

# **Exploring Disease in Africa:**

**AIDS**  
**Sleeping Sickness**  
**Small Pox**

*A curriculum for advanced high school +College students*

**African Studies Center**  
Boston University  
Email: [africa@bu.edu](mailto:africa@bu.edu)

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## **Table of Contents**

Political Map of Africa

Curriculum Introduction

    Main Themes

    How to use this curriculum

    Why Africa

    Why these diseases

Disease in Africa

    Changes in the Land, Changes in Disease

    New People, New Diseases

Introductory Activities

    Richard Burton

    David Livingstone

## **Smallpox**

    Boylston and Boston

    Africans and Inoculation

    Jenner and Vaccination

    Transmission, Symptoms, Death Tolls

    Eradication: Theory and techniques

    Eradication: Ethical Questions

    Discussion Questions

    Activity Ideas

    Additional Materials

        Last case of Smallpox

        Smallpox photograph

## **Sleeping Sickness**

    An Ancient and Modern Disease

    The Two Diseases

        Symptoms

        Treatment

    The Cycle of Transmission

        The Vector (Tsetse Fly)

        The Parasite (Trypanosome)

        The Reservoirs (Wild Animals, Cattle)

        The Host (Humans)

    Precolonial African Methods

Colonization and Increasing Sleeping Sickness

Colonial methods of control

Modern methods of control

Discussion Questions

Activity Ideas

Additional Materials

Map of Sleeping Sickness Epidemics in E. Africa

Trypanosomiasis cycle 1, 2

Methods of Sleeping Sickness Control

## **AIDS**

AIDS Today

The Worst Epidemic?

Disease Ecology,

Prevention and Transmission

African Action Against AIDS

Generic Drugs & South Africa

Availability and Regional Differences

Health and Human Rights

Ethics of Scarcity

Discussion Questions

Activity Ideas

## **Appendix 1**

Stanley George Browne Excerpt

Geography and Disease

Geographic Map of Africa

Vocabulary List

Additional Resources (annotated)

Author Biography

Boston University African Studies Outreach Center

## **Appendix 2**

David Livingstone Excerpt PDF

## **Appendix 3**

Richard Burton Excerpt PDF

## **Appendix 4**

Zanzibar Eradication PDF

Political Map of Africa



## **Curriculum Introduction**

I've written this curriculum for teachers who are interested in Africa, want to teach about Africa, and have a gnawing feeling that what they're reading in the newspapers, hearing on the radio, and watching on TV isn't the whole story, or the only story. Whether your specific interest is in disease, development, ecology, history, human rights, or medical ethics, I believe that this curriculum should provide a useful starting point. The following materials should help students think critically and intelligently about disease in Africa.

This curriculum aims to do a few things, mostly to correct biases that are prevalent in much of what we hear about Africa. Biases that imply that Africa is a disease-ridden continent, that help for these diseases only came with the arrival of outsiders, that disease on the continent continues to a problem that only foreign aid and western ideas can fix. I try to counter some of these ideas by focusing on the only disease that has been globally eradicated (smallpox); an ancient disease that lingers on today (sleeping sickness); and a disease that has only emerged in the lifetime of your students (AIDS). A curriculum focused on three diseases is obviously not comprehensive. Conscious decisions were made about what to include, and teachers should be aware of the themes I've chosen to stress.

One of the things I've emphasized is the role of the environment. I try to show students how diseases are dependent on their environments, and that there is an often complex relationship between geography, climate, flora, fauna and disease. Additionally, the modules on sleeping sickness and AIDS show how we must think about the environment with humans in it—a place that is constantly being shaped and changed through human activity. These materials will show how actions such as the introduction of crops and animals and the building of roads and houses have created new niches for some diseases while pushing out others.

I've also tried to examine disease while keeping in mind current debates about human rights and medical ethics. Real life events occurring on the continent present case studies for students to wrestle with difficult questions such as whether there is a “right” to health; if paternalistic behavior is ever justified; and how to allocate scarce yet lifesaving therapies. I do not advocate a specific position on any of these questions, I merely provide students with the materials needed to come to their own decisions. In the sections on smallpox and AIDS, what students will hopefully discover is that many of the questions about human rights are surrounded by other, stickier, questions of medical ethics—questions that get at ideas of justice and equity. As the curriculum explains, a true ethical dilemma has multiple persuasive solutions, making it an excellent starting point for discussion and debate.

