



THE
CARTER CENTER



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COUNTDOWN TO ZERO: DEFEATING DISEASE ON VIEW AT THE AMERICAN MUSEUM OF NATURAL HISTORY BEGINNING JANUARY 13

EXPLORING THE CHALLENGES AND BENEFITS OF ERADICATING DISEASE

The challenges of eradicating devastating diseases are enormous, but successful strategies can bring about enormous social and economic benefits. Opening at the American Museum of Natural History on January 13, *Countdown to Zero: Defeating Disease* explores the factors that determine if a disease is eradicable – meaning that it can be wiped out completely – as well as the scientific and social innovations that are ridding the world of ancient afflictions.

Developed in collaboration with The Carter Center, the exhibition uses stunning photography, videography, and artifacts to highlight several global efforts to fight infections. Chief among these is the more-than-30-year campaign that may soon eradicate Guinea worm disease, positioning it to become only the second human disease ever eradicated, after smallpox. The exhibition also highlights ongoing programs to eradicate polio, local elimination of river blindness, lymphatic filariasis, and malaria, and the challenge of diseases that cannot be eradicated, including Ebola.

“The number of cases of Guinea worm disease continued decreasing in 2014, bringing Guinea worm eradication closer to the finish line,” said former U.S. President Jimmy Carter, whose Carter Center leads the international campaign to eradicate this

water-borne disease. “We believe eradication of Guinea worm disease is very possible in the next few years, but success will require the strong commitment and focus of the four remaining endemic countries and the many international partners in this public health initiative.”

“The Museum is very pleased to collaborate with The Carter Center to present this exhibition on a critically important challenge in the 21st century, the control and eradication of infectious disease,” said Ellen V. Futter, President of the American Museum of Natural History. “The Museum’s research has had a growing focus on the ecology and genomics of infectious disease, including real-world applications for human health and medicine. This exhibition and the work it highlights are fully aligned with the Museum’s efforts to advance scientific understanding of ecosystems within and without the human body and their interrelationship with one another – and to communicate with a broad public about this complex intersection.”

The Museum has a long tradition of exhibitions that highlight scientific questions with direct bearing on human health, beginning with the groundbreaking *International Tuberculosis Exhibition* in 1908 and including, more recently, exhibitions such as *Epidemic! The World of Infectious Disease* (1999) and *The Genomic Revolution* (2001). *Countdown to Zero* draws on a core area of the Museum’s scientific research, the diversity of parasitic and microbial life, such as the organisms responsible for transmitting malaria.

SMALLPOX

In 1959, the World Health Organization announced an audacious goal: the eradication of smallpox, one of history’s deadliest diseases that was estimated to have killed more than 300 million people since 1900 alone. Smallpox was a good candidate for eradication: it was easily diagnosed, there was an effective vaccine, and the variola viruses that caused it did not live in any other animal host. By 1977, international cooperation, technological innovations such as freeze-dried vaccine and the bifurcated needle, and a targeted public health strategy helped end the disease.

Eradicating smallpox prevented millions of deaths and, by removing the need to treat and prevent the disease, saved many countries tens of millions of dollars. It also demonstrated that disease eradication was possible. Today, the health care sector is still applying the lessons of the successful smallpox eradication effort.

“The most important tool is people: highly motivated local communities, deeply committed national health care workers, and international leaders like President Carter,” said Mark Siddall, curator of *Countdown to Zero* and a curator in the Museum’s Division of Invertebrate Zoology. “Whether there’s a vaccine for smallpox, a drug for malaria, or a water filter to break the Guinea worm infection cycle, it has to get into the hands of people empowered both to deploy those assets and to gather massive quantities of data. You can’t treat what you don’t track.”

GUINEA WORM

Guinea worm disease, a debilitating condition caused by the parasite *Dracunculus medinensis*, has plagued humanity for thousands of years. When former U.S. President Jimmy Carter and The Carter Center began leading a coordinated program against Guinea worm disease in 1986, 3.5 million people in Africa and Asia were estimated to be infected. Relying on trained volunteers to help track every infection and to lead community-based intervention, this eradication effort has reduced the number of cases by 99.99 percent – and has put complete eradication within reach.

“The need to engage villages respectfully and fully in addressing their health problem is one of the most important lessons of the Guinea worm eradication campaign,” said Donald Hopkins, Carter Center vice president for health programs.

