

Immunization and Prophylaxis of Healthcare Professionals in the Era of New Epidemics

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Conflicts-Disclaimers

- No Conflicts other than as inventor on patents assigned to the National Cancer Institute
- The views expressed are personal and are not policies of NCI, the National Institutes of Health, USA, or the DHHS

My Experience As Research Scientist Focusing on AIDS and Cancer Vaccines and Immunotherapies

- AIDS Vaccine
- AIDS Prep
- AIDS PEP
- Hepatitis B
- Vaccinia

Early AIDS Experience

- Many questions on the nature of the disease, the virus, transmission, safety
- Infections of Health care workers, lab personnel
- Post Exposure Prophylaxis
 - Implemented immediately after NCI developed specific AIDS drugs
 - Hepatitis B vaccination
 - Vaccinia and recombinant vaccines

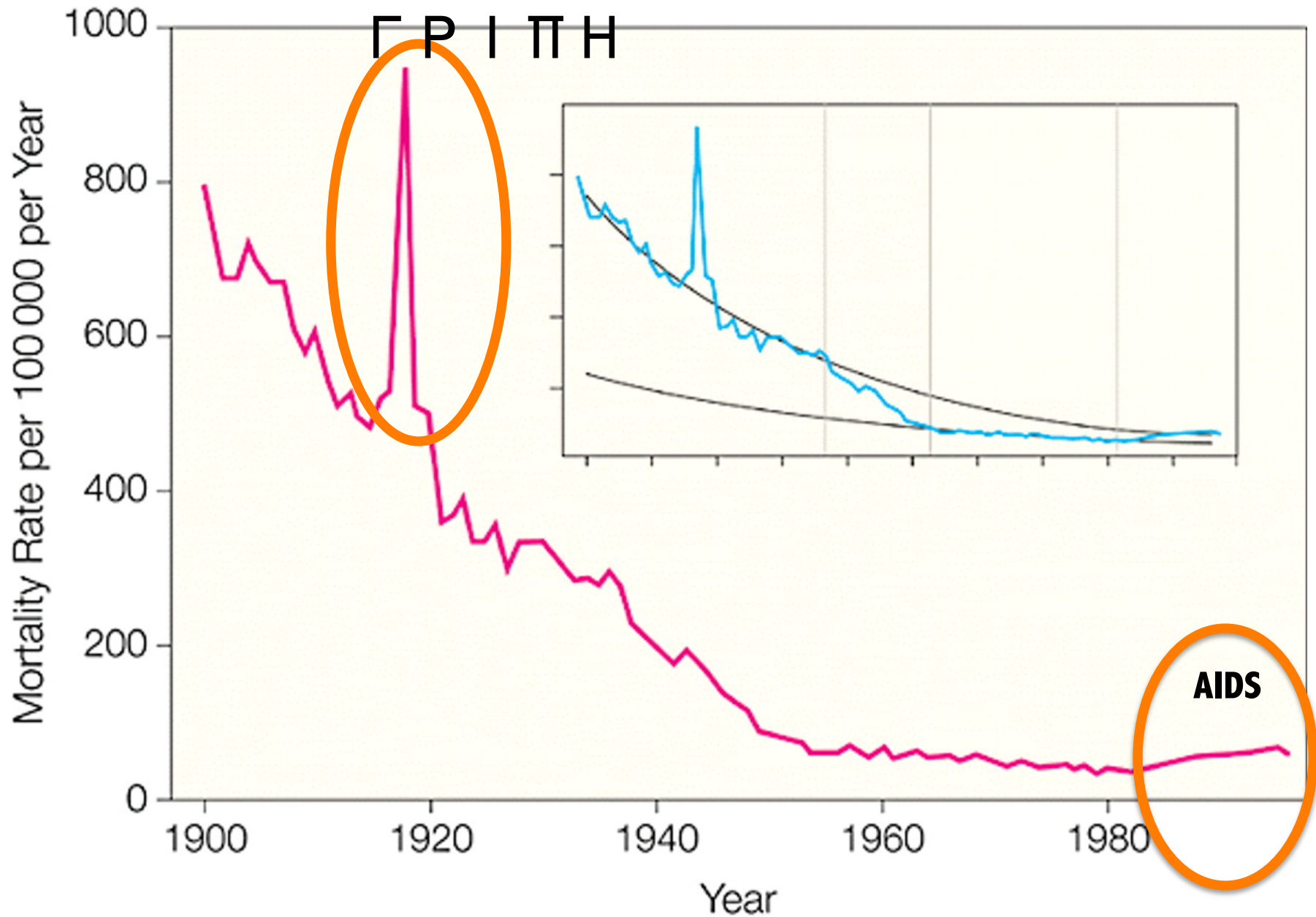
PrEP

- Pre-exposure Prophylaxis opens new ways to address AIDS
- Absence of vaccine has led to PrEP as a method for epidemic control