Throughout these pages, my thinking is undergirded by the idea of “African agency,” which is the belief that Africans were always active participants in events, not just passive subjects or observers. In practical terms, this simply means I have a bias toward reporting heavily on African ideas, techniques and practices. It also means that in each of the disease modules, students will be presented with information about how Africans controlled diseases prior to Western colonization and how they continue to do so today. An exploration of these practices will draw students into fifteenth century West African kingdoms where smallpox epidemics were contained, and across the continent and into the present where South African citizens have demanded new rights about access to life saving drugs.

I hope you find this curriculum useful as you expose your students to new ways of thinking about disease in Africa.

### **Main Themes**

Briefly stated, the main themes of this curriculum are:

- The physical environment profoundly shapes disease. The environment is more than just the natural environment. People modify the land and waterscapes in innumerable ways: by building houses, cutting down trees, building roads, grazing livestock, planting crops for agriculture, and introducing new plants and animals. All of these changes create new disease environments.
- Africans had indigenous methods to control disease. From across the continent, there were a variety of different responses to different diseases. Some were pragmatic and evidenced a deep understanding of disease even before modern science had explained the intricacies of diseases such as sleeping sickness and smallpox.
- Diseases respect no boundaries. Although this curriculum focuses on Africa, there are global connections when it comes to the spread, prevention, treatment, management and eradication of disease. In order to understand diseases worldwide today, we must understand diseases in Africa historically.
- Diseases exist in the realm of human rights. We cannot discuss diseases in a moral vacuum, and must consider them within the current realm of human rights. Inquiries into disease raise questions about global inequities, the allocation of scarce resources and if there is a “right” to health or life saving treatments.

### **How to use this curriculum**

This curriculum is made up of three separate modules, focusing on smallpox, sleeping sickness and AIDS. The materials have been designed so that the modules can be used individually as stand alone lessons, or all together to explore similarities and differences among and between the diseases. Each module contains a narrative introduction to the disease, which students can read or used by the teacher as lecture notes. Additionally, each module includes a list of discussion question and activity ideas and primary source documents and images. Prior to the disease modules, there is a master vocabulary list and two activity ideas to introduce students to thinking about diseases and their treatments in Africa.

Each module highlights a different concept. Short synopses are provided below:

- For smallpox, students will be exposed to ancient African practices to control smallpox that predated Western forms of vaccination, and how that practice helped stop an epidemic in eighteenth-century Boston. This module also explores the successful eradication of smallpox and asks some difficult ethical questions about the paternalism of public health campaigns and the rights (autonomy) of individual people to choose not to participate.
- For sleeping sickness, particular attention is paid to African techniques for controlling disease by thoughtfully managing the environment. This section also demonstrates the integral role of the environment and the complex relationship that exists between vector-borne diseases and their environments.

- For AIDS, the curriculum presents materials about not only the toll of the epidemic, but also how Africans are responding. Additionally, this module presents the most information about current debates on human rights and medical ethics, highlighting questions of whether there is a right to life saving treatment, and how to distribute scarce life-saving resources.

### **Why Africa?**

Maybe the question should be asked, “Why *not* Africa?” How much is known about this vast continent, and how much is taught in the high school curriculum? In short, it seems there is *too* much misinformation about Africa, and too little emphasis in the high school curricula. It's important for young adults to have an understanding of this massive, diverse, continent.

### **Why these diseases?**

The first disease is smallpox, which is the oldest of the diseases presented, and also the only one to be eradicated. Important because: ancient disease; only one eliminated via the methods of modern medicine and public health working together; eradicated with a vaccine developed only in the 1950s; that vaccine given to people only with the organized efforts of global public health efforts (World Health Organization, etc). Also important because a truly devastating disease, horrifying and almost always fatal. Also interesting case study because despite the West's late creation of a vaccine, Africans had methods of variolation in order to prevent against smallpox dating back hundreds if not thousands of years. Through smallpox we'll be able to explore African indigenous knowledge about disease, the transfer of African medical knowledge to the West (rather than the other way around), and how an infectious disease can be eradicated.

