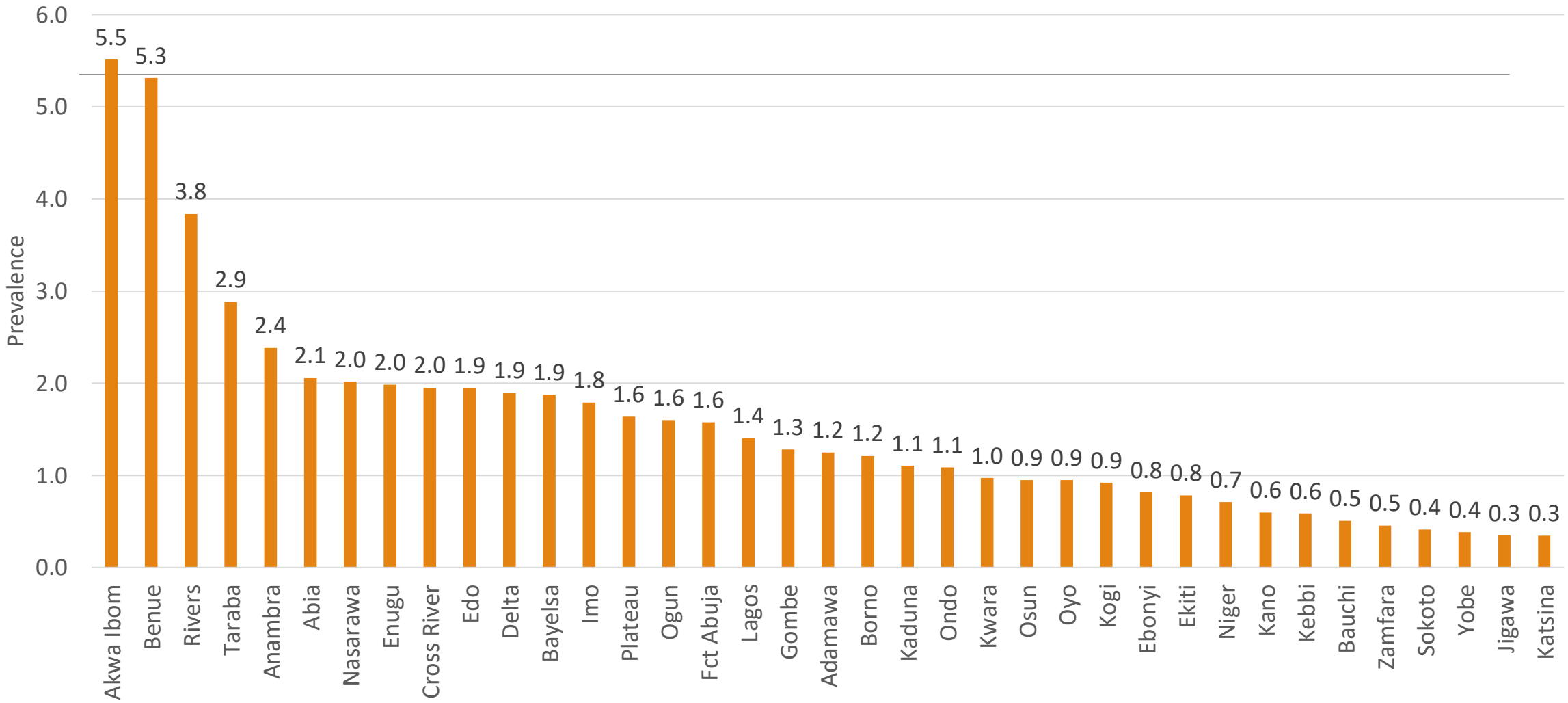


HIV Prevalence in Nigeria

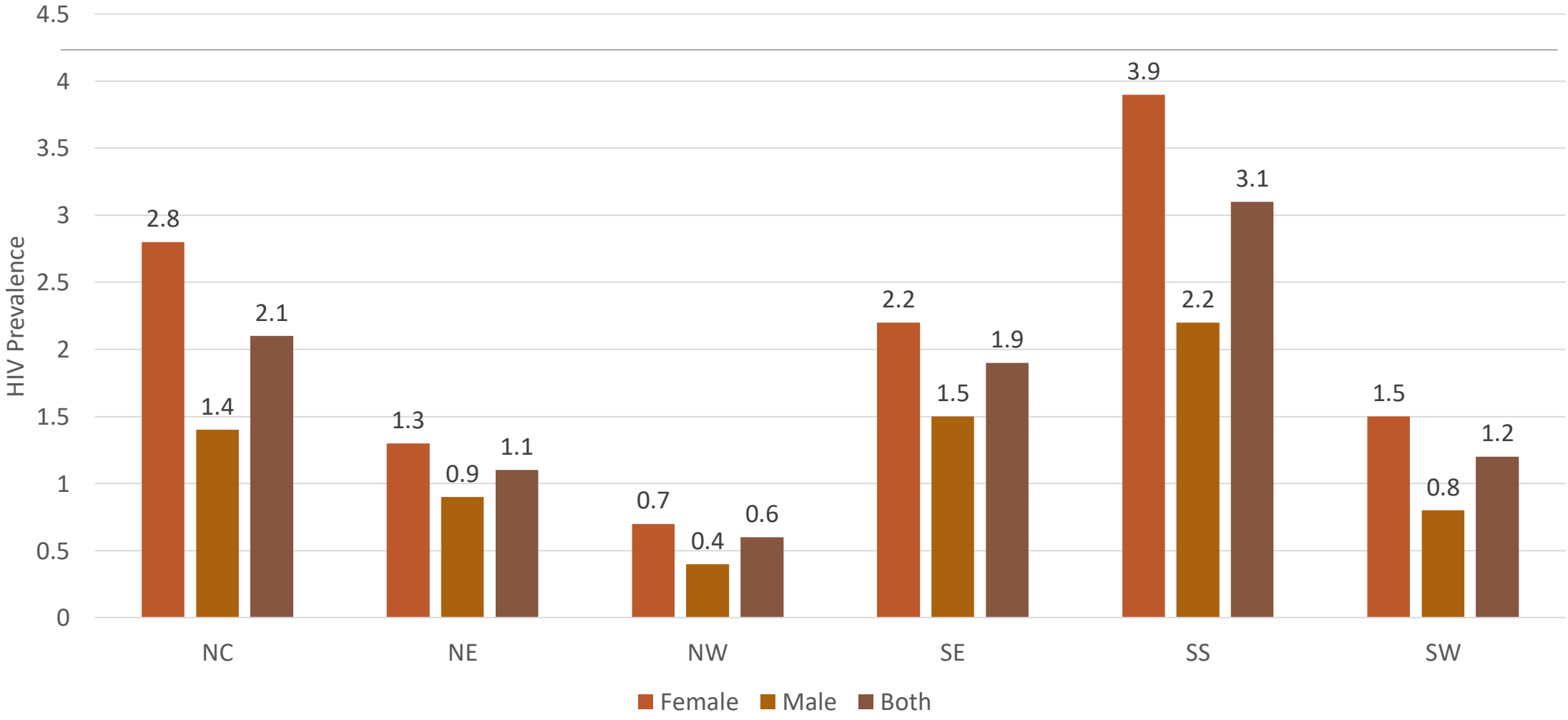
- HIV prevalence is dropping in the general population at 1.4%, but still high among key populations

  - MSM -22.9%
  - Sex Workers
    - Brothel based - 19.4%
    - Non brothel based - 8.6%
  - PWID-3.4%

