



BOTSWANA KEY



Controlling the Pandemic: Public Health Focus

Just 25 years since it was first reported, HIV/AIDS has become one of the world's greatest public health crises. More than 39 million people worldwide are estimated to be living with HIV/AIDS, mostly in developing countries. Although a variety of public health measures such as safe sex practices and needle exchange programs for intravenous drug users have proven effective in controlling the spread of the disease, they are often surrounded by controversy. Effective antiretroviral therapy (ART) exists to treat individuals with HIV/AIDS and control the disease in their bodies, but the treatments are costly and not readily available in some parts of the world.

In this lesson you will first watch a video that examines the facts about HIV/AIDS and methods for controlling the spread of the disease. You will then evaluate epidemiological information to identify factors contributing to the spread of HIV/AIDS around the world. You will compare the data from several countries to answer the following question:

If you were a member of a team of experts convened 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 several countries and regions of the world, as well as in the United States. Be sure to study your results carefully and check your answers 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 through sharing needles, through semen and vaginal fluids during intercourse, from a mother to a child 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 medical and public-health related control methods used to limit the spread of HIV?

Different control methods are:

- a) Providing education and training about HIV, including how HIV develops into AIDS, how HIV is spread, how to prevent transmission, and how to treat HIV and AIDS;
- b) Offering specific and culturally relevant instructions on how to use and obtain condoms and clean needles, which should be targeted to high-risk groups such as commercial sex workers and intravenous drug users (in places where HIV is concentrated in these populations);
- c) Ensuring safe, HIV-free blood supplies for transfusion;
- d) Providing access to HIV testing, with protection from discrimination;
- e) Diagnosing HIV infection in pregnant women, and providing them with timely access to anti-HIV ART drugs to decrease mother-to-child transmission of HIV;
- f) Ensuring that males are circumcised;
- g) Possibly, treating other STDs; and
- h) 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. How does the limited availability of ART medicine in low income countries affect individuals with HIV/AIDS? What can happen to the virus?

The HIV virus mutates very quickly and therefore can develop resistance to medication if it is not administered continuously. ART medication is crucial in slowing down the progression from HIV to AIDS and limiting the spread of the virus in the body. ART decreases 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 that mandated condom use, lowering the transmission of HIV among the Thai Army.

In Uganda, 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), the authority for global health issues within the United Nations system. 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 several 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 regionally		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 regionally		2 million

Table 3: Country Specific (unless otherwise indicated)

	2003	Most Recent Year with Data
Total population	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 assigned country	12%	85%
ART Coverage in assigned region		17%



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

1. Calculate the prevalence (percentage of sick individuals in an entire population), including both children and adults with HIV, for 2003 and the most recent year for which data are available.

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 assigned country to find the cause-specific mortality rates due to AIDS in 2003 and in the most recent year for which data are available. Calculate the same for your region for the most recent year with data.

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

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

AIDS mortality in adults & children 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 total percentage of deaths due to AIDS for people in your assigned region.

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

4. Produce a graph of the following results for your assigned country and region for 2003 and for the most recent year for which data are available:
 - Total HIV prevalence rate (%) (including children and adults) for the assigned country, and for adults only in your region
 - Cause-specific mortality rates (%) due to AIDS (including both adults and children) in your assigned country and region
 - ART coverage (%) for adults in your assigned country and region

Please see attached graphs.

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

In Botswana, the total number of HIV cases in both adults and children have increased by 10,000 from 2003-2005, the prevalence rate in Botswana is 15%; the prevalence rate in sub-Saharan Africa is 6.1%. Clearly, Botswana is in dire need of measures to improve treatment of infected individuals. 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 in the assigned country since 2003? How do the country's cause-specific mortality rates due to AIDS compare to the rates of the region in which your country is located? 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 that of the region -- 1% in Botswana, compared to 0.3% in Sub-Saharan Africa. Again, this points to the importance of taking steps to ensure that ART 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 HIV/AIDS.. The total number of cases in Botswana may have increased because of aggressive efforts to identify people who have HIV; therefore, more sick individuals are being diagnosed and treated. In addition, efforts have been made to distribute ART drugs. Treatment prolongs the lives of people with HIV/AIDS. As a result, as more people are treated, the number of people living with HIV (and therefore the HIV prevalence rate) increases, even as the number of new cases (incidence) stays the same.

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

In 2003, only 8,000 of the 53,000 adults in Botswana who needed ARTs were receiving it. In 2005, 71,000 adults needed treatment and 72,000 adults were receiving it. This should have a positive impact, although the overall number of deaths has not yet decreased. This may be because deaths from AIDS were underreported in the past. More individuals are being recorded as dying from AIDS, which may be keeping the number of deaths from declining in the short term. Over time, you should expect to see fewer AIDS related-deaths as more people receive needed ART treatment.

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 at the number of individuals being screened.) Do you think there are sufficient ART distribution centers and testing and screening centers available?

The prevalence of HIV in Botswana as calculated above is 15%. Botswana is making efforts to test for HIV in 100 percent of all blood samples that are collected for whatever reason. While this is an effective step in the right direction, there are others at risk who still need to be tested. In the entire country of Botswana, there are only 16 testing and counseling sites and 32 ART distribution sites for HIV-infected individuals.



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

Botswana is an upper-middle income country, with the average annual per capita income of about \$8,920 per family. The amount of money spent per year on average for health related costs is \$375, which is about 4% of a family's yearly income. To overcome concerns about expense, the government runs free treatment facilities, and has also established a number of HIV-testing sites, which is bringing treatment to those who need it the most. However, Botswana's most pressing problem is a critical shortage of medical personnel to help treat the sick. In addition, facilities are too far away for people who need access. The government has also initiated campaigns to educate people about mother-to-child transmission. Although HIV prevalence has not decreased, ART coverage is on the rise. 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, soliciting more volunteers, funding more facilities across the country, and many others. ***

Post-Class Discussion

11. How does your country compare to the other 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.

Of all the countries being studied in this lesson, Botswana has the highest HIV-prevalence rate. However, it also has the highest increase in the number of sick people receiving ART drugs. 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 ART medication is a great improvement. Aside from Costa Rica, Botswana has made the most effort to deal with HIV/AIDS through national programs geared towards distributing ART to those who need it most.

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

The United States has better access to preventative resources and medication than many developing countries such as Botswana. However, Botswana has taken many steps towards dealing with the problem. Botswana also has taken careful steps to account for the numbers of individuals being treated with ART, indicating emphasis on treating the sick. The United States does not provide those numbers.