The second disease presented is sleeping sickness. This disease is often overlooked in current discussions about disease in Africa, yet it has been around for centuries and continues to be endemic in parts of the continent, and occasionally epidemics flare up. Sleeping sickness can be fatal, severely decreases quality of life and there is still no method for prevention. Although a pharmaceutical treatment has been available for more than half a century, it is still not widely available in the places where people need it.

Sleeping sickness is the most obvious example of a disease that is profoundly rooted in, and affected by, the environment. It is the most complicated of the diseases presented in terms of the required physical conditions, and the complex interactions between vector, host, reservoir and victim. It is here also where we will find more examples of Africans thoughtfully managing the physical landscape in order to minimize exposure to the disease.

The final disease presented is the most notorious, and the most intimately linked with Africa: AIDS. It is an obvious choice for a curriculum such as this one. Almost everyone knows about AIDS, and has heard about the devastating toll the epidemic has had in Africa. This disease, however, also presents some interesting contrasts to the other two. AIDS is not transmitted by a vector, and is not as intimately linked to the environment as sleeping sickness. But, we will show how the AIDS epidemic took on a particular shape due to humans' impact on the environment (location of roads, patterns of urbanization and rural-urban contact, presence of labor migration).

This epidemic has often been portrayed as one requiring foreign solutions. The curriculum challenges this idea by illustrating some of the mechanisms Africans have used to cope with the fallout of the epidemic: home based care for the sick being just one example. The epidemic is not just a case of foreign solutions, but also very pragmatic responses on the ground. Finally, we will explore the dark reality that because of cost and politics, drugs to treat AIDS patients are not widely available in Africa. This raises important questions about human rights that students will be forced to address while grappling with what human rights mean.

## **Disease in Africa**

### *Changes in the Land, Changes in Disease*

As a continent full of diverse landscapes and ecosystems, Africa has always had disease. But, Africa did not always have the *same* diseases they have now, and they did not suffer from them in the same way. All diseases are rooted in their environment, but some are more sensitive to environmental changes than others. One of the biggest shifts during the past millennium is that people's relationship to the land has changed.

Until 5000 BC (?), Africa's population was composed primarily of small nomadic groups engaged in hunting and gathering. These small groups of people traveled from place to place, hunting and collecting wild grains. They moved to a new location when the seasons changed or when a place no longer provided food.

Although it goes against many people's expectations, the disease burden was actually quite low for these nomadic people. They did not have many things: permanent homes, reliable food supplies, iron tools or agricultural knowledge. But they also did not have many diseases common in Africa today. For instance, waterborne diseases such as dysentery and cholera were virtually unknown since groups would move before fouling their water supply. Their lack of contact with livestock also protected them against diseases such as smallpox or measles.

Answers as to why people stopped being nomadic and turned to settled agriculture are hard to prove definitively. What we do know is that when groups began to settle down to grow their own crops, it ushered in a new era. With the blessings of no longer being dependent on what they could find, they also had to endure the hardships that came with new diseases. As groups settled down to domesticate animals and grow crops, Africans intentionally and unintentionally changed the land. And with changes in the land came changes in the disease environment.

## **ANIMALS AND NEW DISEASES**

The domestication of animals was a major step in creating settled agricultural societies. Domestication meant far more contact between humans and cattle, chickens and goats, which made people increasingly susceptible to animal diseases. Viruses that formerly only affected these animals were given multiple opportunities to mutate and transition from being purely animal diseases into human ones. The process of a disease mutating and jumping species is a two part process that almost always begins with a new, higher level of contact between animals and humans. In the first phase, an animal disease mutates to infect a human that is in contact with a sick animal. In this case, an animal is sick, and a human becomes sick through contact with the infected animal. To use the recent scare about bird flu as an



example, the first phase was when sick birds infected the farmers and handlers who were around them. To reference one of the diseases we'll study in this curriculum, cowpox jumped from sick cattle to the hands of the milkmaids who were in constant contact with them.

