



Journey to Planet Earth

Transcript for Episode 06: Hot Zones

Complete Version

Journey to Planet Earth is produced by

**Screenscope, Inc.
4330 Yuma St, NW
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(Opening Tease)

Next on Journey to Planet Earth. Are we winning the battle to prevent global outbreaks of infectious diseases? Kenya, plagued with the escalating consequences of malaria. Peru, scientists discover new hot zones of dengue fever. Bangladesh, working hard to cope with massive cholera epidemics. And the United States, confronting West Nile Virus and other emerging public health threats. A gathering storm or false alarms? Coming up, Journey to Planet Earth explores the link between environmental change and infectious disease.

(Matt Damon On-Camera)

Hi, I'm Matt Damon and welcome to *Journey to Planet Earth*. In this episode we explore the link between environmental change and the spread of infectious disease. We will visit a world where billions of people are without clean drinking water or proper sanitation services.

But we'll also see that travel, commerce, and tourism have put newly emerging diseases on our very own doorstep. I think you'll find it a timely and important investigation -- so please join me now -- as our journey begins.

(Opening Montage)

In the 1970's, new vaccines and antibiotics seemed to be winning the war against infectious diseases. Most scientists were confident that the major contagious killers were retreating. HIV AIDS put an end to all that. In the last thirty years, there has been a dramatic upsurge of infectious diseases all over the world. Not just AIDS but insect and waterborne diseases too. Malaria, cholera, and dengue fever are spreading fast. National boundaries, even the well-policed ones, are porous. Can we keep global pandemics away from our shores? In the United States, West Nile Virus is already rampant. Will the west be any safer from these diseases than it was from HIV? Join us now as Journey to Planet Earth investigates how environmental change is fostering the tide of contagion which threatens to engulf us all.

(Fishing Village)

Our journey begins here, along the shores of East Africa's Lake Victoria. Shared by Tanzania, Uganda, and Kenya this is one of the world's largest fresh water lakes. It's fertile waters sustain more than thirty million people. Each morning the villagers of Kombewa, a small fishing settlement in Kenya, prepare to work Lake Victoria's shallow but fertile waters. As the men ready their nets and boats, the women sort through what's left of yesterday's catch. If the weather holds and they find the right feeding grounds -- the fishermen could earn twice Kenya's average income for a day's labor. It almost seems like an idyllic way of life.

But this region is located in one of Africa's unhealthiest environments. Lake Victoria is the malaria capital of the world. Thirty five hundred children live in the village of Kombewa. Over six hundred will never see their fifth birthday. The towns along Lake Victoria are located on the equator; the weather is hot and steamy -- the perfect breeding ground for the deadly *Anopheles* mosquito -- the only carrier of malaria

(Hospital)

Hospitals can't begin to handle the burden. At any given time, as much as 80% of the local population may be infected with malaria. Doctors Jose Stoute and Alfred Odindo are studying malaria's affect on the most vulnerable -- young children.

Jose Stoute

Children here are repeated exposed to one bout of malaria after another after another after another until they begin to develop immunity. But in the meantime, they are susceptible to complications from those repeated attacks, and that's why children here have a high mortality from malaria.

Little Yvonne Dhiambo is three years old and just recovering from her fourth bout with malaria. She still hasn't developed an immunity to the disease. If she can survive a few more years she may be one of the lucky ones. In this region, 20% of children under the age of five die of malaria.

Jose Stoute

The reality is that it doesn't have to be that way. Malaria is a curable disease, and most of the fatalities occur due to the lack of adequate drug supplies and adequate health care facilities.

(Fishing Village)

Though the village of Kombewa has been hit hard by malaria the people are now faced with an equally dangerous threat. Today was not a good day for fishing. It's been this way for some time. Although they appear calm, the men work with a sense of urgency. Raw sewage, over-fishing and agricultural run-off are slowly destroying the lake's ecosystem. Livelihoods and traditional lifestyles are threatened. Many are left with few choices but to abandon their ancestral fishing grounds and migrate to larger cities. Despite the optimism suggested by a soft-drink advertisement, reality here is harsh.

