

## Key Facts about Epidemiology of HIV/AIDS in Children Worldwide

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### Abstract:

Unfortunately, we do not know how many perinatally (Human Immunodeficiency Virus) HIV-infected people are living in countries today, while knowing these informations is necessary. United Nations Programme on HIV/AIDS (UNAIDS) reports that there are 3.4 million children under 15 years of age with HIV and 2 million adolescents between 10 and 19 years of age. Although the vast majority of children were perinatally infected, older children are combined with behaviourally infected adolescents and youth in global reporting, without disaggregation by sex. The aim of this study is to introduce the prevalence and prevention of HIV/AIDS (Acquired Immunodeficiency Syndrome) in children of worldwide.

### Key Words:

AIDS, Children, Epidemiology, HIV.

### Introduction

The Human Immunodeficiency Virus (HIV) targets the immune system and weakens people's surveillance and defense systems against infections and some types of cancer. As the virus destroys and impairs the function of immune cells, infected individuals gradually become immunodeficient. The most advanced stage of HIV infection is Acquired Immunodeficiency Syndrome (AIDS), which can take from 2 to 15 years to develop depending on the individual. AIDS is defined by the development of certain cancers, infections, or other severe clinical manifestations. Human Immunodeficiency Virus (HIV) can be transmitted from infected mothers

to their infants during pregnancy, labour, delivery, and breastfeeding period. The risk of transmission is 15–30% in non-breastfed infants and 20–45% in breastfed infants. Currently countries are moving towards the elimination of new paediatric HIV infections by 2015. It is estimated that a total of 260,000 children were infected with HIV in 2012, whereas 670,000 perinatal infections were prevented in low- and middle-income countries between 2009 and 2012 (1-4) (Table 1).

### Signs and symptoms

The symptoms of HIV vary depending on the stage of infection. Though people living with HIV tend to be most infectious in the first few months, many are unaware of their status until later stages. The first few weeks after initial infection,

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Received: Jan 15, 2014 ; Accepted: Mar 10, 2014

individuals may experience no symptoms or an influenza-like illness including fever, headache, rash or sore throat. As the infection progressively weakens the person's immune system, the individual can develop other signs and symptoms

such as swollen lymph nodes, weight loss, fever, diarrhoea and cough. Without treatment, they could also develop severe illnesses such as tuberculosis, cryptococcal meningitis, and cancers such as lymphomas and Kaposi's sarcoma, among others (1,3,4).

**Table 1:** Data on the size of the HIV/AIDS epidemic.

WHO Region	Prevalence of HIV among adults aged 15 to 49 (%) <sup>i</sup>	Number of people (all ages) living with HIV <sup>i</sup>	Number of deaths due to HIV/AIDS <sup>i</sup>
	2012	2012	2012
Africa	4.5 [4.2-4.8]	24 900 000 [23 400 000- 26 500 000]	1 200 000 [1 000 000- 1 300 000]
Americas	0.5 [0.4-0.6]	3 000 000 [2 600 000- 3 700 000]	83 000 [63 000- 110 000]
South-East Asia	0.3 [0.3-0.4]	3 400 000 [2 900 000-4 000 000]	200 000 [170 000- 240 000]
Europe	0.4 [0.3-0.5]	2 200 000 [1 900 000-2 500 000]	98 000 [74 000- 130 000]
Eastern Mediterranean	0.2 [0.1-0.2]	490 000 [350 000- 690 000]	33 000 [23 000- 47 000]
Western Pacific	0.1 [<0.1-0.2]	1 400 000 [720 000 - 2 200 000]	62 000 [63 000- 110 000]
Global	0.8[0.7-0.9]	35300000[32200000-38800000]	1600000[1400000-1900000]

<http://apps.who.int/gho/data/node.main.619?lang=en>

### Sub-Saharan Africa

#### *Epidemiology*

Over 3 million children under 15 years of age were living with HIV in sub-Saharan Africa in 2010, representing more than 90% of all children with HIV in the world (5). Eastern and Southern Africa bear a larger burden with 2.2 million children with HIV, relative to the 990,000 in West and Central Africa. Paediatric Antiretroviral Treatment (ART) coverage greatly lags behind that of adults at 21% compared to 55%. The largest groups of children with HIV worldwide in 2009 and their ART coverage in 2010 were in Nigeria (360,000; 11%), South Africa (330,000; 50%), Kenya (180,000; 28%), Tanzania (160,000; 12%), Uganda (150,000; 21%) and Zimbabwe (150,000; 35%) (5-7). It has been widely publicized that 50% of African children will die by their second birthday without treatment (8). Less is

known about the 17% of slower progressors who may survive to 17 years of age, and fewer efforts are focused on identifying older children, who have not yet been diagnosed and linked to care (9,10). A model of survival of these older children and Perinatally HIV-infected Adolescents (PHIVA) has projected expansion of this population until 2013 in Zimbabwe and 2020 in South Africa, with on-going increases in deaths up to 23,000/year by 2030 at mean ages up to 18 years (9). Investigators have further hypothesized that a greater proportion of children infected through breastfeeding would be slower progressors, compared to those with in utero infection (11) (fig.1).