In the absence of a vaccine or curative medicine, the campaign has focused on interrupting the parasitic worm’s life cycle by filtering water to remove tiny crustaceans that carry infective Guinea worm larvae. *Countdown to Zero* will display a number of “pipe filters,” which are worn by many people around their necks and used as straws to filter drinking water, as well as educational materials that raise awareness about the disease, including items like picture books for those who cannot read.

POLIO

Only two years after the number of polio cases worldwide reached an all-time low, the disease – which mainly afflicts children and can lead to permanent paralysis or death – is once again resurgent due in part to armed conflicts that have compromised health care in endemic areas.

Polio has been around for millennia, but it was not until the late 1800s in Europe and the U.S. that the world witnessed the first great polio epidemics. By the late 1950s, mass vaccinations based on injectable vaccines using dead poliovirus were underway across the U.S., Europe, Australia, and Canada. A global campaign to eradicate polio began in 1988.

Today, the world is at a critical juncture in eradication. In Nigeria, Afghanistan, and Pakistan, religious fundamentalists have raised vocal – even violent – opposition to Western-backed vaccination efforts. The disease also has returned to places that were previously polio-free, including Syria, where civil war has savaged the country's health care system and led to massive population displacement. The end for polio is in sight, but failure or abandoning the effort now would lead to thousands of new cases.

RIVER BLINDNESS

About 120 million people worldwide are at risk for river blindness, which is transmitted by black flies that breed near waterways. When they bite humans, these flies can pass along small thread-like parasites, which mate and send thousands of tiny larvae into the skin and eyes – causing extreme itching, skin rashes, and, in the worst cases, blindness.

The disease, also known as onchocerciasis, has been nearly eliminated in Latin America through education, surveillance, and community-based drug treatment. In Africa, where 99 percent of river blindness cases today occur, health officials have generally sought to *control* river blindness – to keep the number of cases to a minimal level. But the success of semiannual mass drug administration in Latin America has raised hopes that the disease can be removed completely from some African countries as well. Still, challenges remain, including high rates of the disease in Africa; co-

infection in some areas with another parasite, *Loa loa*, that can cause serious complications after mass drug administration, displaced populations; weak health systems; political instability; and the African black flies' long flight range and higher efficiency at transmitting the disease.

LYMPHATIC FILARIASIS

Lymphatic filariasis threatens almost 1 billion people around the world. Many of those infected by this parasitic worm suffer from severe, painful swelling of limbs or genitals, known as elephantiasis. This debilitating disfigurement is also a source of shame and social isolation.

Health workers rely on two main tools to combat lymphatic filariasis: bed nets, which prevent mosquitoes from biting, and drugs— ivermectin and albendazole— which prevent mosquitoes from becoming infected, interventions that have led to a remarkable decrease in transmission among at-risk populations.

Ivermectin, one of the drugs used to treat lymphatic filariasis, is also effective against the worms that cause river blindness, and bed nets stop mosquitoes that may be carrying malaria as well. Governments and health organizations are trying to work more efficiently and effectively by integrating lymphatic filariasis elimination with efforts to fight malaria, river blindness, intestinal worms, and schistosomiasis (snail fever).

MALARIA

A child dies from malaria every minute, but despite ongoing research, existing treatments, and well-funded efforts to stop transmission, eradication remains a distant goal. Many drug treatments exist, but the parasites that cause the disease are constantly evolving resistance to the medications, and a highly effective vaccine is still far off. For now, bed nets treated with insecticide to create a physical barrier against mosquitos that transmit the parasite to humans and timely treatment of those with fever, anemia and other symptoms of the disease remain the most effective tools.

In fact, thanks in large part to those two interventions, malaria cases have fallen

by 25 percent worldwide since the year 2000. Improvements in diagnosis and treatment are also a big part of the success: new diagnostic tests can identify infection in a matter of minutes, and artemisinin-based combination drug therapies blend the effects of different medications to counter the emergence of more drug resistance.

Development of new interventions may lead to even greater success. Researchers are making progress on new vaccines, even better diagnostics, and improved insecticides. Scientists are also exploring other approaches, including genetically engineered mosquitoes that will no longer be able to transmit the parasite.

EXHIBITION ORGANIZATION

Countdown to Zero: Defeating Disease at the American Museum of Natural History is curated by Mark Siddall, curator in the Museum's Division of Invertebrate Zoology, in collaboration with Dr. Donald Hopkins, Carter Center Vice President for Health Programs. The exhibition will be on view at the Museum through July 2015 and then at the Jimmy Carter Presidential Library and Museum in Atlanta, GA, beginning fall 2015.

