Vaccine Activities Update

National Institute of Allergy and Infectious Diseases, National Institutes of Health

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National Institute of Allergy and Infectious Diseases

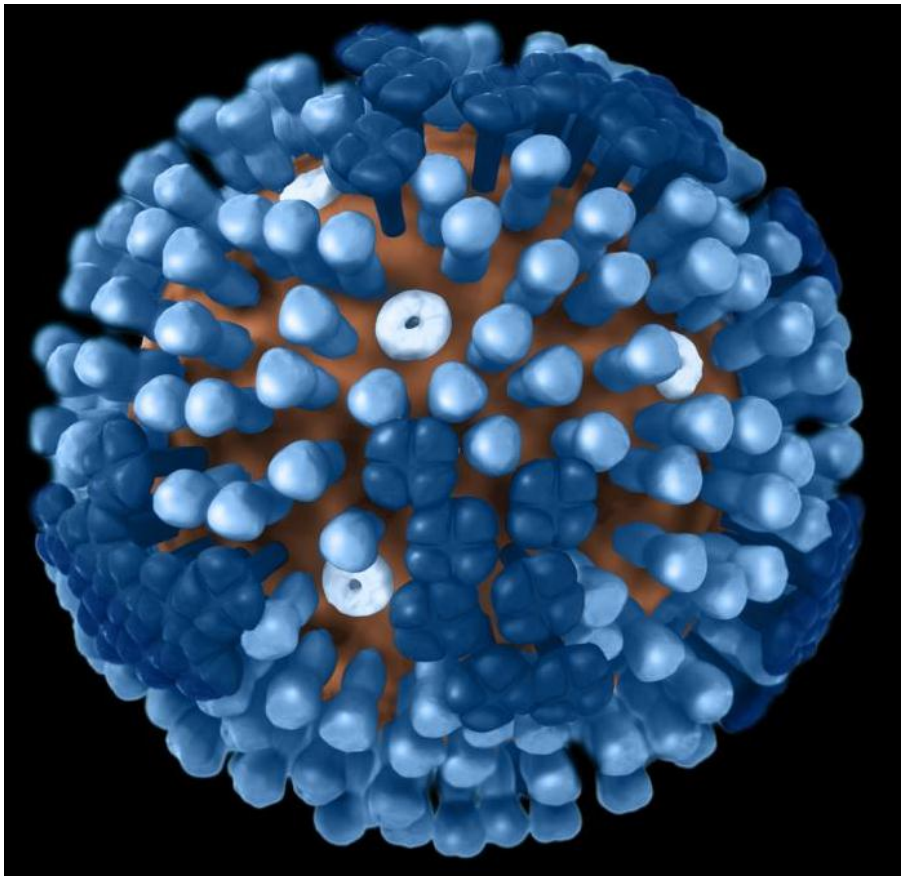
National Institute of Allergy and Infectious Diseases

Environmental Influences on Child Health Outcomes (ECHO) Program

- NIH recently invited comments and suggestions on ECHO (the National Children's Study Alternative)
- Leverage existing cohorts to study environmental exposures on pediatric health outcomes
- Focus areas:
  - Obesity
  - Birth defects and other early outcomes
  - Neurodevelopment disorders
  - Airway diseases

http://grants.nih.gov/grants/guide/notice-files/NOT-OD-15-117.html

NIAID Research: Influenza Vaccine



Credit: Dan Higgins

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National Institute of Allergy and Infectious Diseases (NIAID)

http://www.niaid.nih.gov
Tuesday, July 21, 2015

Virus-Like Particle Vaccine Protects Mice from Many Flu Strains

NIAID Research Could Aid Development of Universal Flu Vaccine

LM Schwartzman *et al*. An intranasal virus-like particle vaccine broadly protects mice from multiple subtypes of Influenza A virus. *mBio* (2015).

