



World Medical Association Assembly

**Emerging and Re-Emerging Infectious Diseases:
From AIDS to Zika**

Anthony S. Fauci, M.D.
Director
National Institute of Allergy and Infectious Diseases
National Institutes of Health
October 14, 2017

THE HILL
January 13, 2017

White House Holds Disaster-Response Exercise with Trump Officials



The NIH Record

U.S. Department of Health and Human Services
November 20, 1984
Vol. XXXVI
No. 24
National Institutes of Health

Dr. Anthony Fauci, Expert on Immunity and AIDS, Named Director of Nat'l. Institute of Allergy and Infectious Diseases

Dr. Anthony S. Fauci has been named Director of the National Institute of Allergy and Infectious Diseases, effective Nov. 2. NIAID conducts and supports research to better understand the causes of allergic, immunologic and infectious diseases, and to develop better means of preventing, diagnosing and treating such illnesses.



Dr. Fauci, 43, an internationally renowned expert on the immune system, has been chief of NIAID's Laboratory of Immunoregulation since 1980 and deputy clinical director of the Institute since 1977.

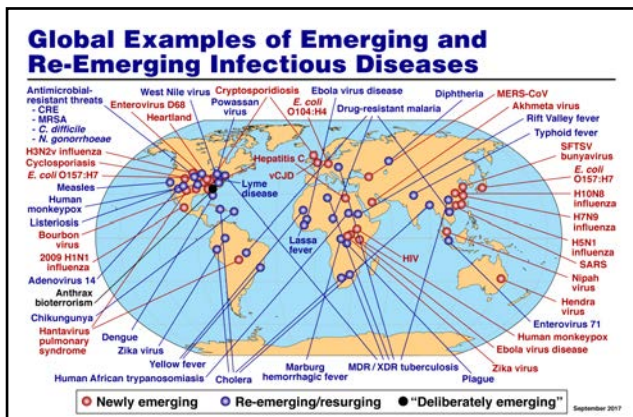
"I am extremely pleased that Dr. Fauci will take over the leadership of this important institute," HHS Secretary Margaret M. Heckler said in announcing the appointment. "His unique background, particularly in the fields of immunology and infectious diseases, will be of key importance in maintaining and accelerating our momentum in these crucial



Dr. Fauci is internationally renowned for his expertise on the immune system.

Testimony before the House Appropriations Subcommittee for NIH – 1980s

Five Administrations and Emerging Infectious Diseases

Ronald W. Reagan 1981-1989



George H.W. Bush 1989-1993



William J. Clinton 1993-2001



George W. Bush 2001-2009



Barack H. Obama 2009-2017



Ronald W. Reagan
1981-1989

■ HIV/AIDS

CENTERS FOR DISEASE CONTROL
MMWR
MORBIDITY AND MORTALITY WEEKLY REPORT

June 5, 1981

**Pneumocystis Pneumonia –
Los Angeles**

July 3, 1981

**Kaposi's Sarcoma and
Pneumocystis Pneumonia
Among Homosexual Men –
New York City and California**

1 June 1982 Volume 96 Number 6

Annals of Internal Medicine

Published Twice Monthly by the American College of Physicians


The Syndrome of Kaposi's Sarcoma and Opportunistic Infections: An Epidemiologically Restricted Disorder of Immunoregulation

Anthony S. Fauci, M.D.

"...because we do not know the cause of this syndrome, any assumption that the syndrome will remain restricted to a particular segment of our society is truly an assumption without scientific basis."