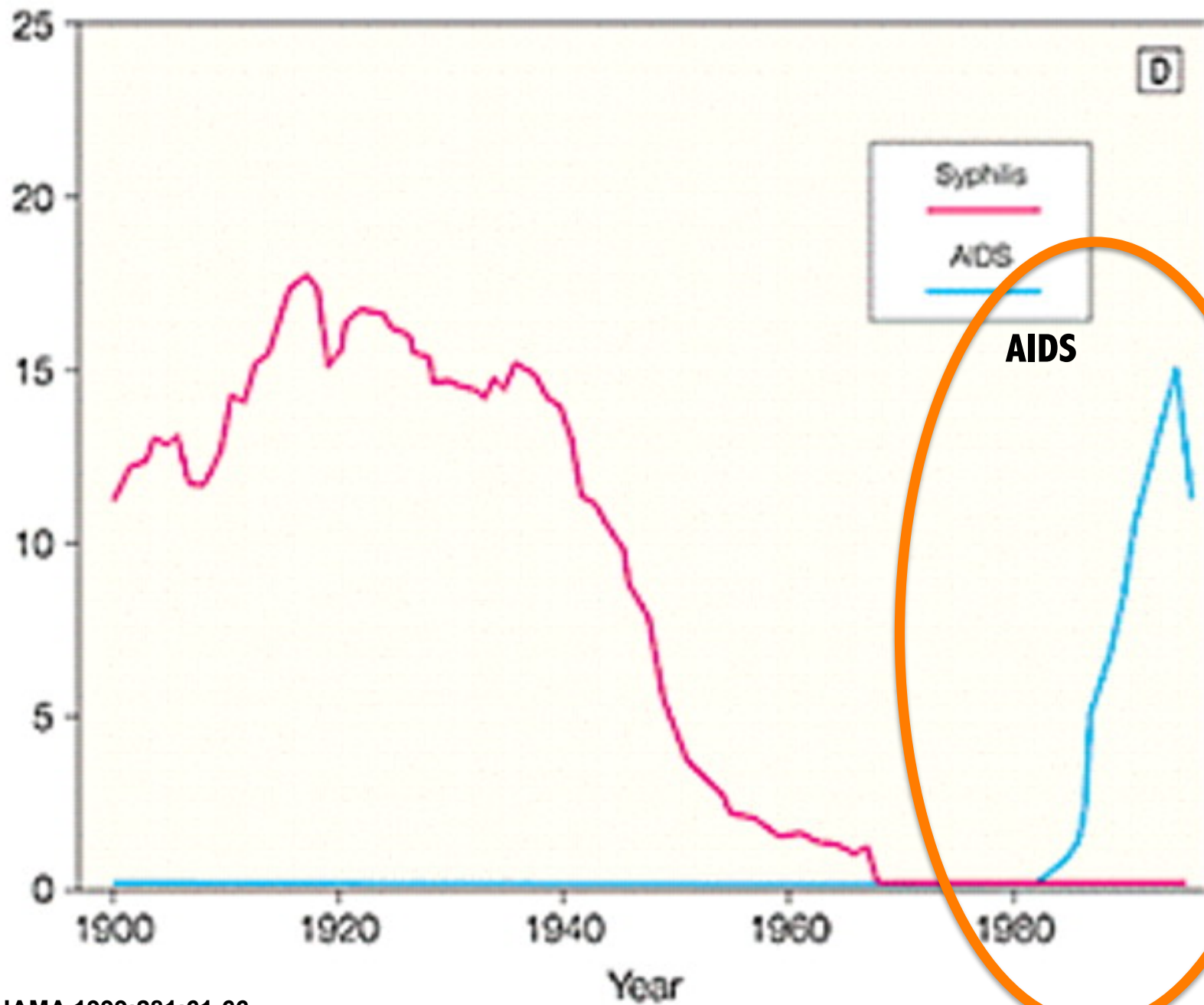
Continuous Effort Is Essential

- Progress against infectious disease and cancer is steady
- Vaccines is a huge part of the progress and the only way to eradication
- New epidemics are a constant threat as the world