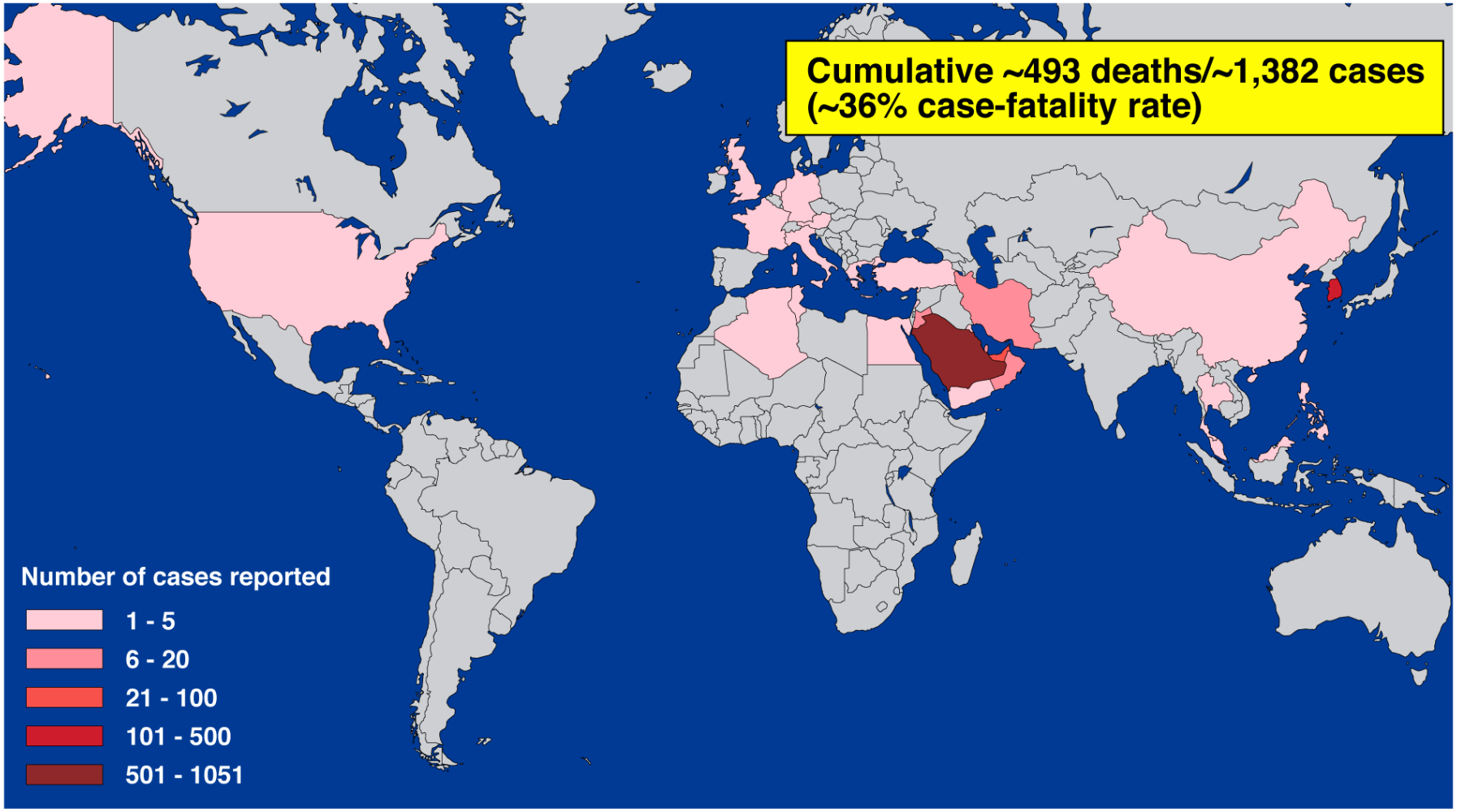
NIH National Institute of Allergy and Infectious Diseases

NIAID Research: Epstein-Barr Virus

- Epstein-Barr virus affects 9 out of 10 people during lifetime
  - Major cause of mononucleosis
  - Associated with 200,000 cases of cancer each year
- Experimental nanoparticle-based vaccine
  - Developed using structure-based design
  - Elicited potent neutralizing antibodies in animals
- Nanoparticle vaccine design could be used to create or redesign vaccines against other pathogens

M Kanekiyo *et al*. Rational Design of an Epstein-Barr Virus Vaccine Targeting the Receptor-Binding Site. *Cell* (2015).

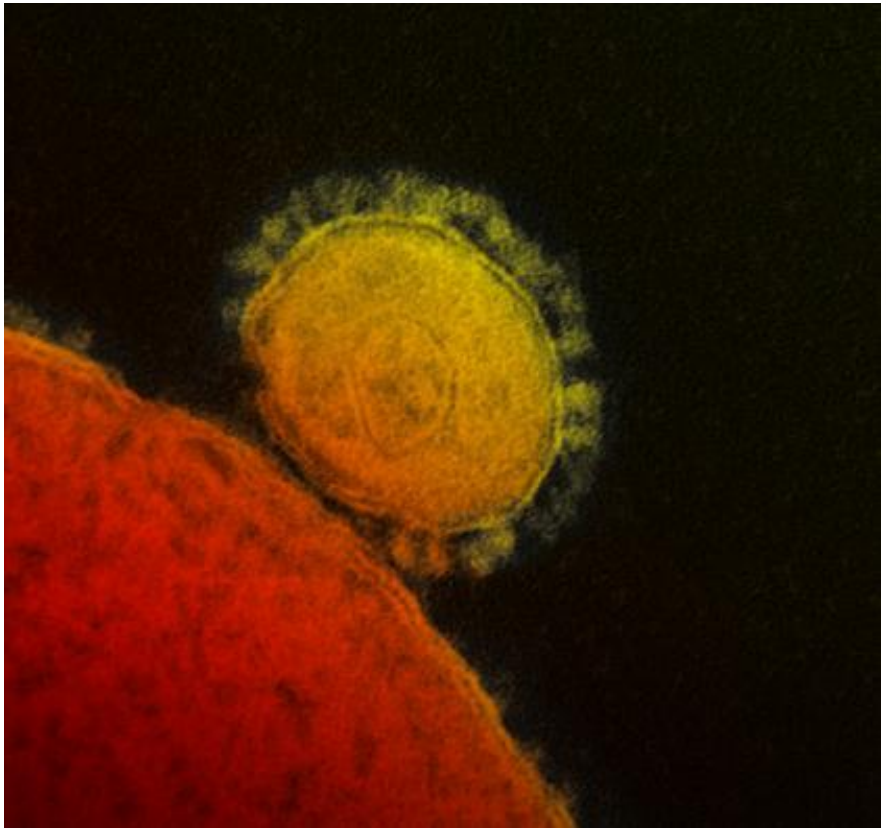
Countries with Confirmed Cases of MERS-CoV, 2012-2015