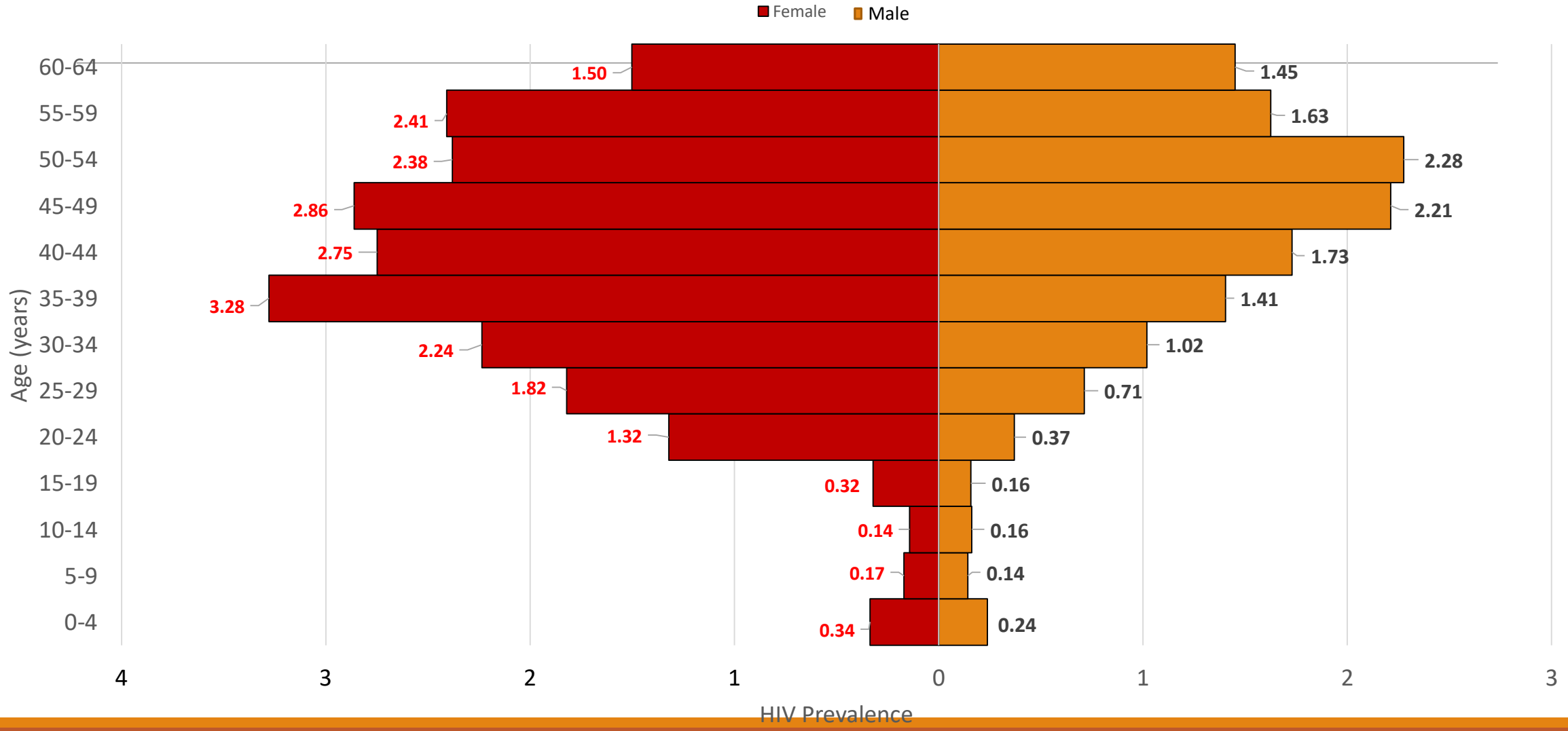
HIV Prevalence by States (NAIIS 2018)