continues to shrink, new areas of the world become accessible and well-travelled
- Cancer related vaccines have a huge impact

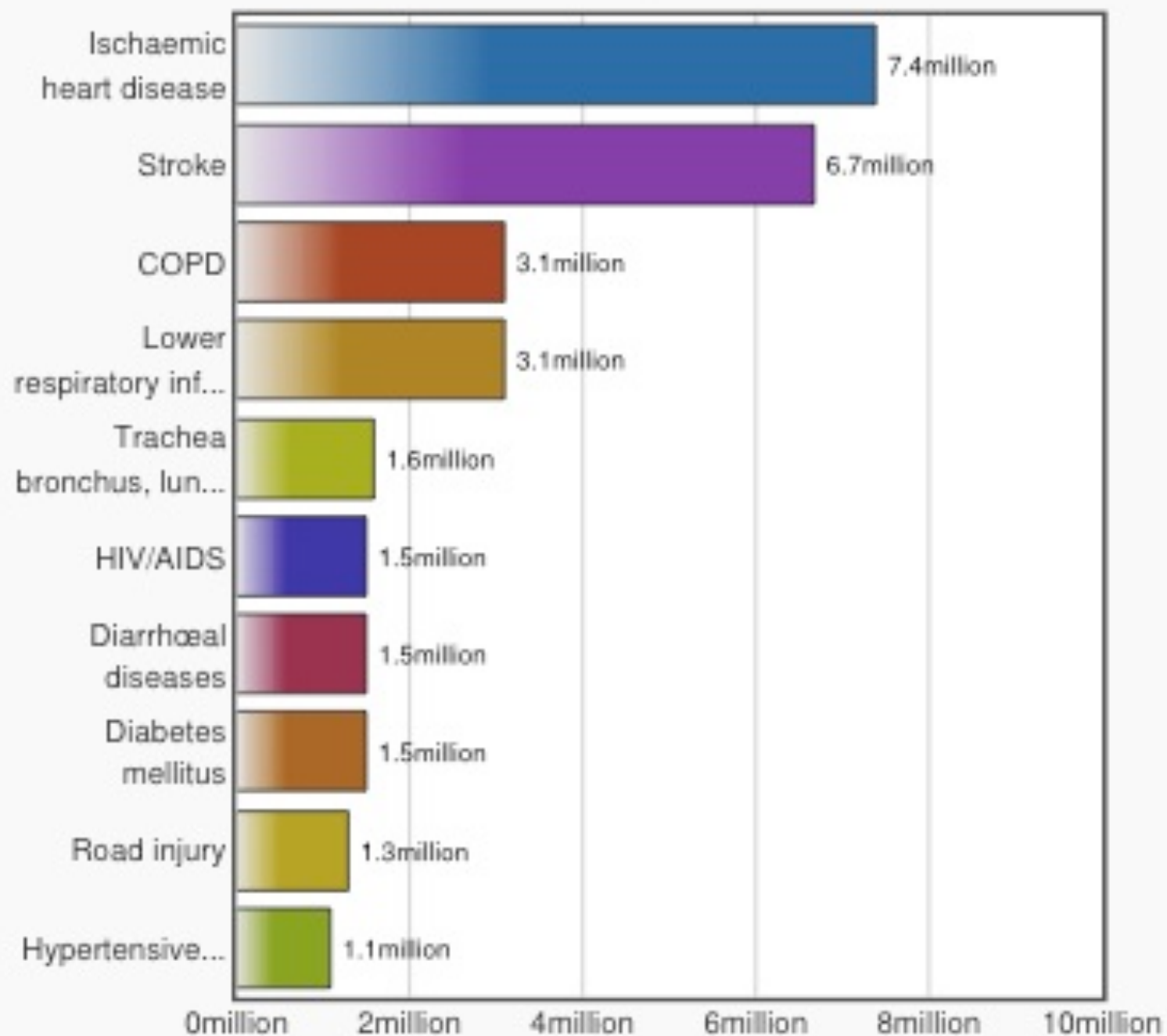
Crude Infectious Disease Mortality Rate in the United States from 1900 Through 1996