(Bus Station)

Local bus stations are jammed. Most are escaping from severe economic pressures. They bring with them all their possessions -- very little is left behind -- including the lethal malaria parasite. The most popular destination is only six hours away.

(Nairobi)

Once a small trading post in the middle of the grasslands, Nairobi is now a metropolis of over 2 million people. At first glance Kenya's capital seems like a prospering modern city.

Ronald Rosenberg

People from the West have a romantic view of Africa. If they think about Kenya, they think about the savanna and these huge herds of elephant, and antelope and lions, but in fact, modern Africa is really much more like this., with large cities like Nairobi that act as magnets to bring people in from the countryside where they're having trouble making a living. When they come into a city like Nairobi, they bring with them a nucleus for epidemics.

(Kibera)

Nairobi is ringed with impoverished shantytowns like Kibera. Over two hundred and fifty thousand migrants are crowded into less than two square miles. For those fleeing from the environmental and economic hardships of Lake Victoria, life here is even harder – unemployment is over 80% -- nearly all live on less than \$2 a day. With no sanitation facilities Kibera suffers from a variety of deadly infectious diseases.

Even the act of collecting a few drops of tainted water is a daily struggle. Yet, until recently, Nairobi was malaria free. Today, it's hit the city with a vengeance – thousands of children are infected -- and the epicenter is Kibera.

Medical researchers Amy Korman and Juma Makasa are investigating the outbreak.

Amy Korman

Malaria is generally considered a disease of rural areas, not really a disease of cities. We're trying to determine the extent to which malaria is transmitted in Nairobi. You need three things. You need people that have malaria; you need the mosquito to transmit it; and you need to verify that the mosquito is actually carrying the malaria parasites.

The research team suspected that the massive migration from the countryside was linked to the spread of malaria.

Ronald Rosenberg

When they come into a city like Nairobi they bring with them the diseases from their homes, but they also change the environment so that mosquitoes that transmit malaria are able to breed more readily.

(Research Team)

And that is exactly what researchers discovered. The Anopheles mosquito was present in Nairobi because the environment was changing. Typical of many newly arrived slum dwellers, Paulina Karugo grows vegetables on a small plot of land behind her home. But in the process, she and hundreds of others have unknowingly created the perfect breeding ground for the Anopheles mosquito -- a hot zone of infection.

Amy Korman

You have high density housing and you have agricultural practices next to this housing that are good places for these mosquitoes that carry malaria to grow up in. If the season is good for mosquito development, you may have a transmission going on in an area where you don't normally associate it.

The implications of what was discovered in Nairobi are significant – there is a definitive link between the spread of infectious disease and manmade changes to the environment. It's happening in Kenya and it's happening in some of the most remote places on the planet.

(Peruvian Andes)

The high valleys and jungles of Peru. These are some of the greatest stands of tropical rainforests in the world. Through dense vegetation -- perennially shrouded in mist -- here, water slowly courses down the eastern slopes of the Andes. It all eventually flows into the vast basin of the Amazon River. In the depths of the jungle, just as in Nairobi, people are suddenly dying of malaria. This crisis has brought to Peru a team of international scientists. Their mission takes them downstream on a remote tributary of the Amazon.

(Research Team)

Their goal is to enter the hot zone of infection and discover the cause of the epidemic. Field researcher, Amy Vittor is from the Johns Hopkins Bloomberg School of Public Health.

Amy Vittor

Ten years ago there was virtually no malaria in this area. Around 1997 malaria had risen so much that a third of the whole population had it in a single year. Now we are at the stage where pretty much everyone has had malaria at least once, some as many as 13 times.

Amy and her assistant begin by visiting villages that are suffering the most fatalities. They are looking for the slightest clues that could explain the mystery. She also asks questions -- and patiently listens to their stories. But she learns nothing that would suggest the cause of the epidemic. She keeps searching for answers -- knowing only one thing for sure -- in 1965 there were only fifteen hundred cases of malaria in all of Peru. Today, it's over one hundred and sixty-five thousand.