### Asia

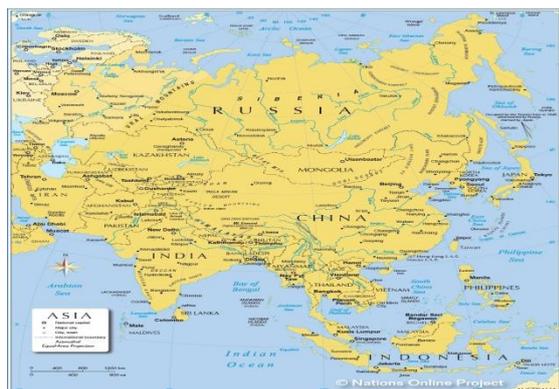
#### *Epidemiology*

An estimated 180,000 children under 15 years of age were living with HIV in the

Asia-Pacific in 2010, with 39% ART coverage (5). The largest national treatment programme for children <15 years of age in Asia is in India, where 18,000 of the 70,000 of those infected were on ART in 2009 (6). In the same period, there were an estimated 16,000 children with HIV in Thailand, with 8000 receiving ART (6). A study of those in the national ART programme before 2007 reported an 88% survival rate at five years of ART (12). China's national programme had enrolled around 5100 children by 2009 (13), with 1600 on ART (6). Although general surveillance data for children are inconsistent, Cambodia was treating 3600 and Vietnam 2000 children by 2009 (6) (Fig.2).



**Fig.1:** Countries of Sub-Saharan Africa



**Fig.2:** Countries of Asia

**United States**

*Epidemiology*

1. According to UNAIDS, approximately 4500 HIV-infected children under 15 years of age lived in North America in

2011, the vast majority in the United States (5). However, given the ageing population of PHIVA, this number under the age of 15 years likely represents less than half of the total number who are perinatally infected. By 2007, according to the Centers for Disease Control (CDC), 49% of PHIVA in the United States were over 15 years of age (14). UNAIDS reports less than 100 deaths among HIV-infected children less than 15 years of age, but again, given the age distribution of the perinatally infected population, this likely represents less than half the number of deaths among the perinatally infected in the United States, especially since older individuals are at increased risk of death (15).

Nevertheless, given the low mortality and very low number of newly infected babies (<100 per year), the perinatally infected population in the United States is at a relatively stable number of over 10,000 individuals, most of whom are now young adults and with the oldest members now entering the fourth decade of life. Approximately two-thirds of Perinatally HIV-infected Adolescents (PHIVA) in the United States are African-American/non-Hispanic, and approximately 20% are Hispanic; 53% are female (14) (Fig.3).



**Fig.3:** Countries of United States

**Europe**

*Epidemiology*

The UNAIDS estimate for the number of HIV-infected children under 15 years of age in Western and Central Europe in 2011

was 1600. As in the United States, this likely represents less than half of the perinatally infected population. The estimates for the number of deaths and new infections are similar to those for the United States. The perinatally infected population in Europe is likely slightly younger overall than in the United States and much more likely to have emigrated from abroad, as demonstrated by data from the Collaborative HIV Paediatric Study (CHIPS). The characteristics of the epidemic in Eastern Europe are quite different from that in Western and Central Europe. Here, the prevalence among adults is actually increasing, fuelled predominantly by intravenous drug use. According to UNAIDS, the number of infected children under 15 years of age in Eastern Europe and Central Asia is estimated to be 11,000, with more new paediatric infections and deaths among HIV-infected children than seen in the United States and other parts of Europe. The number less than 15 years of age has been relatively stable for most of the past decade suggesting that the number of newly infected infants equals the number of deaths plus the number who reach 15 years of age every year (16) (Fig.4).