UNAIDS Global AIDS Update, July 2017

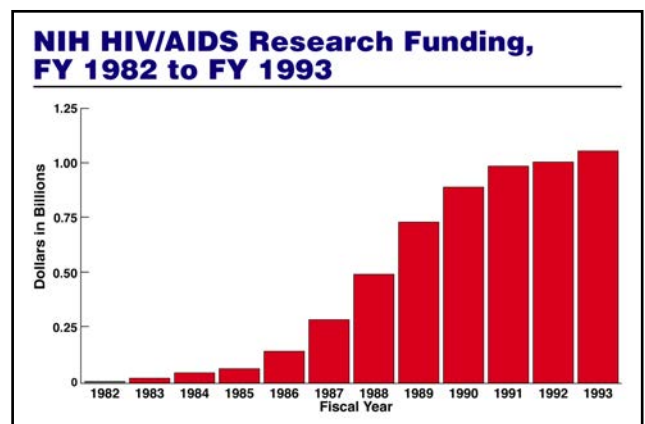


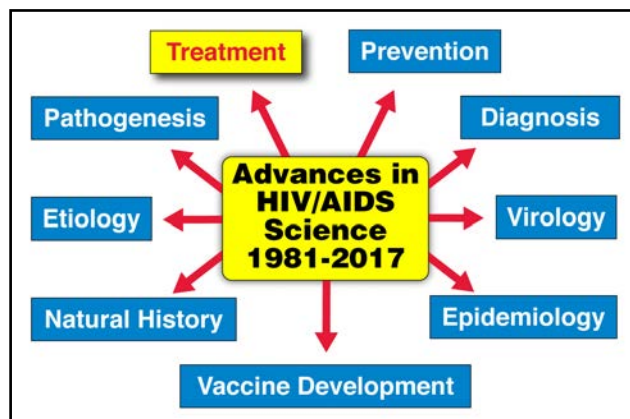
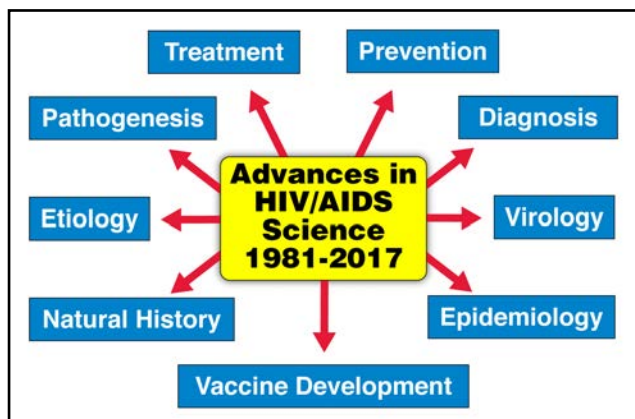
- In 2016:
 - 36.7 million living with HIV
 - 1.8 million infected with HIV
 - 1.0 million people died from AIDS-related illnesses in 2016
- Since start of the pandemic
 - 76.1 million infected with HIV
 - 35.0 million have died from AIDS-related illnesses



■ HIV/AIDS

George H. W. Bush
1989-1993





Rounds at NIH Clinical Center, Early 1980s – AIDS Patient



■ Median survival of AIDS patients: ~8-15 months

FDA-Approved Antiretroviral Drugs

NRTI <ul style="list-style-type: none"> 5 multi-drug combinations Abacavir Didanosine Emtricitabine Lamivudine Stavudine Tenofovir (TDF, TAF) Zidovudine 		Pharmacokinetic Enhancers <ul style="list-style-type: none"> Cobicistat Ritonavir
NNRTI <ul style="list-style-type: none"> Delavirdine Efavirenz Etravirine Nevirapine Rilpivirine 	PI <ul style="list-style-type: none"> Atazanavir Darunavir Fosamprenavir Indinavir Lopinavir/Ritonavir Nelfinavir Ritonavir Saquinavir Tipranavir 	Multi-Class Combinations <ul style="list-style-type: none"> Atripla Complera Genvoya Odefsey Stribild Triumeq
Integrase Inhibitors <ul style="list-style-type: none"> Dolutegravir Elvitegravir Raltegravir 		Fusion Inhibitor <ul style="list-style-type: none"> Enfuvirtide
		Entry Inhibitor <ul style="list-style-type: none"> Maraviroc

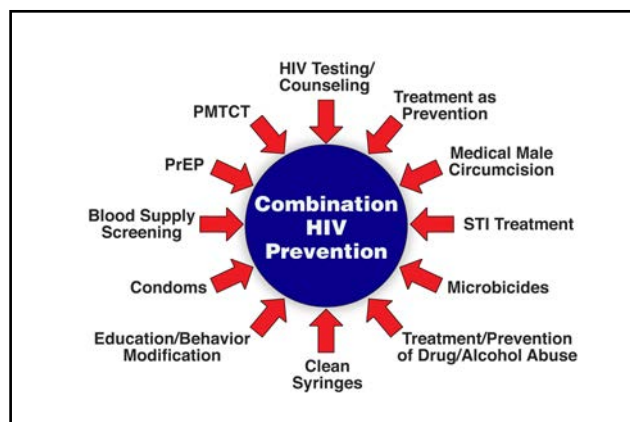
Source: AIDSinfo.nih.gov, 1/2017.

Life Expectancy for 20-Year-Old Newly Diagnosed with HIV, 1980s and Today

1980s (no ART) | 1-2 years from AIDS diagnosis

Today (on ART) | ~53 years

Source: JL Marcus et al., JAIDS, 2016.