Crude Mortality Rates for Syphilis And AIDS



The 10 leading causes of death in the world 2012

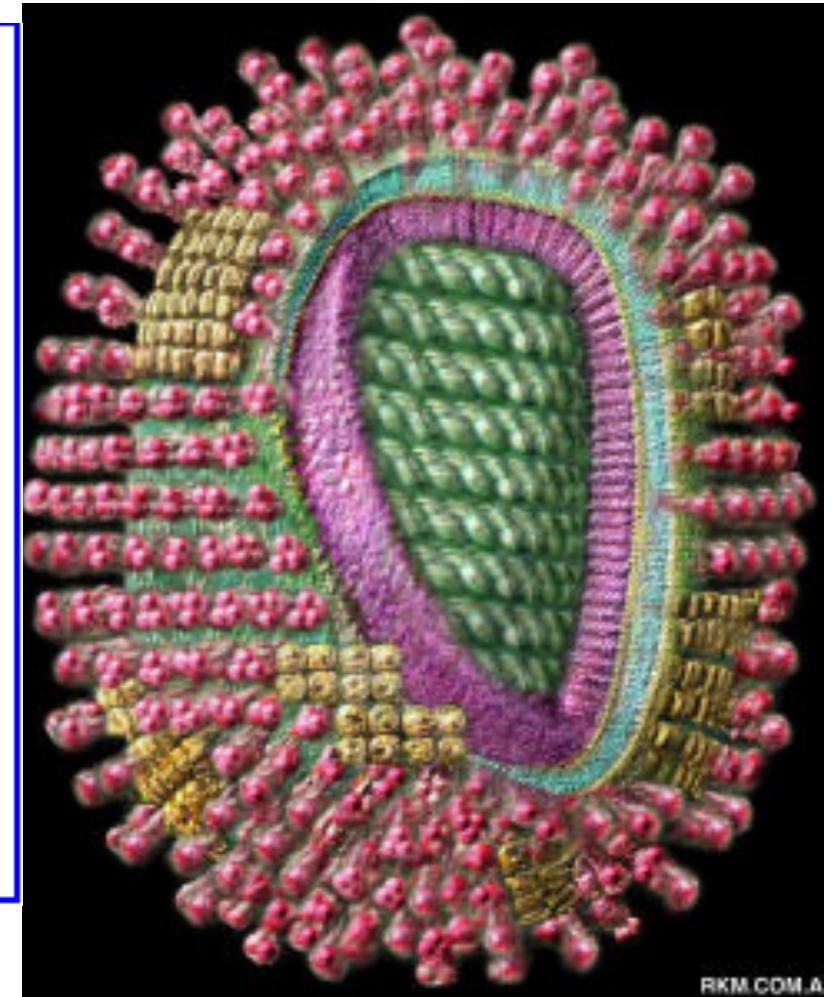