In a Bora village, the tribal leader explains how malaria affects his people. Before they used to sleep without mosquito nets. Now it's impossible, he says. He also reports that the Bora children are being repeatedly infected and the situation is getting worse. Three have died in just the last week. Amy's research takes her deeper into the jungle. Closer to the center of the hot zone. She is aware that one cause of the epidemic may be the abandonment of mosquito eradication programs -- a result of Peru's recent economic crisis.

Amy Vittor

Obviously, economics plays a major role, and other factors such as the amount of health care available, people's behavior, all of these things play into malaria prevalence

But she thinks there may be something else behind the epidemic. For months Amy collects water samples from streams and rivers surrounded by dense forest. She is looking for the larva of the malaria carrying Anopheles mosquito. In nearly every location, none are found. Then Amy confirms her suspicions.

When she samples water from deforested areas there is clear evidence of a widespread infestation of the Anopheles mosquito. Everything points toward a link between malaria and the clear-cutting of the rainforest.

Amy Vittor

Deforestation causes numerous changes in the ecology. The soil composition, changes in the pH of water, the amount of shade that comes down to the forest floor. All of these things change. As these things change, the amount of breeding sites available for malarious mosquitoes also changes,

People like the Bora have always cleared small gardens like this in which they grow the manioc and bananas on which they depend. In this classic slash and burn agriculture, the impact is not nearly as severe as it looks -- most gardens are rotated and the forest is allowed to grow back. It has been practiced for millennia by the indigenous people of the Amazon. But today huge expanses of the rainforest are being clear-cut for cattle ranching. Here there is no rotation; the forest is not allowed to grow back. Amy and her team have found that recently cleared open pastures are perfect breeding grounds for the anopheles mosquito.

(Amy's Lab)

Each day, as Amy records her findings she knows the importance of her research. Globally, malaria kills over two million people every year -- mostly the poor who can't afford medication. This makes the anopheles mosquito the greatest killer of man in the animal kingdom.

Amy Vittor

The bottom line really is that we're changing the ecology in a dramatic way, and we don't really know what are consequences are.

The spread of malaria is not the only consequence of clearing the rainforest, but it may turn out to be one of the most devastating. Cut down at the rate of a thousand acres a day, the Amazon is being cleared to make way not just for farmland but for towns too. One of the great concerns for the future is that insect born diseases are adapting to cities. Malaria is one - but there are others.

(Iquitos)

This is the port city of Iquitos. Built in the heyday of the rubber boom it still remains the center of commerce on the upper Amazon River. But those living in its sprawling shantytowns 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. 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.

In Iquitos, collectors search for the mosquito, *aedes aegypti* -- anything that holds water is a potential breeding ground. In the hundreds of old tires, basins and wells of the shantytowns, *aedes aegypti* has found its ideal environment. Its larvae thrive in these stagnant waters. Epidemics in Iquitos would have once seemed remote from the developed world. But this city has become a favorite destination of eco-tourists. And with daily flights to the U.S. and Europe -- no disease outbreak stays local for long.

Amy Morrison

Dengue is really a global problem. The interesting thing about *aedes aegypti* is it's a completely urbanized mosquito. It has adapted to human beings and as a result it can travel with them on airplanes, on boats and people actually can move the virus, the dengue virus around the world rapidly as well.

Travel, commerce, and tourism have put places like Iquitos and Nairobi on the doorstep of the West. In the United States and Europe, they eradicated malaria and most other insect born diseases in the 1950's. That doesn't mean they are gone for good.

(Kennedy Airport)

At New York's Kennedy airport, they are alert to the problem. Every day, over three hundred flights arrive from other parts of the world, carrying not just people but plants and animals too. All of them are inspected. Each year the United States spends 350 million dollars to protect its borders from infectious diseases. Careful attention is paid to horses. They are often carriers of lethal diseases. Blood sample are taken and the animals are put into quarantine until the results come back.

K. N. Ahmad

We test them for four different diseases which don't exist in this country. And we test them out, and if they come out positive, they have an option to take the horses back to the country of origin, or we destroy them here.