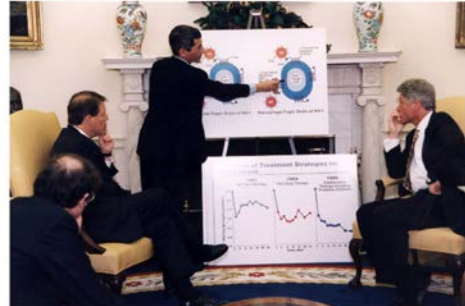




William J. Clinton
1993-2001

- HIV/AIDS
- West Nile Virus
- H5N1 Influenza
- Antimicrobial Resistance

Meeting at the White House to Discuss AIDS Research, Dec. 3, 1996



Commencement Address by President Clinton at Morgan State University, Baltimore, May 18, 1997

"If America commits to find an AIDS vaccine and we enlist others in our cause, we will do it... Today I'm pleased to announce the National Institutes of Health will establish a new AIDS vaccine research center dedicated to this crusade."

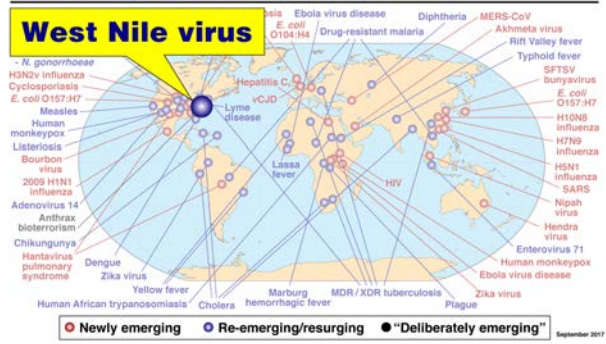


VRC Research: From HIV to Zika



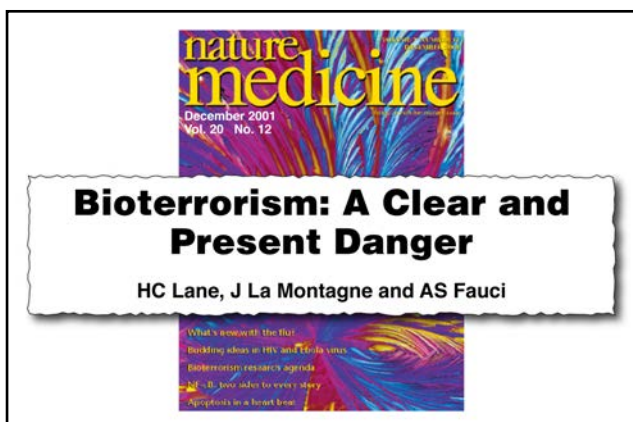
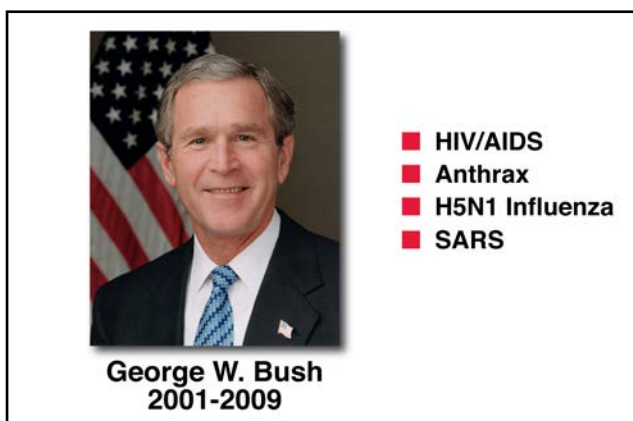
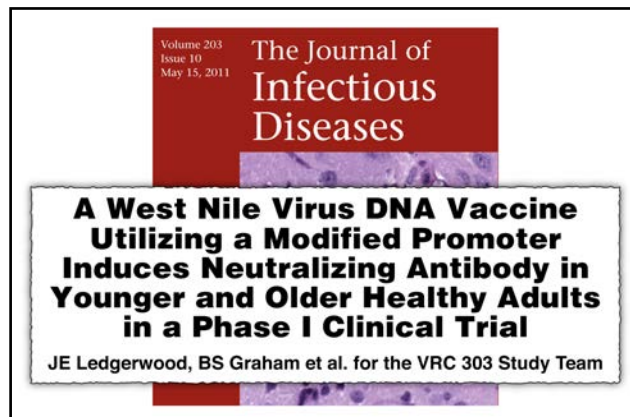
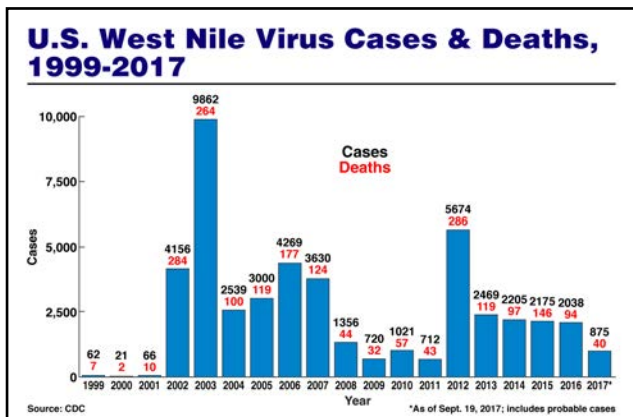
- HIV
- West Nile virus
- Chikungunya
- Ebola/Marburg
- Influenza
- Malaria
- MERS-CoV
- RSV
- Tuberculosis
- Venezuelan, Eastern, and Western equine encephalitis viruses
- Zika