Source: WHO, July 29, 2015

AS Fauci/NIAID

Middle East Respiratory Syndrome (MERS)



Credit: NIAID

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National Institute of Allergy and Infectious Diseases (NIAID)

Wednesday, August 19, 2015

NIH Scientists and Colleagues Successfully Test MERS Vaccine in Monkeys and Camels

U.S. Department of Health and Human Services
NIH News
National Institutes of Health

National Institute of Allergy and Infectious Diseases (NIAID)

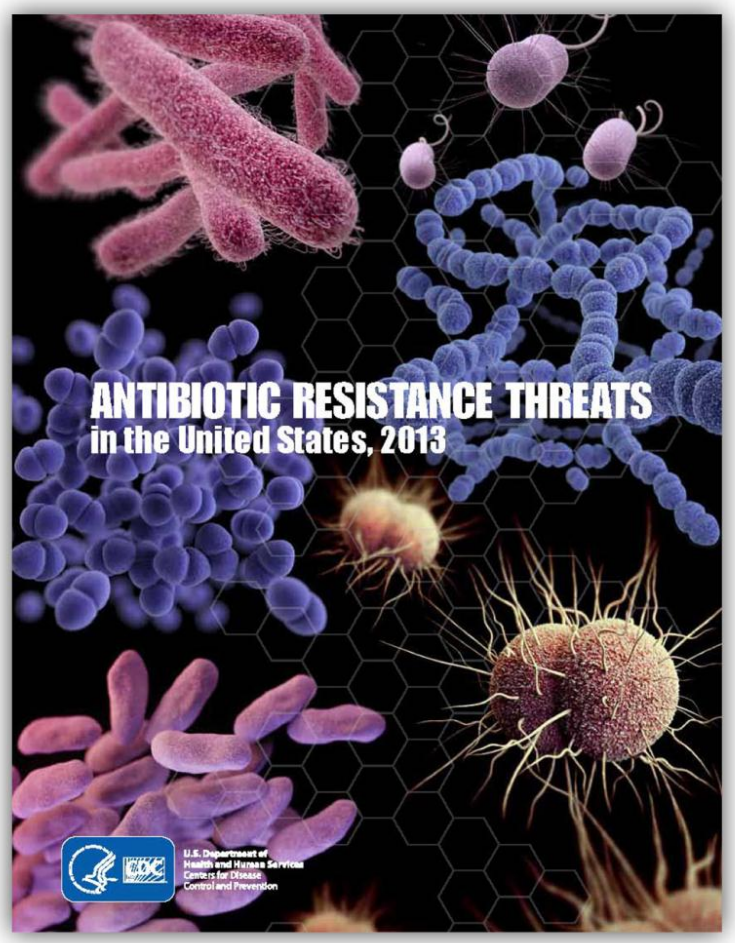
Tuesday, July 28, 2015

Experimental MERS Vaccine Shows Promise in Animal Studies

K. Muthumani *et al*. A synthetic consensus anti-Spike protein DNA vaccine induces protective immunity against Middle East Respiratory Syndrome Coronavirus in non-human primates. *Science Translational Medicine* (2015).

L Wang *et al*. Evaluation of candidate vaccine approaches for MERS-CoV. *Nature Communications* (2105).

Antimicrobial Resistance in the U.S. Results in Lost Lives and Dollars



- 2 M drug-resistant infections, 23,000 deaths/yr
- Annual costs:
  - $20 B in excess healthcare costs
  - $35 B in lost productivity

AS Fauci/NIAID

Increasing White House Emphasis on Antibiotic-Resistant Bacteria

"We now have a national strategy to combat antibiotic-resistant bacteria, to better protect our children and grandchildren from the reemergence of diseases and infections that the world conquered decades ago."

Credit: MSNBC.com

– President Barack Obama,
Global Health Security
Agenda Summit,
September 26, 2014

Vaccines: Innovative Approach to Combating Antimicrobial Resistance

- Unique characteristics of the organisms of concern
  - Many are hospital-associated infections
  - Small, localized, unanticipated outbreaks
- Challenges to vaccine development
  - Many of these pathogens associated with healthy human flora
- Complex regulatory, policy, and implementation issues for vaccines
- Potential solution: “Prophylactic Immune Interventions”
  - Targeted intervention for at-risk populations
  - Preventive approach for infectious disease control

C Heilman. Vaccines: An Innovative Approach to Combating Antimicrobial Resistance. *Infectious Disease News.* (2015)