Despite all of the precautions it's simply impossible to stop every disease from entering the United States.

(New York City)

During the summer of 1999 New York City became a hot zone for a rare and deadly virus. A mosquito borne disease from a remote part of Africa crossed the Atlantic and forged a foothold in America. In early August thousands of crows started dropping out of the sky. Three weeks later an 80-year old women died of encephalitis. Within weeks another 56 cases were reported -- seven people died. Health officials were puzzled -- then alarmed.

(Laboratory)

Attention quickly shifted to high security laboratories that study toxic diseases like Anthrax and Ebola. Scientists started dissecting dead birds -- looking for clues that could confirm their suspicion -- that the virus that affected birds was also lethal to humans. Eventually the disease was isolated -- it was something never before found in the Western Hemisphere -- West Nile Virus.

Michael Turrell

No one knows how it got here, though personally, I believe it arrived here in an infected mosquito hitching a ride in an airplane. If we want to be able to have the freedom to travel around the world, this is one of the side effects.

(Telephone Call Center)

Today, phone banks across the nation receive reports of dead birds. Since its entry into New York, West Nile Virus has become a public health threat to an entire continent -- thousands of people have already been infected. During the summer months, when mosquitoes are most active, the calls never seem to stop. When birds start dying -- there's a good chance West Nile is not far behind.

(Spraying)

It's also an early warning signal to initiate mosquito control measures -- like the selective spraying of pesticides. West Nile thrives in the neat back yards and gardens of suburbia -- it preys on the weak and the elderly. In wealthy countries like the United States, resources are available to fight mosquito borne outbreaks. For now, most public health officials don't expect West Nile to become a greater threat.

Michael Turrell

The West Nile really has served as a wake-up call. The introduction into the United States, a virus which has never been here before, illustrates the possibility for other pathogens, other viruses and bacteria, to come into the United States.

(Mosquito)

Health authorities believe that West Nile could be a harbinger of things to come -- it re-enforces the fact that disease knows no borders.

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.

Peter Gleick

There are 1.1 billion people worldwide that don't have access to basic clean drinking water, and 2 1/2 billion people worldwide that don't have access to the sanitation services that...that we take for granted. And the direct implication of this failure to provide basic human needs for water are water-related diseases.

The affects of water borne diseases are devastating. In the poorest regions of the world 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 born diseases become even more urgent.

(Peru)

And that's exactly what happened 4,000 miles and a world away from New York City.

Once a small Spanish colonial port on the Pacific, Peru's capital -- Lima -- has become a bustling, overcrowded metropolis of nearly 9 million people. In the wealthier parts of town water is piped in from the mountains. It's abundance makes it hard to believe that the city is located in one of the driest deserts in the world. In the slums sprawling across the arid landscape that surrounds Lima, the lack of water is a brutal reality. Their hardships are almost unimaginable. Most live with no electricity. Their huts are made of sticks, straw matting and salvaged bits of corrugated steel. Sanitation is non-existent -- disease is rampant. The life expectancy of a child born in these slums is ten years less than those living in the developed world.

Robert Gilman, a public health specialist, knows that water is at the heart of the community's problems.

Robert Gilman

Water is crucial. You need for drinking. You need it for washing. Washing means cleanliness. Cleanliness means diarrhea. If you don't have cleanliness, you get diarrhea and you get other diseases, so this is a major risk factor for these individuals for disease.

He has worked in Lima's slums for over ten years.

Robert Gilman

Water here is absolutely necessary. One this area is a desert, there's no water around. Two, right now it's the summer, it's hot. This is the time when diarrhea occurs. Why does diarrhea occur more? Because there's less water, and the bacteria can grow much faster.

It's hardly surprising that intestinal infections are common to these slums. What is surprising is that the most serious water borne infection of all -- cholera - was, until recently, non-existent.

(Cemetery)

Many of the gravesites of Lima's cemeteries are grim reminders of a national disaster -- they all have one thing in common -- they mark the beginning of the largest cholera epidemic to strike the western hemisphere. The year was 1991. This was a time when funeral processions became common throughout Peru -- a time when an entire country went into mourning.

