



## BOTSWANA KEY



### Controlling the Pandemic: Public Health Focus

HIV/AIDS continues to be a global problem, especially in the world's low income countries. Various public health measures, including safe sex practices and needle sharing prevention, are effective ways to control the spread of the disease. Individuals infected with HIV use antiretroviral therapy to control the disease in their body. After watching the video discussing control measures for HIV/AIDS, you will evaluate epidemiological information to determine factors contributing to the spread of HIV/AIDS around the world. You will compare the data for different countries to answer the following question:

*If you were hired as part of a team to control the spread of HIV/AIDS in a certain country, how would you use statistical data to help determine the most effective regional public health plan?*

After gathering information about the state of the HIV/AIDS epidemic in your assigned country, you will share the results with your classmates. You will have an opportunity to compare the situation in different countries and regions of the world, including the United States. Be sure to study your results carefully and closely to ensure that you make appropriate correlations between the numbers. Keep in mind that statistics are not always as clean cut and easy to compare as you may think!

#### Pre-Viewing Questions

1. What is public health?

Public health is the study of how diseases spread in a population and the measures used to control them.

2. How is HIV spread between individuals?

HIV can be spread by sharing needles, through semen and vaginal fluids during intercourse, and from mothers to children in the uterus, and through breastfeeding and birth.

3. What regions of the world are most affected by the HIV pandemic?

Developing countries are most impacted, especially sub-Saharan Africa.

4. What are some different control methods used to limit the spread of HIV (medical and public health related)?

Different control methods are:

- a) Education and training about HIV (how HIV leads to AIDS, how HIV is spread and how to effectively prevent transmission, and how HIV can be treated);
- b) specific and culturally relevant instructions on the use, and availability, of condoms and clean needles, targeted to high risk groups such as commercial sex workers and IV drug users (in places where HIV is concentrated in these populations);
- c) ensuring safe, HIV-free blood products (for transfusion) supply;
- d) access to HIV testing, with protection from discrimination;
- e) diagnosis of HIV infection in pregnant women, and timely access to anti-HIV ART drugs by pregnant women to decrease mother to child transmission of HIV;
- f) male circumcision;
- g) possibly, treatment of other STDs;
- h) and, possibly, widespread anti-HIV ART treatment which may decrease the infectiousness of persons living with HIV (as well as potentially decreasing stigma associated with HIV).

#### **After Viewing the Video**

Revisit the questions above and add any details that you may have missed before, then answer the questions below.

5. What risk does the limited availability of Antiretroviral therapy (ART) medicine in low income countries pose to individuals with HIV/AIDS? What can happen to the virus?

The HIV virus mutates very quickly and therefore can develop resistance to medication if the use of medication is not continuous. ART medication is crucial in slowing down the progression from HIV to AIDS and limiting the spread of the virus in the body. ART leads to a decrease in the level of HIV in the blood, and it may decrease person-to-person transmission (although this is currently under study).

6. Pick one of the countries highlighted in the video and describe a specific program established there that has helped reduce the spread of HIV/AIDS.

Botswana established routine HIV testing in medical clinics as part of blood screening for all ailments. Intensive national campaigns to eliminate mother-to-child transmission have also been instituted.

Thailand incorporated a nation-wide campaign among sex-workers where it mandated condom use, lowering the transmission of HIV among the Thai Army.

In Uganda, where roughly 1/3 of the army was once HIV-positive, government distribution of 160 million condoms per year has virtually halted the sexual spread of HIV in many areas.

### **Evaluating the Data**

In small groups, you will be evaluating data provided by the World Health Organization (WHO). From this data, you will determine the extent of the HIV/AIDS threat in different countries and regions, as well as possible ways to control the spread of the disease. You will present your results to the class and compare data from different countries to understand regional and international risk factors and variations. First, complete the following questions and data tables by doing some research as a team.

#### *Assigned Country Botswana*

- Go to <http://www.who.int/globalatlas/predefinedReports/default.asp>. Follow the link to the *Epidemiological Fact Sheets* and print the copy of the report relevant to your country.
- Go to <http://www.who.int/hiv/epiupdates/en/index.html>. Follow the link to the most recent *Report on Global AIDS Epidemic* and print the report for global information to use in your evaluation.
- Go to <http://www.who.int/hiv/countries/en/index.html> and print the relevant *Profile on HIV/AIDS treatment scale-up* sheet for your country.