Global Examples of Emerging and Re-Emerging Infectious Diseases



Global Distribution of West Nile Virus, 1999





February 5, 2002



President GW Bush: "Tony, what scares you the most among potential microbial threats that a terrorist might use?"

Fauci: "Mr. President, I worry more about the natural occurrence of an influenza pandemic and the ongoing plague of HIV than I do about a bioterror attack."

Newsday

November 18, 2001

The Worst Bioterrorist May Be Nature Itself

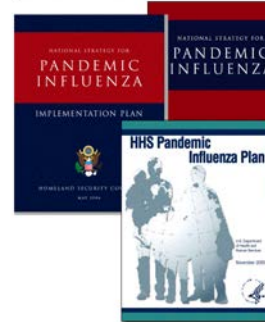


REVIEW ARTICLE

Avian Influenza A (H5N1) Infection in Humans

The Writing Committee of the World Health Organization
(WHO) Consultation on Human Influenza A/H5

Pandemic Influenza Preparedness Strategy and Implementation

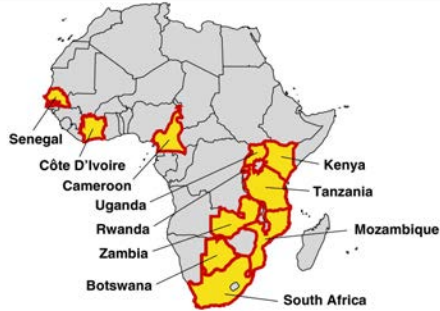


- International Surveillance
- Domestic Surveillance
- Vaccines
- Antivirals
- Communications
- State and Local Preparedness

The Birth of the President's Emergency Plan for AIDS Relief (PEPFAR)



Addressing HIV/AIDS: Visits to 11 Countries in Sub-Saharan Africa



The President's Emergency Plan for AIDS Relief – \$15B Over 5 Years

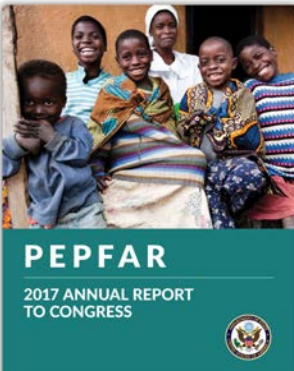
Goals:

- Prevent 7 million new infections
- Treat 2 million HIV-infected people
- Care for 10 million HIV-infected people, orphans and other vulnerable children



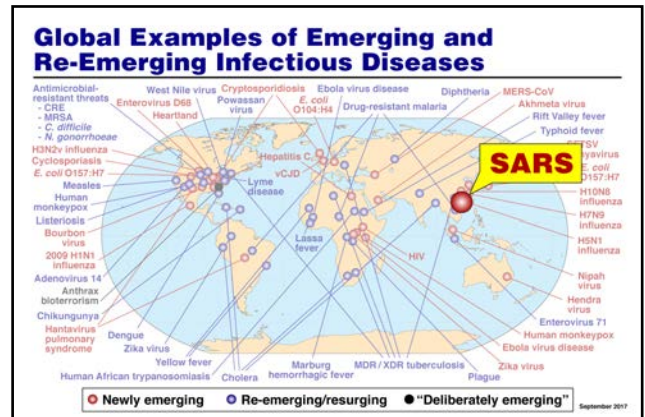
State of the Union Address, January 28, 2003