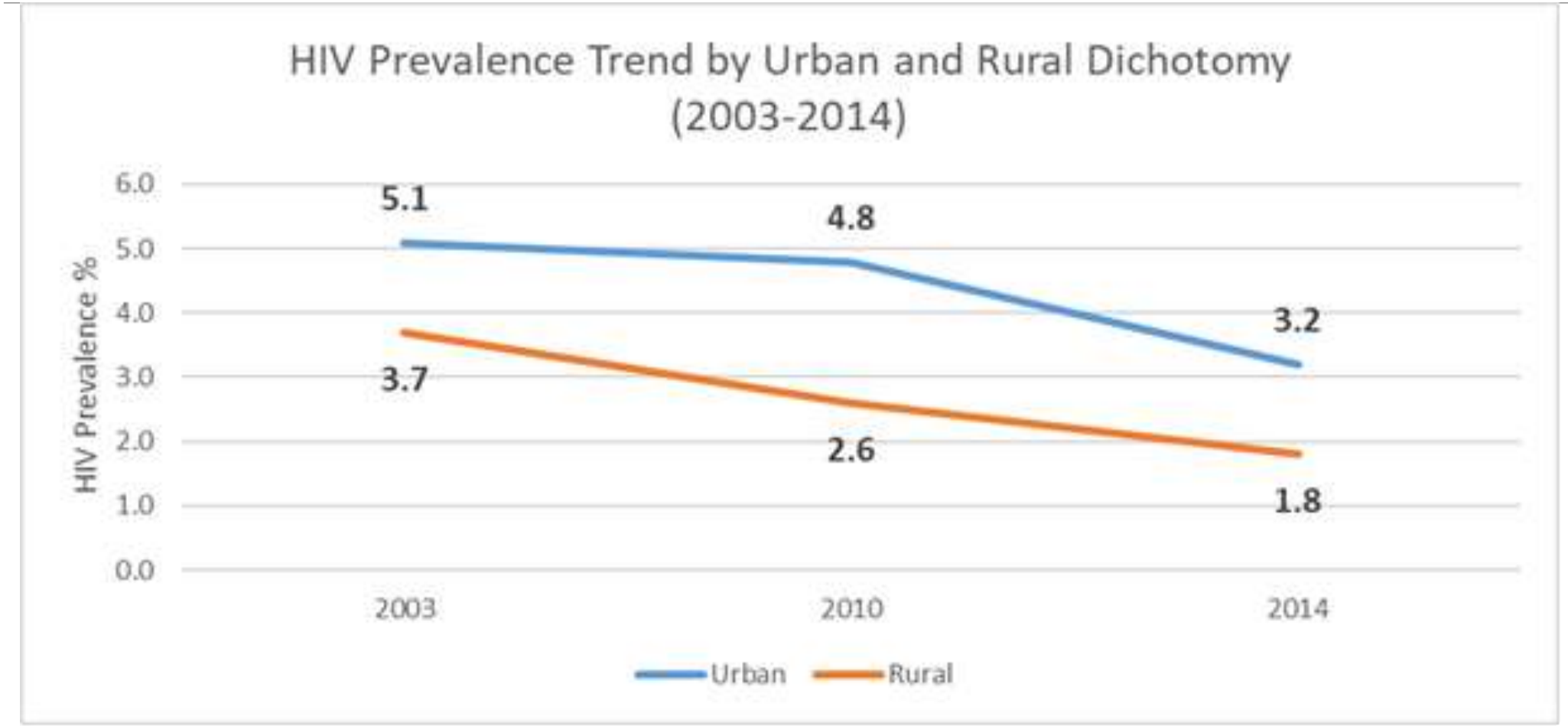
HIV Prevalence by Geopolitical Zones (NAIIS 2018)



HIV Prevalence by Age and Sex (NAIIS 2018)



HIV Prevalence Trend- Urban vs. Rural



HIV Transmission

- **Sexual**
  - Vaginal (99% of sexual transmission)
  - Anal
  - Oral sex
- **Parenterally**
  - transfusion of infected blood/blood products
  - Donated organs
  - Unsterilized needles

HIV Transmission

- **Perinatally-** Mother to Child Transmission (MTCT) occurs:
  - During pregnancy
  - Labor and delivery
  - Breastfeeding
- **Occupational Transmission**
  - Health care workers
  - Laboratory staff

Perinatal Transmission**

- Perinatal transmission accounts for about 90% of pediatric infections
  - 20% in utero
  - 60-65% at delivery
  - 12-15% via breast milk
- 25-40% transmission in the absence of intervention in SSA.