The exhibition is designed and produced by the American Museum of Natural History's award-winning Exhibition Department under the direction of David Harvey, senior vice president for exhibition.

Countdown to Zero is presented by the American Museum of Natural History in collaboration with The Carter Center, Atlanta.

Countdown to Zero is proudly supported by Clarke, Public Health Mosquito Control, Conrad N. Hilton Foundation, Lions Clubs International Foundation, Mectizan Donation Program, and Vestergaard.

This exhibition is made possible by the generosity of the Arthur Ross Foundation.

AMERICAN MUSEUM OF NATURAL HISTORY (AMNH.ORG)

The American Museum of Natural History, founded in 1869, is one of the world's preeminent scientific, educational, and cultural institutions. The Museum encompasses 45 permanent exhibition halls, including the Rose Center for Earth and Space and the Hayden Planetarium, as well as galleries for temporary exhibitions. It is home to the Theodore

Roosevelt Memorial, New York State's official memorial to its 33rd governor and the nation's 26th president, and a tribute to Roosevelt's enduring legacy of conservation. The Museum's five active research divisions and three cross-disciplinary centers support approximately 200 scientists, whose work draws on a world-class permanent collection of more than 33 million specimens and artifacts, as well as specialized collections for frozen tissue and genomic and astrophysical data, and one of the largest natural history libraries in the world. Through its Richard Gilder Graduate School, it is the only American museum authorized to grant the Ph.D. degree. In 2012, the Museum began offering a pilot Master of Arts in Teaching program with a specialization in Earth science, which is the only non-university affiliated such program in the United States. Approximately 5 million visitors from around the world came to the Museum last year, and its exhibitions and Space Shows can be seen in venues on five continents. The Museum's website and collection of apps for mobile devices extend its collections, exhibitions, and educational programs to millions more beyond its walls. Visit amnh.org for more information.

THE CARTER CENTER (CARTERCENTER.ORG)

A not-for-profit, nongovernmental organization, The Carter Center has helped to improve life for people in more than 80 countries by resolving conflicts; advancing democracy, human rights, and economic opportunity; preventing diseases; and improving mental health care. Based in Atlanta, Georgia, The Carter Center was founded in 1982 by former U.S. President Jimmy Carter and former First Lady Rosalynn Carter, in partnership with Emory University, to advance peace and health worldwide.

Beginning with the Center's leadership of the international Guinea worm eradication campaign since 1986, which has reduced cases by more than 99.99 percent, the Center has pioneered neglected disease eradication and elimination by targeting river blindness, lymphatic filariasis, blinding trachoma, and malaria (island of Hispaniola). The International Task Force for Disease Eradication is housed at The Carter Center and chaired by Carter Center Vice President for Health Programs Dr. Donald Hopkins.

The Center uses evidence-based practices to carefully evaluate whether its interventions are significantly reducing the burden of disease. In conjunction with

ministries of health and other partner organizations, The Carter Center conducts rigorous annual peer reviews and evaluations of its five infectious disease health programs.

Hours

The Museum is open daily, 10 am–5:45 pm. The Museum is closed on Thanksgiving and Christmas Day.

Admission

Museum admission is free to all New York City school and camp groups.

Suggested general admission, which supports the Museum’s scientific and educational endeavors and offers access to the Museum’s 45 halls including the Rose Center for Earth and Space, is \$22 (adults) suggested, \$17 (students/seniors) suggested, \$12.50 (children) suggested. All prices are subject to change.

The Museum offers discounted combination ticket prices that include suggested general admission plus special exhibitions, IMAX or 3D films, and Space Shows.

- Museum Plus One includes one special exhibition, IMAX or 3D film, or Space Show: \$27 (adults), \$22 (students/seniors), \$16 (children)
- Museum Supersaver includes all special exhibitions, IMAX or 3D film, and Space Show: \$35 (adults), \$28 (students/seniors), \$22 (children)

Visitors who wish to pay less than the suggested Museum admission and also purchase a ticket to attend a special exhibition, IMAX or 3D film, or Space Show may do so on-site at the Museum. To the amount they wish to pay for general admission, they add \$25 (adults), \$20.50 (students/seniors), or \$13.50 (children) for a Space Show, special exhibition, or IMAX or 3D film.

Public Information

For additional information, the public may call 212-769-5100 or visit the Museum’s website at amnh.org.

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