- President Bush announces the President's Emergency Plan for AIDS Relief (PEPFAR)

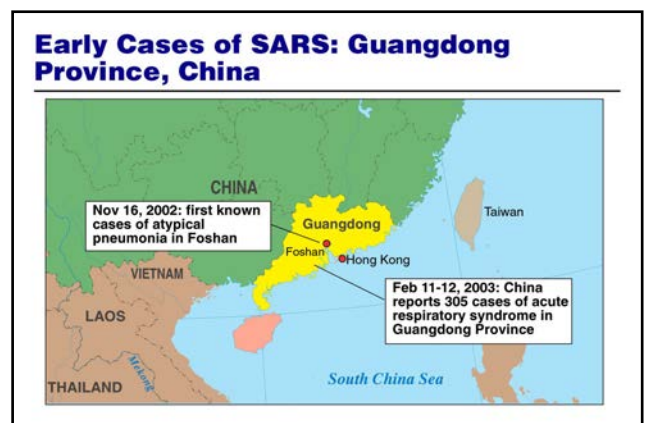


PEPFAR
2017 ANNUAL REPORT
TO CONGRESS

- 11.5 million on antiretroviral therapy, end-2016
- Nearly 2 million perinatal HIV infections averted



SARS: A New Challenge to Global Health

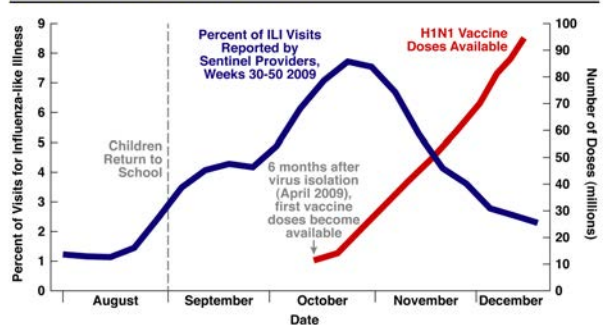
Global H1N1 Influenza Cases, as of April 29, 2009



Senate Appropriations Subcommittee Hearing on H1N1 Influenza, April 28, 2009



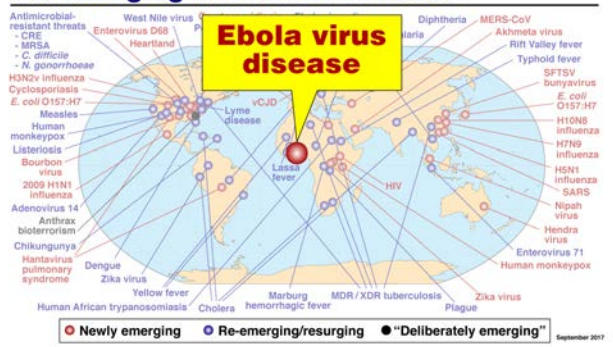
Vaccine Lags Behind 2009 H1N1 Influenza Pandemic



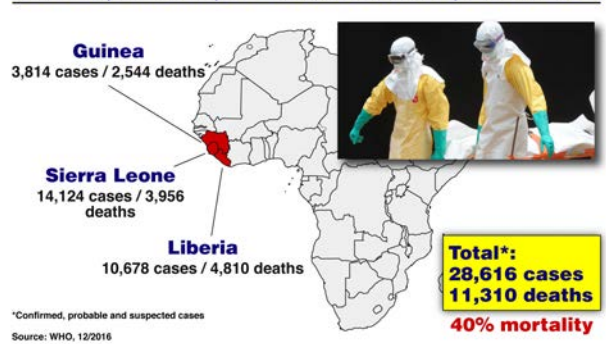
House Oversight and Government Reform Committee Hearing on H1N1 Influenza Vaccines, Sept. 29, 2009



Global Examples of Emerging and Re-Emerging Infectious Diseases



Reported Ebola Virus Disease Cases in Guinea, Liberia, and Sierra Leone, 2014-2016



First Case Diagnosed in the U.S.: Timeline



First Two Ebola Transmissions Within the U.S.

The New York Times

October 12, 2014

Texas Health Worker Tests Positive for Ebola

2nd Ebola Case in U.S. Stokes Fears of Health Care Workers

USA TODAY

October 14, 2014

Fear Spreads Faster than Ebola: Our View

By USA Today Editorial Board



NIH Special Clinical Studies Unit: Designated Ebola Treatment Facility



*As of Oct. 2014, three Designated Ebola Treatment Facilities existed in the U.S.