(Cholera Epidemic)

The cholera epidemic began in a small coastal fishing village about 250 miles north of the nations capital. Within days Lima became a hot zone. Victims started arriving at local hospitals every few minutes. Cholera causes severe diarrhea and vomiting. This quickly dehydrates the patient -- death can come within hours. The treatment is to quickly rehydrate the patient by mouth or more often intravenously.

Within weeks Peru's medical facilities were overwhelmed by the disease. Hospital personnel desperately tried to cope with the growing epidemic.

Hediego Gonzales

Its catastrophic -- it's a catastrophe its more than an epidemic outbreak -- it's a disaster for Peru.

Because the epidemic began in a fishing village many thought seafood might be responsible. This nearly destroyed the export markets for Peruvian fish. Fisherman and their relatives staged angry demonstrations. 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. In Lima's wealthy neighborhoods cholera claimed very few victims -- here people can afford to drink bottled water. Within a month the epidemic crossed the Andes and struck the Amazonian port city of Iquitos. In it's slums, people bathe in and drink the same river water they use as a toilet. It didn't take long for cholera to spread north until it reached Mexico. Ultimately a disease which was thought to have disappeared from the Americas, left a harsh legacy --- more than a million people infected -- 11,000 dead. For now, the cholera epidemic is long gone.

(Lima's Seashore)

Daily life has returned to normal. Yet Lima's semi-treated sewage still pours into the Pacific -- just a few hundred yards off these popular beaches. This raises an urgent question: can impoverished cities provide adequate sanitation systems to cope with growing populations? The answer is, they can.

(Villa El Salvador)

One of Lima's largest shantytowns, Villa El Salvador looked like this thirty years ago. An urban invasion of the desert -- a village without electricity or water. Today Villa El Salvador is a thriving community. Praised by the United Nations, it's an example of what can happen when the poor organize to develop their own infrastructure. Villa El Salvador has paved streets and electricity. It established a small manufacturing sector which provides employment opportunities -- and a chance to escape the chains of grinding poverty. Communal health centers and kitchens cater to those in need. And above all else Villa El Salvador has a sewage system and clean running water. Its success has also shown the way to other, younger shanty towns like Ventanilla, which is just beginning to improve it's infrastructure.

Robert Gilman

This is a major advance for this community. This sewer and running water mean that there will be probably 70 percent less episodes of diarrhea, and obviously, this translates into much lower mortality rates and morbidity rates for the community. Water, again, is the clue. Sewage brings hygiene. This is what was missing with the cholera epidemic.

Today the fishing industry is back to normal and cholera is now under control. But until recently no one really knew what caused the sudden epidemic.

(El Nino Visualization)

In 1991 there was a major El Nino event in the Pacific. This resulted in the warming of the ocean along the 2000-mile coastline of Peru -- creating the perfect conditions for a massive growth of algae which also nourish the toxic cholera bacterium. Scientists have now discovered why Cholera outbreaks are triggered by the periodic warming of ocean waters.

Rita Colwell

Peru offers a dramatic example of how a cholera epidemic can explode. The waters of Peru were warmed by a very intense El Nino which occurred in '90, '91 '92' period. This led to very large increases in plankton populations of a type that carry the cholera bacterium. We now know the peaks of cholera epidemics are the result of people drinking water that contain large numbers of these plankton, which in turn contain large numbers of the cholera bacterium.

Today, unclean water is the dominant factor in places suffering from poverty, overcrowding, and the spread of infectious disease -- in places where a toilet is just a hole in the ground.

(Bangladesh Visualization)

Nowhere is this more evident than in one of the poorest countries on Earth—Bangladesh.

Located in South Asia, it is virtually surrounded by India, with the Bay of Bengal to the south and the world's highest mountain range looming to the north -- the Himalayas. Here over 135 million people live in a country the size of New York State. With more than nine million crowded into the capital, Dhaka -- this is a city struggling to enter the 21st century.

Abdullah Brooks

Now, that we have such a mobile population, people from here can be in any other part of the world within a day or so. Areas like this are hot zones. They are areas where there is a lot of crowding, population density, and therefore the opportunity for a lot of infection.