**Fig.4:** Countries of Europe

### Latin America and the Caribbean

#### Epidemiology

The 2011, UNAIDS estimates for Latin America and the Caribbean were 60,000 HIV-infected children under 15 years of

age, 3300 new paediatric infections, and 3500 deaths (5). The two countries with the most infected children in these regions are Brazil (20,000 infected children under 15 years of age), the largest economy in Latin America, and Haiti (13,000 infected children under 15 years of age), the poorest country in the western hemisphere. Since 2009 the decline in new infections has been 32% in the Caribbean and 24% in Latin America, as Preventing Mother-to-Child Transmission (PMTCT) coverage approaches 80% in the Caribbean and over 50% throughout Latin America. As new infections are prevented and as perinatally infected children survive and mature into adolescence and young adulthood, the number of infected children under 15 years of age has declined from a peak of 22,000 in the Caribbean in 2004 to 18,000 in 2011. The peak in Latin America was 54,000 in 2005–6, down to 42,000 in 2011. Given these trends, the number under 15 years of age reported by UNAIDS is an underestimate of the total perinatally infected population, though not to the same extent as seen in the United States and Western and Central Europe (5) (Fig.5).



**Fig.5:** Countries of Latin America and the Caribbean

#### Facts

- HIV continues to be a major global public health issue, having claimed more than 36 million lives so far.
- There were approximately 35.3 [32.2–38.8] million people living with HIV in 2012.

- Sub-Saharan Africa is the most affected region, with nearly 1 in every 20 adults living with HIV. Sixty nine per cent of all people living with HIV are living in this region.
- HIV infection is usually diagnosed through blood tests detecting the presence or absence of HIV antibodies.
- There is no cure for HIV infection. However, effective treatment with antiretroviral drugs can control the virus so that people with HIV can enjoy healthy and productive lives.
- In 2012, more than 9.7 million people living with HIV were receiving antiretroviral therapy (ART) in low- and middle-income countries(1,3,4).

### Transmission

HIV can be transmitted via the exchange of a variety of body fluids from infected individuals, such as blood, breast milk, semen and vaginal secretions. Individuals cannot become infected through ordinary day-to-day contact such as kissing, hugging, shaking hands, or sharing personal objects, food or water(1,3,4) (Picture 1).



Picture 1: HIV is not transmitted by hugging

### Risk factors

Behaviours and conditions that put individuals at greater risk of contracting HIV include:

- Having unprotected anal or vaginal sex;
- Having another sexually transmitted infection such as syphilis, herpes, chlamydia, gonorrhoea, and bacterial vaginosis;
- Sharing contaminated needles, syringes and other injecting equipment and drug solutions when injecting drugs;
- Receiving unsafe injections, blood transfusions, medical procedures that involve unsterile cutting or piercing; and
- Experiencing accidental needle stick injuries, including among health workers(1,3,4).

### Diagnosis

An HIV test reveals infection status by detecting the presence or absence of antibodies to HIV in the blood. Antibodies are produced by an individual's immune system to fight off foreign pathogens. Most people have a "window period" of usually 3 to 6 weeks during which antibodies to HIV are still being produced and are not yet detectable.

This early period of infection represents the time of greatest infectivity, but transmission can occur during all stages of the infection. If someone has had a recent possible HIV exposure, retesting should be done after 6 weeks to confirm test results, which enables sufficient time to pass for antibody production in infected individuals (1,3,4).

### Prevention

Individuals can reduce the risk of HIV infection by limiting exposure to risk factors. Key approaches for HIV prevention, which are often used in combination, include:

#### 1. Male and female condom use

Correct and consistent use of male and female condoms during vaginal or anal penetration can protect against the spread of sexually transmitted infections, including HIV. Evidence shows that male

latex condoms have an 85% or greater protective effect against the sexual transmission of HIV and other sexually transmitted infections sexually transmitted infections (STIs).

## **2. Testing and counselling for HIV and STIs**

Testing for HIV and other STIs is strongly advised for all people exposed to any of the risk factors so that they can learn of their own infection status and access necessary prevention and treatment services without delay. WHO also recommends offering testing for partners or couples.

## **3. Voluntary medical male circumcision**

Medical male circumcision, when safely provided by well-trained health professionals, reduces the risk of heterosexually acquired HIV infection in men by approximately 60%. This is a key intervention in generalized epidemic settings with high HIV prevalence and low male circumcision rates.

## **4. ARV based prevention**

ART as prevention

A recent trial has confirmed if an HIV-positive person adheres to an effective antiretroviral therapy regimen, the risk of transmitting the virus to their uninfected sexual partner can be reduced by 96%. For couples in which one partner is HIV-positive and the other HIV-negative, WHO recommends offering ART for the HIV-positive partner regardless of her/his Cluster of Differentiation (CD4) count.