The Washington Post

October 25, 2014

Nina Pham, Nurse Who Contracted Ebola, is Now Free of Virus and Leaves NIH



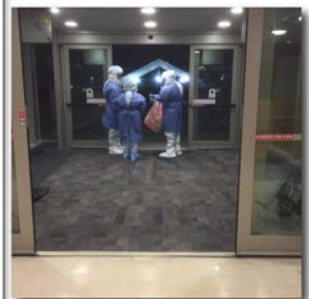
Photo: The Washington Post

Photo: Nina Pham


CNN


March 12, 2015

U.S. Ebola Patient Headed to NIH



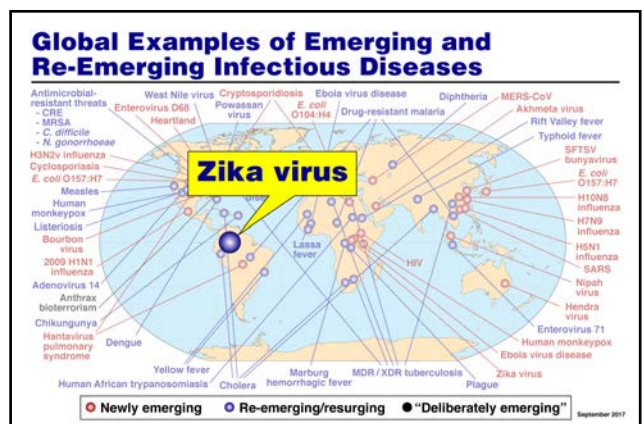



National Institutes of Health
Turning Discovery Into Health

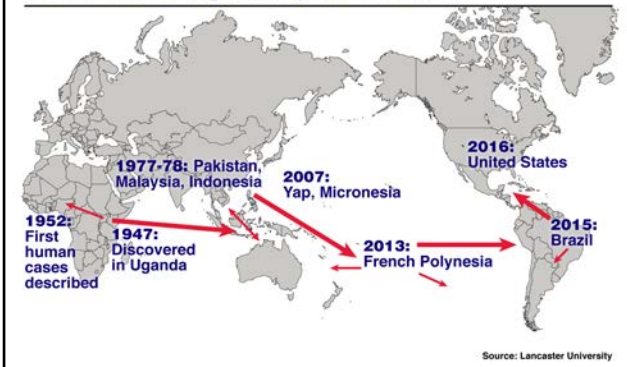

NIH News
National Institutes of Health

Thursday, April 9, 2015

Patient Admitted With Ebola Virus Disease Discharged From NIH Clinical Center

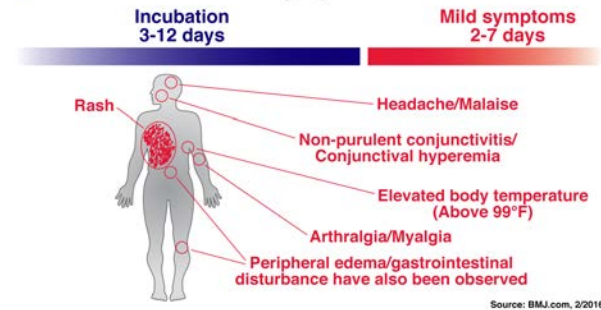


Zika Virus Spread, 1947-2017

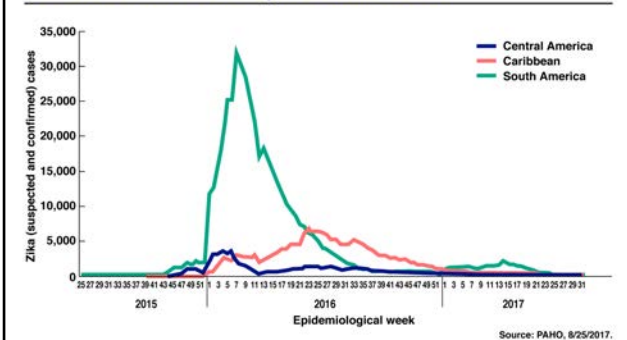


Symptoms of Zika Virus Infection

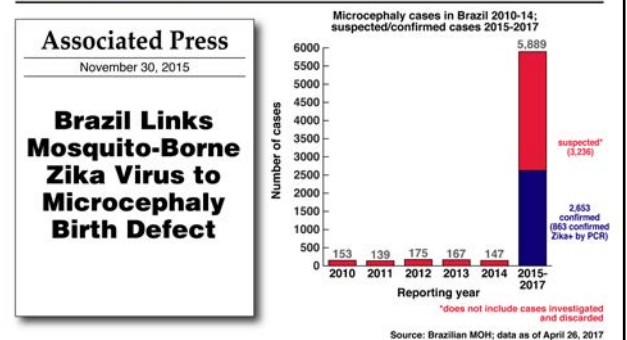
■ 4 in 5 individuals *asymptomatic*