(Dhaka Streets)

Each day thousands pour into Dhaka from the countryside -- nearly all come in search of a better quality of life. For most, the city has little to offer. This 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. There's an ancient superstition that a black circle painted on a child's face will ward off disease -- sometimes even death. It's a commonly practiced custom.

(Hospital wards)

Yet, over nine percent of children born in Bangladesh die before the age of five. Just after the rainy season the country suffers from major outbreaks of Cholera. This is when 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. Doctor George Fuchs has devoted his career to fighting the disease.

George Fuchs

We see about 120,000 patients a year. So I think that it's pretty apparent that Bangladesh has the highest rates of cholera in the world. So this is a perfect place for us to study this severe illness. We've converted this hallway into a ward because right now is our peak time for diarrheal disease. The conditions are perfect to allow cholera and other organisms to thrive right now. The ambient temperature is sufficiently warm. The amount of water in the atmosphere, all create an environment that allows cholera to flourish.

Unlike Peru, epidemics in Bangladesh are annual events -- tied to the seasonal ebb and flow of water.

(Countryside)

This is a part of the world defined by water. And at its heart is a great river estuary -- a complex highway of rivers and streams rising in India and the Himalayas that slowly make their way into the Bay of Bengal. In the rural countryside -- in the thousands of small villages -- nearly everything revolves around water. Here, the daily fabric of life hasn't changed in decades. But there is one other constant -- most of the land is just a few feet above sea level.

(Monsoon floods)

For two months each year monsoons sweep across the Bay of Bengal and flood much of Bangladesh -- tens of millions are left homeless.

Rita Colwell

In the Bay of Bengal, during the monsoon there's a brackish water, warmer water, ideal for the bloom of plankton and, of course, subsequently the epidemics of cholera as a result of people drinking the water directly, without filtration, without chlorination.

(Post Monsoon Ponds)

When the waters recede -- nearly every river and pond is tainted with the deadly cholera bacterium.

(Tube Wells)

To ease the problem of cholera, the government drilled five million wells to provide clean drinking water for 97 percent of the rural population. This simple act may have saved millions of lives -- but it also resulted in an unforeseen public health disaster.

(Arsenic victim)

Not long ago, rural health workers reported signs of a mysterious ailment. Villagers were developing skin lesions -- nausea and hemorrhaging often followed. These are the signs of arsenic poisoning -- a slow acting but fatal disease. Shastri is 27, she probably won't live to thirty. There is no cure for arsenic poisoning.

(Pumps)

It turns out that much of Bangladesh's underground water supply contains naturally occurring arsenic. With almost 70 million at risk, the people of Bangladesh now face the largest mass poisoning in history. Lack of clean water leaves people with very few choices. It's one of the world's biggest killers.

Peter Gleick

The estimate is that there are 250 million cases of water-related diseases a year. Three to five million people die a year, 20 or 30,000 perhaps a day, from water-related diseases that we know how to prevent, that are easy to prevent and to cure, but that we failed to prevent.

(Rural Road)

With a patience forged by the seasonal rhythms of an ancient landscape, the people of Bangladesh struggle with waterborne diseases. This has become part of a global problem -- a problem that is not limited to the countries of the developing world.

(Chesapeake Bay)

The Chesapeake Bay is North America's largest estuary. With over 11,000 miles of shoreline and fed by 48 major rivers, it supports nearly 300 species of fish. The people of Crisfield, Maryland have been working the bay for over three hundred years. Not very long ago this small fishing village of 3,000 boasted the largest registry of sailing vessels in the United States. This was once home to over 150 oyster processing plants. Today Crisfield's watermen are suffering a serious decline in their catch. The bay is showing the affects of sewage, pesticides and industrial effluents that have been seeping into the Chesapeake for decades. It's the end of the crabbing season -- the time to pull in their traps for the winter.

Robert Daniels is not very hopeful.

Robert Daniels

I'm not optimistic about the future because, number one, the decline in crabs, and the number two -- some kind of disease that gets into our oysters and I don't know. When it hits an oyster bed, it seem like every oyster on the oyster bed dies.

