



Hot Zones



Introduction

See how changes in global and local ecosystems are connected to the increased spread of infectious diseases. Locations: Kenya, Peru, Bangladesh and the United States.

“Hot Zones” shows just how closely human health is dependent on that of the environment. With the outbreak of thirty previously unknown diseases in the last two decades, the film examines the human consequences of altering global and local ecosystems. In this program, we visit Kenya, Peru, Bangladesh and the United States where changing climates, uncontrolled development and loss of natural habitat have led to an increase in infectious disease. We also explore how cutting edge use of remote sensing data and new epidemiology studies are assisting health and ecosystem scientists predict and ultimately control serious epidemics.

Our journey begins along the shores of East Africa's Lake Victoria, one of the world's largest fresh water lakes. Home to more than thirty million people, this region is located in one of Africa's unhealthiest environments. Lake Victoria is the malaria capital of the world. To make matters worse, raw sewage, over-fishing and agricultural run-off are slowly destroying the lake's ecosystem. Many families are left with few choices but to abandoned their ancestral fishing grounds and migrate to larger cities like Nairobi, only six hours away. Until recently, Nairobi was malaria free. Today, it has hit the city with a vengeance — 40% of its children are infected. Scientists are struggling to understand the spread of malaria by examining environmental change and the massive migration of people from the countryside.

In the high valleys and jungles of Peru lie some of the greatest stands of tropical rainforests on the planet. In the depths of the jungle, just as in Nairobi, people are suddenly dying of malaria. Deforestation and changes in land use are affecting the distribution of many disease vectors. As the forests are cleared and wildlife eradicated, vectors of disease must seek out new hosts on which to feed — namely humans. In an attempt to mitigate the problem, scientists are studying the rainforest to understand how changing land use can affect the distribution of disease vectors.

One of the great concerns for the future is that insect borne diseases are adapting to cities. Malaria is one — but there are others. In the Peruvian port city of Iquitos, those living in sprawling shanty towns not only suffer from an upsurge of malaria they have become victims of another mosquito borne disease — Dengue fever. Ten years ago it posed no threat. But today, Dengue has reached epidemic proportions — five percent of its victims will die. Once again, research shows that cities can create their own ecology of disease — making them ripe for colonization by mosquitoes.



But environmental degradation and infectious disease are not exclusive to the tropics or the developing world. Travel, commerce and tourism have put places like Iquitos and Nairobi on the doorstep of the West. In the United States and Europe, health professionals successfully eradicated malaria and most other insect borne diseases in the 1950's. That doesn't mean they are gone for good. Diseases never before seen in the Western hemisphere, like West Nile virus, are a looming threat to the United States.

Yet there is a global health issue even greater than insect borne diseases looming for the 21st century. It revolves around the most basic human need — water — clean water. The effects of water borne diseases are devastating. In the poorest regions of the world one in five do not live to see their fifth birthday — diarrhea alone claims the lives of nearly three million children each year. As people flood into cities, the problems of sanitation, clean water and the spread of water borne diseases become even more urgent.

In 1991, a cholera epidemic began in a small coastal fishing village about 250 miles north of the Peru's capital. Within days Lima became a hot zone. Victims started arriving at local hospitals every few minutes. Because the epidemic began in a fishing village many thought seafood might be responsible. The reality is, raw fish was never the problem provided it was washed in clean water. Cholera is transmitted when infected human waste contaminates the water supply — it is a disease of the poor.

Bangladesh is a place whose fragile infrastructure is squeezed hard by the dispossessed and poor. Clean water and sanitation are rare commodities — disease is rampant — especially for children. Yet, ten percent of children born in Bangladesh die before the age of five. Seasonal outbreaks of cholera make hospitals look more like battlefields littered with casualties of war. Each year the disease strikes nearly half a million Bangladeshis — it claims 25,000 lives.

Water is clearly a global problem — and it is not just limited to the countries of the developing world. In Maryland's Chesapeake Bay, watermen have faced a serious decline in their catch. Several years ago watermen began to notice grotesque lesions in the fish and crabs they were catching. Not long after the fish started getting sick, so did the watermen. The bay is showing the affects of sewage, pesticides and industrial effluents that have been seeping into the Chesapeake for decades. Teams of scientists struggle to find solutions, but the fish are still dying and the watermen of Maryland continue to suffer.

Fortunately, there are programs that are beginning to offer glimmers of hope. In the jungles of Peru, clinics have been established in rural villages — introducing vaccination programs that promise to ease the suffering from mosquito borne diseases. In Bangladesh, thousands of rural health workers are teaching women simple sanitation procedures that will help protect their children from cholera and other serious childhood diseases. In the slums of Dhaka, clinical trials of a new oral vaccine for ecoli hold great promise to ease the suffering of infants. And in Kenya, medical researchers have helped convince local authorities to begin eradicating the breeding grounds for the deadly Anopheles mosquito.

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