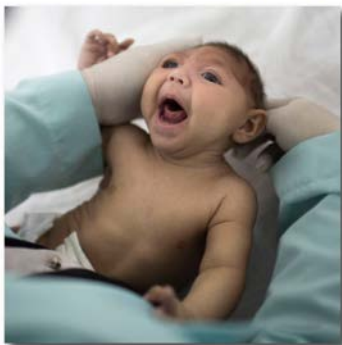
Suspected and Confirmed Zika Cases in the Americas, 2015-2017



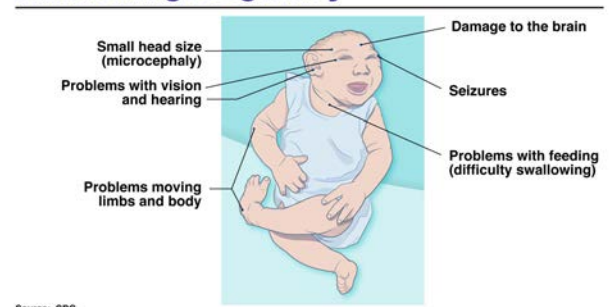
Marked Increase in Microcephaly Cases in Brazil

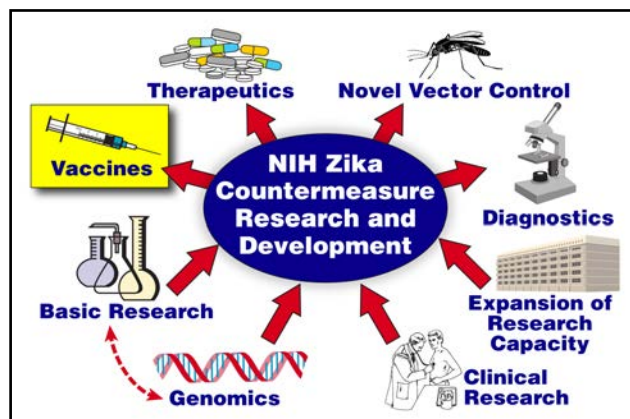
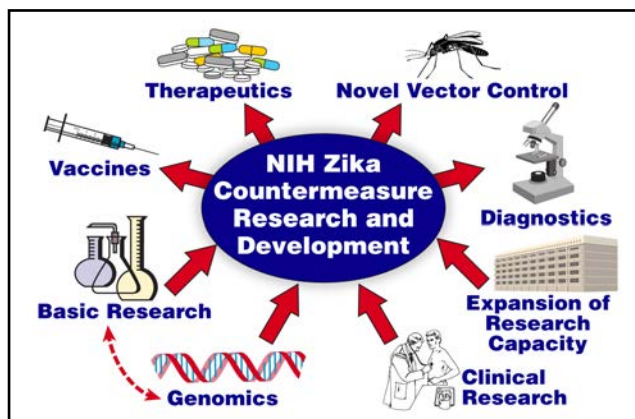


Baby Born With Microcephaly



Congenital Zika Syndrome is a Pattern of Birth Defects in Babies Infected with Zika During Pregnancy





NIH Zika Vaccine Candidates

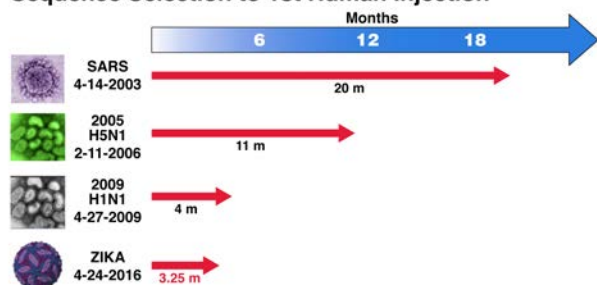
- **DNA vaccine** (NIAID VRC)
- **Zika purified inactivated vaccine** (WRAIR/NIAID/BARDA and Sanofi Pasteur)
- **Live-attenuated Zika/dengue chimeric virus** (NIAID intramural/Butantan)
- **mRNA vaccine candidate** (NIAID VRC, GSK)
- **Vesicular Stomatitis Virus vectored vaccine** (NIAID extramural)