## **5. Harm reduction for injecting drug users**

People who inject drugs can take precautions against becoming infected with HIV by using sterile injecting equipment, including needles and syringes, for each injection. A comprehensive package of interventions for HIV prevention and treatment includes:

- Needle and syringe programmes;

- Opioid substitution therapy for people dependent on opioids and other evidence based drug dependence treatment;
- HIV testing and counselling;
- HIV treatment and care;
- Access to condoms; and
- Management of (STIs), tuberculosis and viral hepatitis.

## **6. Elimination of Mother-to-Child Transmission of HIV (eMTCT)**

The transmission of HIV from an HIV-positive mother to her child during pregnancy, labour, delivery or breastfeeding is called vertical or mother-to-child transmission (MTCT). In the absence of any interventions HIV transmission rates are between 15-45%. MTCT can be nearly fully prevented if both the mother and the child are provided with antiretroviral drugs throughout the stages when infection could occur.

WHO recommends a range of options for prevention of MTCT (PMTCT), which includes providing ARVs to mothers and infants during pregnancy, labour and the post-natal period, or offering life-long treatment to HIV-positive pregnant women regardless of their CD4 count. New guidelines for PMTCT will be issued in 2013. In 2012, 62% of the estimated 1.5 million pregnant women living with HIV in low- and middle-income countries received effective antiretroviral drugs to avoid transmission to their children, up from 48% in 2010(1,3,4).

## **Treatment**

HIV can be suppressed by combination antiretroviral therapy (ART) consisting of three or more antiretroviral drugs (ARV). ART does not cure HIV infection but controls viral replication within a person's body and allows an individual's immune system to strengthen and regain the capacity to fight off infections. With ART,

people living with HIV can live healthy and productive lives.

More than 9.7 million people living with HIV in low- and middle-income countries were receiving ART at the end of 2012. Of this, about 640 000 were children. This is over 30-fold increase in the number of people receiving ART in developing countries between 2003 and 2012, and close to a 20% increase in just one year (from 8 million in 2011 to 9.7 million in 2012) (1,3,4).

### WHO response

Since the beginning of the epidemic, WHO has been leading the global health sector response to HIV. As a cosponsor of the Joint United Nations Programme on AIDS (UNAIDS), WHO leads on the priority areas of HIV treatment and care, and HIV/tuberculosis co-infection, and jointly coordinates with United Nations Children's Fund (UNICEF) the work on the elimination of mother-to-child transmission of HIV.

In 2011, WHO Member States adopted a new *Global health sector strategy on HIV/AIDS for 2011-2015*. The strategy outlines four strategic directions to guide actions by WHO and countries for five years:

- Optimize HIV prevention, diagnosis, treatment and care outcomes.
- Leverage broader health outcomes through HIV responses.
- Build strong and sustainable health systems.
- Address inequalities and advance human rights.

### WHO's core activities on HIV also include:

- Synthesizing the evidence on the effectiveness, feasibility and safety of HIV interventions and approaches, and guiding the HIV research agenda;
- Articulating policy options for national HIV programmes;

- Improving the availability and quality of HIV-related medicines and diagnostics tools;
- Setting norms and standards for scaling up HIV prevention, diagnosis, treatment, care and support services;
- Providing technical support to countries to build national capacity to plan, implement, monitor and evaluate effective HIV responses;
- Monitoring and reporting on progress in the health-sector response towards achieving universal access to HIV services, including coverage and impact of HIV services; and
- Leading global efforts and facilitating cohesion and collaboration among partners to achieve the HIV-related Millennium Development Goals and the targets set out in the Global health sector strategy on HIV/AIDS, 2011-2015(1,3,4).

### Conclusion

Since the beginning of the epidemic, almost 75 million people have been infected with the HIV virus and about 36 million people have died of HIV. Globally, 35.3 million [32.2–38.8 million] people were living with HIV at the end of 2012. An estimated 0.8% of adults aged 15–49 years worldwide are living with HIV, although the burden of the epidemic continues to vary considerably between countries and regions. Sub-Saharan Africa remains most severely affected, with nearly 1 in every 20 adults living with HIV and accounting for 71% of the people living with HIV worldwide.

Prevalence of HIV in adults is as follow: in Sub-Saharan Africa (5%), in East Asia (0.1%), in North America(0.6%), in Latin American (0.4%), in South and South-East Asia(0.3%), in Eastern Europe and Central Asia(0.9%), in Western and Central Europe(0.2%) and worldwide(0.8%) and these facts can be warning for children.

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