Complete the data tables below by using relevant information from the previous databases. If the information is not available, indicate that with an N/A in the appropriate box. Blackened cells indicate that there is no data available for the majority of the countries or regions for that year.

**Data Table 1: Country Specific (unless otherwise indicated)**

	2003	Most Recent Year with Data
Estimated Number of cases for adults and children	260,000	270,000
Estimated Number of cases for adults (ages 15+ only)	250,000	260,000
Estimated Number of cases for Children (ages 0-14)	13,000	14,000
Estimated prevalence of HIV among adults and children <b>regionally</b>		6.1%

**Table 2: Country Specific (unless otherwise indicated)**

	2003	Most Recent Year with Data
Estimated number of deaths from AIDS among adults and children	18,000	18,000
Estimated number of deaths from AIDS among adults and children <b>regionally</b>		2 million

**Table 3: Country Specific (unless otherwise indicated)**

	2003	Most Recent Year with Data
Total population in Country	1,733,000 (calc from growth rate)	1,765,000
Per capita national Income		\$8,920
Per capita total expenditure on health	\$375	N/A
General government expenditure on health as a % of total expenditure on health	N/A	N/A
Total number of adults needing ART	53,000	71,000
Total number of adults receiving ART	8,000	72,000
ART Coverage for adults in your country	12%	85%
ART Coverage in your region		17%



Respond to the following questions based on the data you have collected above.

1. Calculate the prevalence (percentage of sick individuals in an entire population) for children and adults with HIV combined for 2003 and the most recent year with data.

2003 Adult & children prevalence:  $(260,000/1,771,556) * 100 = 15\%$

2005 Adult & children prevalence:  $(270,000/1,765,000) * 100 = 15\%$

2005 Adult prevalence in Sub-Saharan Africa: 6.1%

2. The cause-specific mortality rate is the percentage of deaths in a country due to a specific cause or disease. Calculate the percentage of deaths due to AIDS in your country to find the cause-specific mortality rates due to AIDS for 2003 and the most recent year with data. Calculate the same for your region for the most recent year with data.

AIDS mortality in adults & kids 2005:  $(18,000/1,765,000)*100 = 1\%$

AIDS mortality in adults & kids 2003:  $(18,000/1,733,000)*100 = 1\%$

AIDS mortality in adults & kids 2005 in sub Saharan Africa:

$(2,000,000/751,000,000)*100 = 0.3\%$

3. Use your *Global Facts and Figures* sheet to determine the percentage of total deaths due to AIDS for people in your region.

$(2,000,000/2,800,000)*100 = 71\%$

4. Produce a graph for the following results for your country and region for 2003 and the most recent year with data:

- HIV prevalence (%) for children and adults combined for your country and adults alone in your region
- Cause-specific mortality rates (%) due to AIDS for adults and children combined in your country and region
- ART coverage (%) for adults in your country and region

Please see attached graphs.

5. Has the total number of HIV cases increased or decreased since 2003 in the country you are studying? How does the prevalence of HIV differ between your country and the region it is in? Explain your response by providing data from your calculations and data tables.

The total number of HIV cases have increased in Botswana from 2003-2005 in both adults and children by 10,000. Botswana has 15% prevalence, while sub-Saharan Africa has 6.1% prevalence. That means that Botswana is in dire need of measures to improve treatment of infected individuals in its country. Sub-Saharan Africa has the world's

highest HIV infection rates, but Botswana has an even higher rate than that of the entire region.

6. Has the total number of AIDS related deaths increased or decreased since 2003 in the country you are studying? How do the cause-specific mortality rates due to AIDS in your country compare to those of the region it is in? Explain your response by providing data from your calculations and data tables.

The total number of AIDS related deaths has remained the same in Botswana. Botswana also has a higher rate of AIDS related deaths than the region, 1% compared to 0.3% in Sub-Saharan Africa. Again, this points to the importance of taking steps to ensure that ARV therapy is accessible to the entire infected population.