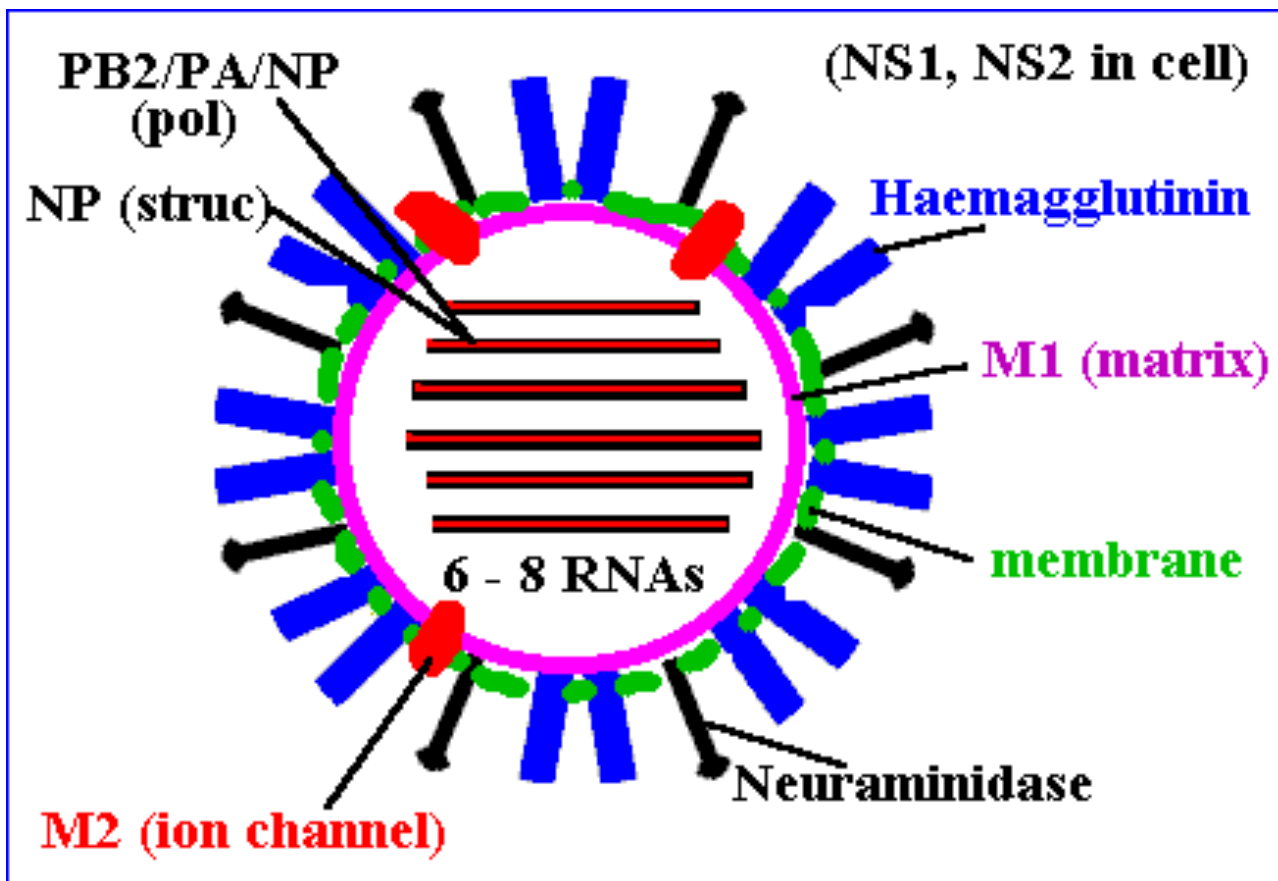


For vaccination, healthcare workers continue to be a difficult group to connect with