Drivers of HIV Epidemic in Nigeria

- Low personal risk perception.
- Multiple concurrent sexual partnership
- Transactional and intergenerational sex
- Sexual transmission among key populations (MSM, Brothel based FSW and Non-brothel based FSW)
- Sexually transmitted diseases (genital ulcers and Non-ulcerative STIs)

Drivers of HIV Epidemic

- Poor health care delivery system.
- Stigma and discrimination
- Socio-economic factors
- Cultural factors:
  - Early marriage
  - Widowhood rite and widow inheritance
  - Polygamy, polyandry and concubinage

Management

- Diagnosis
  - Clinical (Staging no longer very useful-Test and Treat)
  - Laboratory
- Prevention
- Care
  - Laboratory monitoring
  - Opportunistic Infections
- Treatment (Pre/Post exposure prophylaxis, ART Therapy, TasP)

Prevention

Combination prevention. Simultaneous employment of different approaches and intervention types for prevention of HIV infection. Minimum Prevention Package intervention (**MPPI**) combines a set of approaches

- Biomedical approach (Clinic and community based approaches to reduce exposure and risk of transmission and infection. Examples)
- Behavioural approach (Behaviour Change Communication). Gap between knowledge and behaviour is a challenge
- Structural approach. Targets social, legal, political and economic factors that increase vulnerability to HIV

- Best Results achieved when all the methods are combined in some measure

Global Impact of HIV

- Negative economic Impact
- Impact on health systems
- Reversal of gains of childhood survival
- Increasing Orphan Population
- Decreasing life Expectancy

Sexually Transmitted Infections/Diseases

Definitions and Overview

- A sexually transmitted infection (STI) is an infection that can be contacted by having sex.
- Sexually transmitted diseases (STDs) are a group of infectious or communicable diseases in which the primary mode of transmission is through sexual contact.
- As highlighted earlier, the emphasis now is more on infections, since infected people can transmit the infective agents, even before overt signs and symptoms of disease manifest.
- Although all STDs are preceded by STIs, not all STIs result in the development of STDs.
  - For instance, about 90% of women who are infected with human papillomavirus (HPV) clear their infections within two years. Only a few others go on to develop cancer of the cervix

Classification

- Etiologically (by type of causative agent)
- By type of lesions
- By route of Transmission*

Classification by Causative Organisms

- Bacterial
  - Gonorrhea
  - Chlamydia
  - Syphilis
- Viral
  - HIV/AIDS
  - Genital Herpes
  - Human Papilloma Virus
  - Viral Hepatitis
  - Zika
- Parasitic
  - Trichomoniasis
- Fungal
  - Candidiasis

Classification

- By type of Lesions
  - Ulcers
  - Warts
  - Cancers

- By routes of transmission
  - Vaginal
  - Anal
  - Oral
  - Blood
  - Skin contact

Epidemiology

- Global
  - The majority of STIs have no symptoms or only mild symptoms that may not be recognized as STIs.
  - STIs such as Herpes Simplex Virus syphilis can increase the risk of HIV acquisition.
  - In some cases, STIs can have serious reproductive health consequences beyond the immediate impact of the infection itself (e.g., infertility or mother-to-child transmission)
  - Drug resistance, especially for gonorrhea, is a major threat to reducing the impact of STIs worldwide.

Epidemiology

- Many STIs—including chlamydia, gonorrhea, primarily hepatitis B, HIV, and syphilis—can also be transmitted from mother to child during pregnancy and childbirth.

- Common symptoms of STIs include vaginal discharge, urethral discharge or burning in men, genital ulcers, and abdominal pain.

Common STIs

- There are many STIs, but only a few of the more common ones are listed below.
  - Chlamydia
  - Gonorrhea
  - Syphilis
  - Genital Herpes
  - Trichonomiasis
  - Human papilloma Virus
  - Viral Hepatitis
  - Bacterial vaginosis
  - HIV/AIDS
  - Zika*

General Principles of Management

- Prevention
  - Tailored Counseling and behavioral approaches
  - Barrier methods
- High index of suspicion/early diagnosis. Useful, particularly in asymptomatic cases
- Prompt Treatment – symptomatic and definitive
- Responsible use of antibiotics
- Vaccines. Hep B and HPV and few others still in the pipeline
- Vaginal microbicide

Summary Issues

- Many infections are asymptomatic, but very infective.
- Common Symptoms
- While most are sexually contacted, some can be acquired by other means. E.g. blood transfusion.
- Antibiotics useful, but should not be abused.
- Reproductive Health outcomes negatively affected by STIs/STDs
- STIs are strong determinants to HIV infections