A second transition is needed for the disease to become truly dangerous to humans. The virus must mutate again so that it becomes a disease that can not only infect humans, but which can be transmitted and spread from human to human. Once this transition has occurred, the disease no longer needs the sick animal. A person can become sick with the disease just by being in contact with a sick person. To return to the example of bird flu, this is luckily a transition that has not yet occurred. It's this jump that public health officials are especially worried about, since it means that bird flu is no longer dependent on sick birds, only on sick humans. Regarding sleeping sickness, part of what made it such a dangerous disease was that it successfully made this jump and was easily transmitted from one infected person to another.

### **AGRICULTURE AND DISEASE ENVIRONMENT**

Another way that the disease environment was changed was through the practice of agriculture. In order to grow crops, the land had to be cleared and formerly wild grains cultivated in a single area. The changes in the land and the flora meant that new disease environments were created: places for vectors to breed, and places for people to come in contact with those vectors (Vector: See the vocabulary list in the appendix). One way to explore the changes that occurred due to the cultivation of new crops is by looking at one plant. In parts of Uganda, banana trees from Asia were introduced with great success. The trees were planted near homesteads and villages and provided an easily maintained and steady source of food. But in order for the trees to be planted, other plants had to be removed. As the trees grew up, the perfect conditions for tsetse flies (which transmit sleeping sickness) were created. For centuries now, southern Uganda has remained a site of reoccurring sleeping sickness epidemics, which have killed hundreds of thousands, if not millions, of people.

Before we denounce the introduction of banana trees, we have to consider what kind of environment the trees replaced. In the case of southern Uganda, the places where the banana trees were planted used to be an ideal habitat for anopheles mosquitoes—the vectors for malaria. When the trees were introduced and began to grow, the new tsetse environment destroyed the formerly mosquito (and malaria) friendly conditions. Thus the Baganda people suffered more exposure to tsetse flies, but less malaria. It would be hard to argue that this change was either bad or good; it is more honest to claim that this was more a case of environmental change. As we explore the history of disease in Africa, it is important to remember that humans can have both positive and negative impacts on the land, but more often than not, there are mixed results.

### **HOW EPIDEMICS HAPPEN**

Settled agriculture creates denser settlements of people compared to nomadic hunter-gather groups. Larger numbers of people gathered in one place means there is a higher likelihood of epidemic and endemic diseases. With small groups of people, it becomes impossible to have epidemics of disease since these diseases require a sufficient number of uninfected or non-immune people to infect. The way many infectious disease epidemics work is that they enter a new location where there is a large number of uninfected people who have no immunity. The disease sweeps in with an infected foreigner or a local who has become infected while traveling. People quickly become infected and one of two things

happen. Either the person dies or the person becomes immune. After the disease has burned through the human hosts, it will need to retreat to an animal reservoir (allowing it to become endemic) or it will disappear until a sizable number of non-immune people again exists.

### **ADVANTAGES OF AGRICULTURE**

But there are also some advantages to living in settled agricultural villages, despite the fact that it exposed people to new diseases. In particular, there is greater food security which helps prevent malnutrition and undernutrition. There are also advantages gained technologically from sharing knowledge. It was only with the advent of settled agriculture that villages and cities developed, and with those densities of people came much of what we associate with “culture” was able to develop.

#### *New People, New Diseases*

Africa is often considered part of the “old world” consisting of Europe and Asia, but this is only partially true. For millennia the continent had many of the diseases that were in Europe: plague, leprosy, syphilis. But just because these diseases existed on the continent doesn't necessarily mean they emerged there independently. It's unclear whether these diseases were spread from Europe to Africa via contact, or if they arose independently in each place. What we do know is that on many parts of the continent, Africans shared enough diseases with Europe to have a degree of resistance. There were very few “virgin soil” epidemics that resulted in huge losses of life.

One of the ways epidemics began, however, was through the re-introduction of diseases by travelers or traders from other parts of the world. Both the eastern and western coasts of Africa received many visitors, meaning that there were many potential chances for infection.