NIH Zika Vaccine Candidates

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VRC DNA Vaccines for Emerging Infections

Sequence Selection to 1st Human Injection



Courtesy: J Ledgerwood/NIAID VRC

NIH National Institutes of Health
Turning Discovery Into Health

FOR IMMEDIATE RELEASE
Friday, March 31, 2017

News Release

Phase 2 Zika Vaccine Trial Begins in U.S. and Central and South America

Study Will Evaluate NIH's Experimental DNA Vaccine

- Enrollment target: at least 2,490 individuals in the continental United States, Puerto Rico, Brazil, Peru, Costa Rica, Panama and Mexico



Five Administrations and Emerging Infectious Diseases

Ronald W. Reagan 1981-1989



George H.W. Bush 1989-1993



William J. Clinton 1993-2001



George W. Bush 2001-2009



Barack H. Obama 2009-2017



Six Administrations and Emerging Infectious Diseases

Ronald W. Reagan 1981-1989



George H.W. Bush 1989-1993



William J. Clinton 1993-2001



George W. Bush 2001-2009



Barack H. Obama 2009-2017



Donald J. Trump 2017-present



What's Next?

Health Officials Brace for Return of Zika



Available online July 7, 2017

The Brazilian Journal of
INFECTIOUS DISEASES

Will Mayaro Virus Be Responsible for the Next Outbreak of an Arthropod-borne Virus in Brazil?

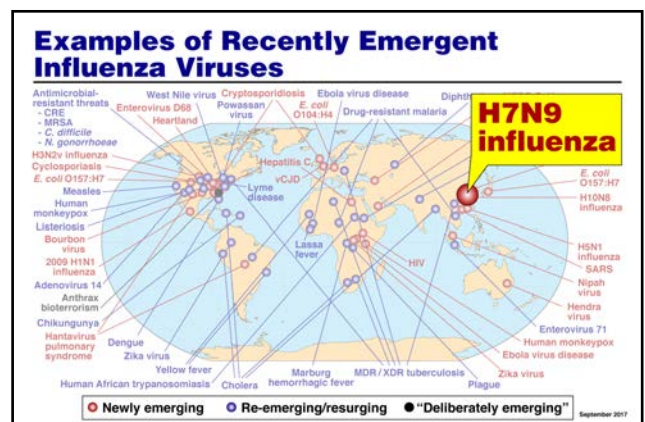
DLO Esposito, BAL daFonseca

ScienceDaily
Your source for the latest research news

August 22, 2017

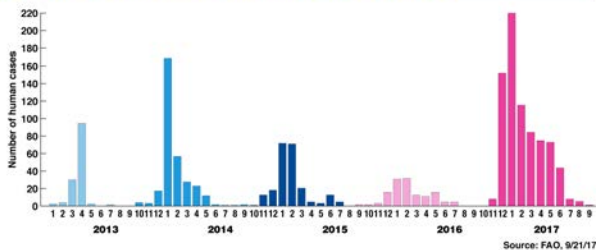
Oropouche Virus Could Emerge and Cause a Public Health Problem

Vector is no longer confined to villages in the Amazon but is spreading to major cities throughout Brazil, researcher warns



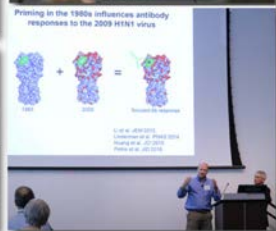
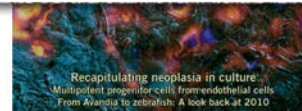
Five Waves of Human H7N9 Influenza Infections in China, February 2013-present

- 1,589 confirmed human cases, 616 deaths
- 5th wave: >50% of cumulative cases



Induction of Unnatural Immunity: Prospects for a Broadly Protective Universal Influenza Vaccine

GJ Nabel and AS Fauci



HealthAffairsBlog

February 9, 2017

What Three Decades Of Pandemic Threats Can Teach Us About The Future

Anthony S. Fauci



"If history has taught us anything, it is that the new administration is likely to experience at least one infectious disease crisis of significance."

Lessons Learned from Previous Pandemics

- Global surveillance
- Transparency and communication
- Infrastructure and capacity building
- Coordinated and collaborative basic and clinical research
- Adaptable platform technologies for vaccines, diagnostics and therapeutics
- Stable funding mechanism – "Public Health Emergency Fund"

Volume 6, Issue 11 November 2008
THE LANCET Infectious Diseases

Emerging Infections: A Perpetual Challenge

DM Morens, GK Folkers & AS Fauci