Oysterman Robert Hambleton has seen his livelihood eroded year by year.

Robert Hambleton

It's bad right now. About all of our rivers have this disease in them and it's killing them. And a lot of places are a lot worse than this; some places they're a 100 percent dead. But hopefully, we've got to look around 'till we find a place we can make some kind of a day's work -- make some kind of living. It doesn't look like very much of a future unless they stop dying -- in this business,

Several years ago watermen like Jack Howard began to notice grotesque lesions in the fish and crabs they were catching.

Jack Howard

I've been a commercial fisherman most of my life. And we noticed we had a lot of fishes with lesions and sores on them. Some of them had portions of the top of their heads eaten down to their skulls, to their eyes, and they had basically parts of their bodies just completely eaten away like acid.

There was worse to come. Not long after the fish started getting sick, so did the watermen.

Jack Howard

And we started get sick ourselves - and the symptoms we had was diarrhea, memory loss and it got to the point that we were so sick sometimes -- and the stomach cramps were so violent that you...you just couldn't do anything.

As more and more watermen became sick, the alarm bells sounded. That's when scientists suspected that human impacts on the bay were the reason fish and watermen were getting ill.

Kellogg Schwab

There's a lot of nutrient load coming from farmlands. There's a lot of microbiological issues coming from human waste. We have leaking sewer lines that are contaminating the Bay with human waste that causes potentially outbreaks of human pathogens.

The first suspect was a toxic algae called Pfiesteria. Further research showed that the problem was much more complex. Many microorganisms were involved -- not just Pfiesteria.

Vicki Blazer

What we now know is that those open lesions are caused by a fungus, not by Pfiesteria. What we don't know is...is what relationship Pfiesteria and the fungus have to each other. For instance, some people have suggested that Pfiesteria toxin damages the skin and allows the fungal agent to get in and cause those lesions. We don't know exactly where the fungus comes from, but we're pretty sure it is a terrestrial source, so runoff is...is an important factor, and we need to understand where does it comes from.

Today research continues -- the fish are still dying and the watermen of Crisfield continue to suffer. And just as the invasion of West Nile virus has raised the alarm in the richer countries of the world about the threat of new insect-borne diseases -- the still puzzling sickness of the Chesapeake is just one more warning about the growing problem of waterborne diseases. Fortunately, there are programs that are beginning to offer glimmers of hope for a variety of public health problems.

(Closing Montage)

In the jungles of Peru, clinics have been established in rural villages -- introducing vaccination programs that promise to ease the suffering from the mosquito borne disease -- yellow fever. In Bangladesh, thousands of rural health workers are teaching women simple sanitation procedures that will help protect their families from cholera and other serious illnesses like arsenic poisoning. In the slums of Dhaka, clinical trials on a new oral vaccine for ecoli hold great promise to ease the suffering of infants. And in Kenya, medical researchers are helping local authorities eradicate the breeding grounds for the deadly Anopheles mosquito. Important programs, yes -- but still not nearly enough to reverse the debilitating affects of insect and water borne diseases that kill nearly 15 million people each year.

Abdullah Brooks

We are increasingly now part of a global community, and it's not just that a disease may be more prevalent in one area or another, but also that economies and people are increasingly interdependent.

Ronald Rosenberg

Disease and economics and security are entwined, and when you can make a contribution to the health of a country, you tend to increase its stability and better its economy.

Rita Colwell

Clearly, what we have to do is provide for the developing countries the capacity for safe drinking water, because this means we reduce disease. This means poverty can be addressed in a powerful way.

Though there are no easy answers -- no quick fixes -- fortunately there are those who are working hard to ease the burden. In the end, the health of those living in places like the Chesapeake Bay and New York City cannot be separated from the well being of those living in Peru, Kenya, and Bangladesh. This presents us with enormous challenges -- requiring new ideas -- new attitudes -- new hope. Planet Earth, this is our home. This is where our journey of discovery must begin.

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End Credits

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In Memory of
Dr. David Abramson

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