### **ATLANTIC EXCHANGES**

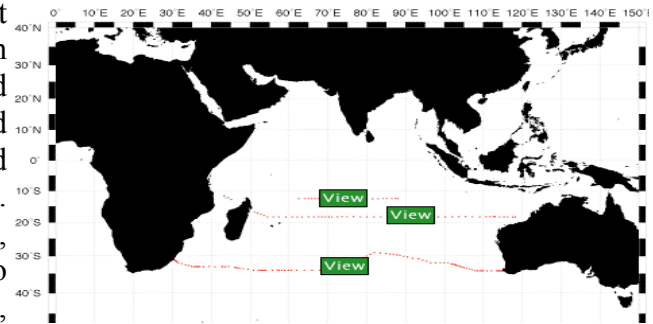
On the West Coast of Africa, there was regular and sustained contact with Europeans from the 1500s onward for the purpose of trade. There was also regular contact with the East Coast of Latin America, and indirectly with the southern United States and Caribbean due to the slave and triangular trade. West Africa was intimately connected to the rest of the Atlantic Ocean world through the slave trade. They exported much more than just people, though. Aspects of West and Central African language, religion and cultural practices could be found on the Eastern coast of Latin America, the Caribbean and in the American colonies in the south. All of this contact meant that in addition to people and ideas, parasites and whole new diseases could be introduced into trading centers. It didn't mean that such biological exchanges were sure to happen, but it did raise many new possibilities.

As just one example of this trans-continental trade in diseases, the African continent was on the receiving end in the 1890s. A boat arriving from Brazil into a west African port brought along not only supplies to trade, but also a very hardy flea. The flea, also referred to as a jigger, was to quickly make its way across the width of the African continent. The flea was not deadly, but it did qualify as a big nuisance. The pregnant flea, which normally resides in dirt or sand, will burrow into the feet of a person walking on top of it. Once establishing itself under the skin, the flea bites into a capillary and begins sucking the person's blood. In the next one to two weeks, the flea releases approximately a hundred eggs that will pass out of the person's foot onto the ground. Inside the body, the flea will continue to suck, growing up to a centimeter in size. The site can become ulcerous and infected, in addition to being quite painful. This new immigrant to the continent moved fast, and had reached the

East African coast within three years. One of the things that the remarkably fast spread of the jigger shows is how well connected West Africa was to its interior since it required people moving across the continent to bring the sand flies with them.

### INDIAN OCEAN EXCHANGES

On the East African coast, there was also a long history of contact with other lands facing the Indian Ocean lands. For centuries, the east coast of Africa had been a destination for traders and travelers from the Middle East, Oman and India. The yearly monsoon winds provided the perfect means for travel since they blew half the year toward Africa and half the year toward India. The nature of this contact differed a bit from that in West Africa, however. On the Eastern coast, new products, people and diseases introduced into the coastal ports and entrepôts moved into the interior more rarely and slowly because of less developed trade networks. This did not stop diseases such as tuberculosis, plague and cholera from being re-introduced into the port areas, where they could cause havoc. And, as the networks into the interior improved in the mid-1800s (created to move slaves and ivory to the coast) diseases more quickly moved into formerly isolated and protected regions..



*The Indian Ocean world, connecting Eastern and Southern Africa to Asia and the Middle East.*

The history of European contact in Africa differs dramatically from that in North and South America. The Americas were considered part of the “new world” where many of the diseases rampant in Europe did not exist. Smallpox and tuberculosis were new diseases to the native Americans, great numbers of whom people died, since they possessed no acquired immunity. In Africa, the tables were turned to some extent. European explorers were unable to penetrate the interior part of the continent—or much beyond coastal areas—for centuries due to the rich disease environment. Europeans possessed no immunity to, or protection for, malaria which was found across huge parts of the continent. Sleeping sickness was also rife, in addition to a number of “fevers” that would routinely kill whole exploration teams. Some scholars have argued that the late colonization of Africa compared to the Americas is due to a degree of protection the continent had because of its unique and deadly disease environment.

### **Introductory Activities**

In order to introduce your students to thinking about disease and medicine in Africa, it may be useful to spend time allowing them to read one or two primary sources that challenge some preconceived notions. There are two documents included in the appendix of this curriculum that have passages that will challenge students' ideas about what constitutes medicine in Africa, how useful African knowledge is, and the flaws that can be inherent in a folk understanding of disease.