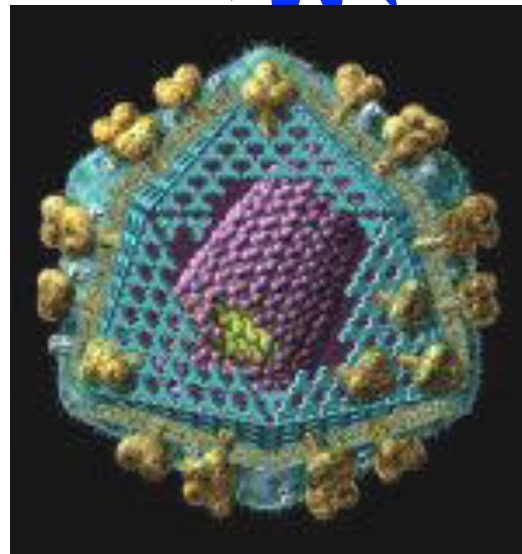
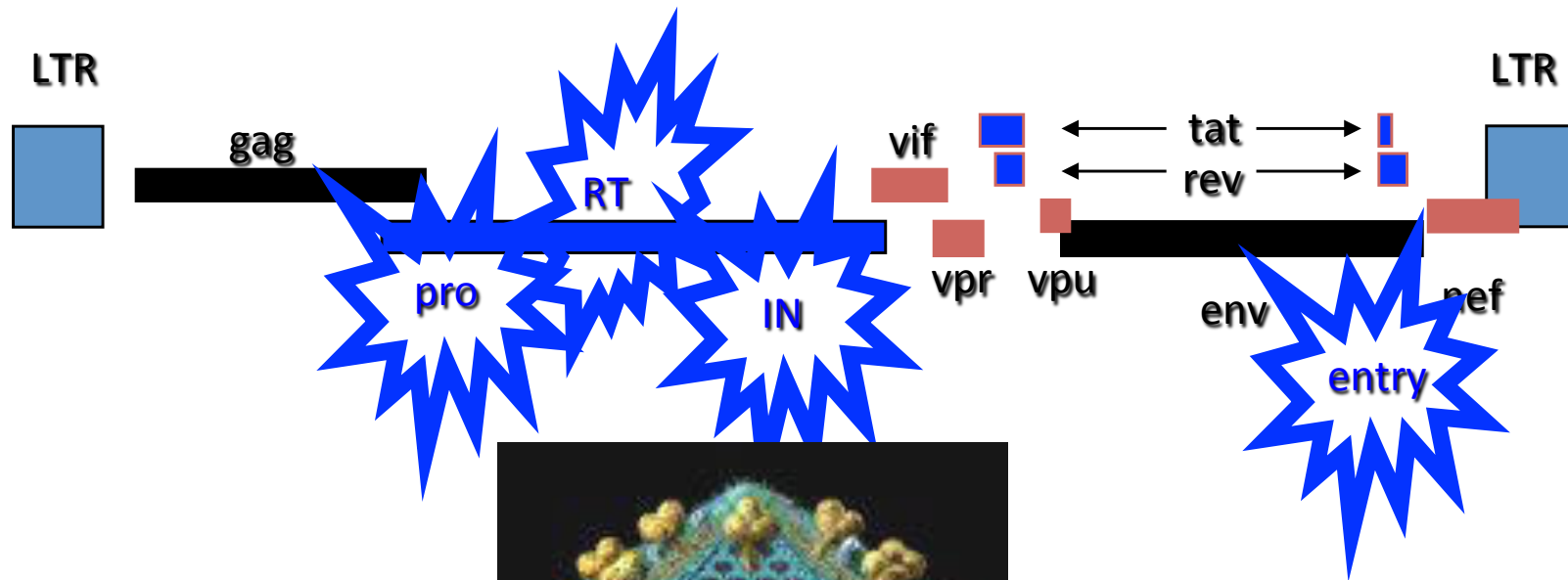
- Solved problems
 - Smallpox
 - The first historically documented epidemic, 1350 BCE
 - The first and only to be eradicated
 - Cost: 100 M \$ for 12 years!
- Unsolved problems
 - AIDS, TB
- “Unsolved Solved” problems
 - Hepatitis B
 - Flu
- Coming problems
 - SARS, MERS