7. What are some of the possible factors that are contributing to changes in HIV prevalence and AIDS related deaths?

Botswana has taken major steps to deal with the problem in their country. The total number of cases may have increased because they have instituted more effort to identify sick individuals and so more people who are sick are being treated. It is clear that major efforts have been made to distribute ART drugs. Treatment prolongs the life of persons with HIV/AIDS, so as access to treatment increases, the number of people living with HIV (and therefore the HIV prevalence) increases, even in the number of new cases (incidence) stays the same.

8. Compare the ART coverage in your country and region. How do you think this is impacting the spread of HIV in your country?

In 2003, while 53,000 adults needed ART, only 8,000 were receiving it. In 2005, the average was 71,000 adults in need of treatment and 72,000 adults were receiving treatment. This has a positive impact, although the number of deaths has not decreased overall. This may be because more individuals who are dying from AIDS are being identified as so, therefore not impacting the death number greatly. Over time, you should expect to see less AIDS related deaths if more people receive the ART treatment needed.

9. Providing national access to HIV testing and screening centers, as well as ART distribution centers, may have an impact on management. In your opinion, how effectively is your country addressing this issue? (*Hint: Look at the method of HIV screening and number of individuals being screened for HIV. Do you think there are sufficient ART distribution centers and testing and screening centers available?*)?

The prevalence of HIV as calculated above is 15%. There have been measures in Botswana to test 100% of all blood samples that are collected for HIV. While this is a very effective step in the right direction, it does not mean that everyone who needs to be tested is being tested. In the entire country of Botswana, there are only 16 testing and counseling sites and 32 ART providing sites for HIV infected individuals.



10. Read through the profile on HIV Prevention/Treatment Scale-up for your country. Given your understanding of how HIV spreads, discuss some of the obstacles faced by your country in establishing total prevention of the spread of HIV. Be detailed and specific, offering relevant suggestions where you see feasible.



Botswana is an upper-middle income country, with the average annual per capita income of about \$8,920 per family. If you calculate the amount of money spent per year on average for health related costs, which is about 4% of a family's income yearly. This is a large amount of their income (though less than the 10% average expenditure in the U.S.) and to overcome this, the government instituted free treatment facilities. It has also established a number of locations for people to be tested for HIV and this has brought treatment to those who need it most. The largest problem Botswana has is that it is in critical need of human resources to help in treating individuals who need care. Another major problem is that people who need access to the available clinics and medical facilities do not live nearby and thus there is a decentralized access to facilities. There have been campaigns to educate people about mother to child transmission and this has also helped. HIV prevalence has not decreased, but there are key increases in ART coverage. Still, the spread of HIV is a major problem in Botswana.

\*\*\*Students can offer a number of suggestions here based on their understandings which include instituting programs encouraging people to join the medical profession, encourage more volunteers, use funding to build more facilities across the country, and many others. \*\*\*

## Post-Class Discussion

11. How does your country compare to the rest of the countries being evaluated in terms of HIV prevalence and prevention measures? What social, economic, and political factors in these countries have led to these different variations? Refer to the graphs containing class data and your classmates' presentations to help you answer this question.

Botswana has the highest prevalence of HIV/AIDS out of all of the countries. However, it also has the highest increase in coverage for ART. This highlights the major steps that the country has taken to address the HIV/AIDS problem. Although the mortality rates are generally higher than the other countries, except for Armenia, the increase in coverage is a great improvement. Aside from Costa Rica, Botswana has made the most effort to deal with the problem through national programs geared towards distribution of ART to those who need it most.

12. Look at the data your teacher provided about HIV/AIDS in the U.S. How does the country you studied compare to the U.S. in terms of prevalence and mortality rates? Does the data surprise you? Why or why not?

Being a developed country, the U.S. accesses preventative resources and medication easier than many developing countries, like Botswana. Keeping this in mind, Botswana has taken many steps towards dealing with the problem on hand. More so, the fact that careful steps have been taken to account for the numbers of individuals being treated with ART, while the U.S. does not provide those numbers, indicates the emphasis on treating the population in need.

\* Student responses will vary based on their reactions.