### **Richard Burton, *First Footsteps in East Africa or an Exploration of Harar*, (London: Longman, Brown, Green, and Longmans) 1856.**

Richard Burton was an adventurer, explorer, spoke more than a dozen languages, and was reputedly the first foreigner to sneak into Mecca. This book was published in 1856 and records his travels around the horn of Africa. In general, Burton is an extensive and thorough chronicler of places. He was a bit of an eccentric for his time since he valued local knowledge, and was possibly less racist than his peers. In his many books, including this one, readers will find quite thoughtful descriptions of local practices and ideas. The following excerpts focus on Burton recounting conversations he had with Somalis about their customs for treating different diseases.

Pg: 180-182

We're reading Burton's footnote to his regular commentary. It has to do with the treatment for a variety of different maladies, including smallpox, chickenpox, dysentery, hemorrhoids and consumption, and the use of leeches. Interestingly, toward the end of the passage Burton records how Somalis argue that their indigenous therapies are more effective than British medicine.

Things to notice/discuss:

- Connections between food/diet and healing are not so different than ideas we have about these things today. (Chicken soup, orange juice)
- Use of leeches then and now (just because old and foreign doesn't mean they're ineffective; leeches are being re-introduced into medical practice today)
- Somali's argue their treatment was more effective than the British. Believable?

Pg: 232-233

This passage discusses the use of oil and butter as a skin protector and illustrates that just because some folk practices are true, not all are.

Things to notice/discuss:

- Use of butter to protect skin, similar to use of shea butter today
- Just because one part of a practice is true (butter as a skin protection), doesn't mean all are true (neutralizes malaria)

General Questions:

- Why did the Somalis have the practices Burton described? How did they learn them?
- Do you have to understand "science" to know a medicine or practice is effective?
- Today, how do we explain chicken soup, orange juice or a particular diet to restore health?
- Should we be wary of dismissing "traditional" or "folk" remedies since there is a tendency for many remedies to return?

**David Livingstone and Charles Livingstone, *Narrative of an Expedition to the Zambesi and its Tributaries; and of the Discovery of the Lakes Shirwa and Nyassa, 1858-1864*, (New York: Harper & Brothers Publishers) 1866.**

The two authors consisted of David (the recipient of the famous line, “Dr. Livingstone, I presume”) and his brother, Charles. What were they doing there? Explain his mixed feelings about local medical practice because of his role as a missionary. Intent on bringing the three “Cs” to Africa: Christianity, civilization and commerce—all through colonization. These excerpts are taken from their absolutely huge book (600+ pages) of very detailed commentary. The included passages show examples of Europeans recognizing African competence regarding agriculture, and a questioning of what “medicine” in Africa is all about. Dr. Livingstone's passages are also a good opportunity to talk about how there can be biases in primary sources, and the importance of being critical readers.

Pg. 57-58; 313; 446-447—What is an African “doctor” and African “medicine”?

- Europeans describing the African “medical profession”: crocodile, elephant, rain doctor. Interesting example of European/African interaction and change since there is now a “gun doctor”.
- Different types of medicine including “child medicine” and the “medicine of fatness”.
- Should we explain these things just in terms of semantics, or does this imply a fundamental difference in how Africans understanding disease and medicine?

Pg. 250-251; 447; 510—Sleeping sickness, African treatment and ideas about

- Paragraph long description of an African technique for preventing, treating tsetse-bitten cattle
- Local knowledge about tsetse
- What did Livingstone understand about the role of the environment and disease ecology? Who do you think understood more about sleeping sickness at this time, why?

Pg. 524-525—Recognizing African knowledge

- Recognition that Africans did possess some skills
- Does this passage fit with the excerpts of other parts of the book?

General Questions:

- How does Livingstone characterize local medicine?
- What do you think he thinks of native practitioners and why?
- If you were using this account to try to write an “honest” assessment of local medical practices, would you use this account—would anything worry you? Do you trust the Livingstone’s assessment?