The Flu Virus



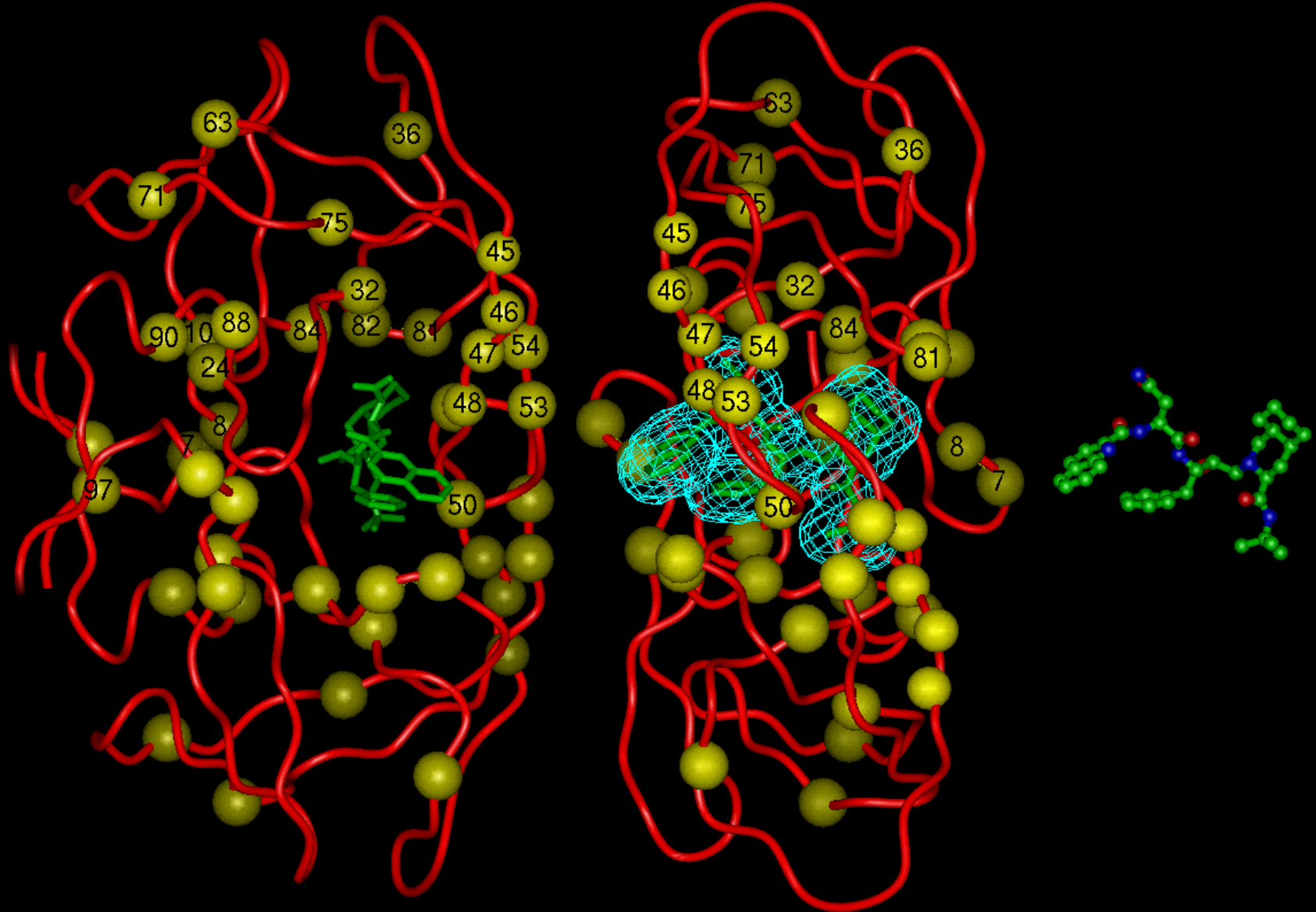
The AIDS Virus, HIV-1



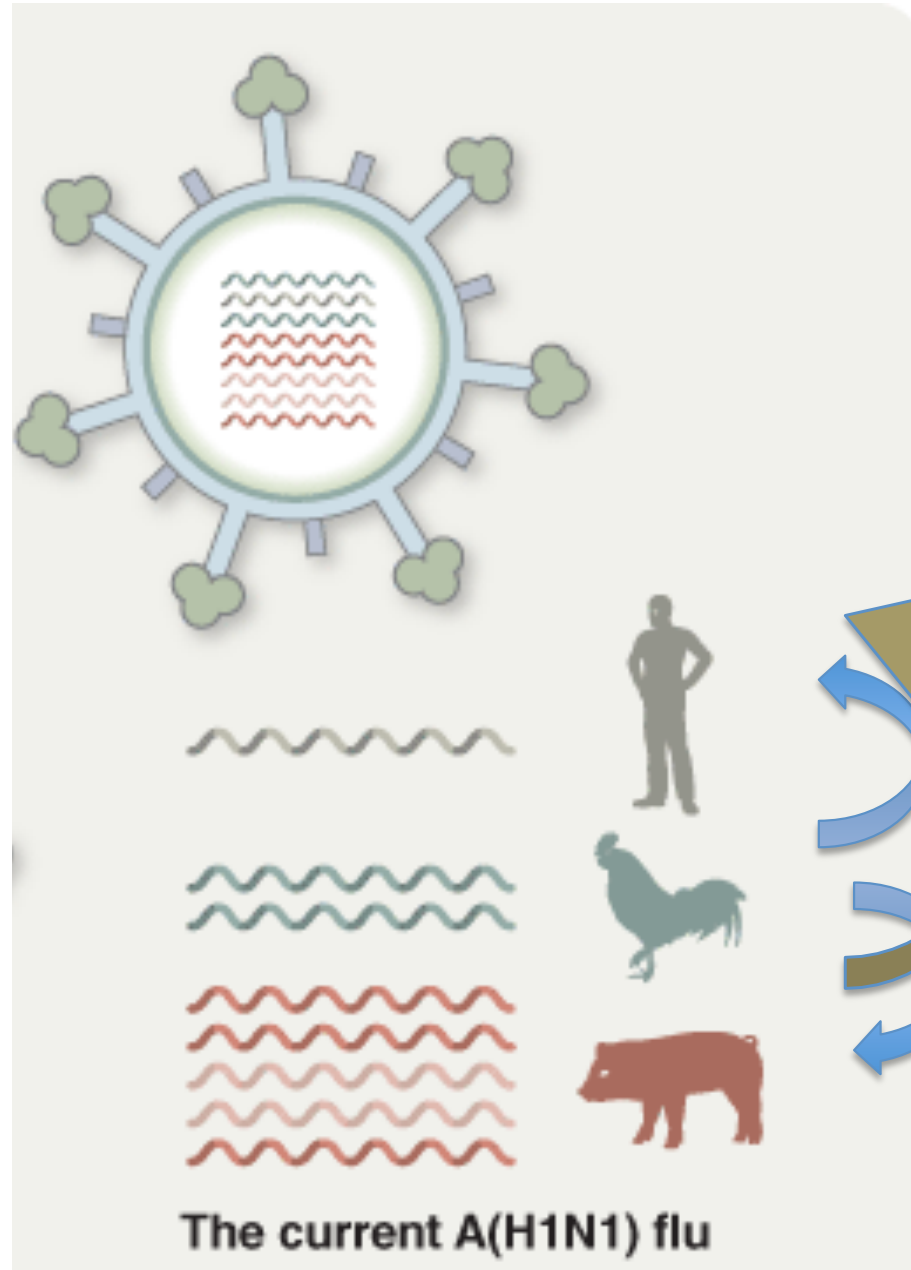
HIV-1, Flu

- RNA viruses that mutate rapidly
- Overcome vaccines
 - Vaccines protect only a narrow range of the possible variants
 - New experimental methods focus on producing vaccines with broad range
- Arms Race that requires vigilance and continuous effort, investment

Residues associated with HIV PR drug resistance

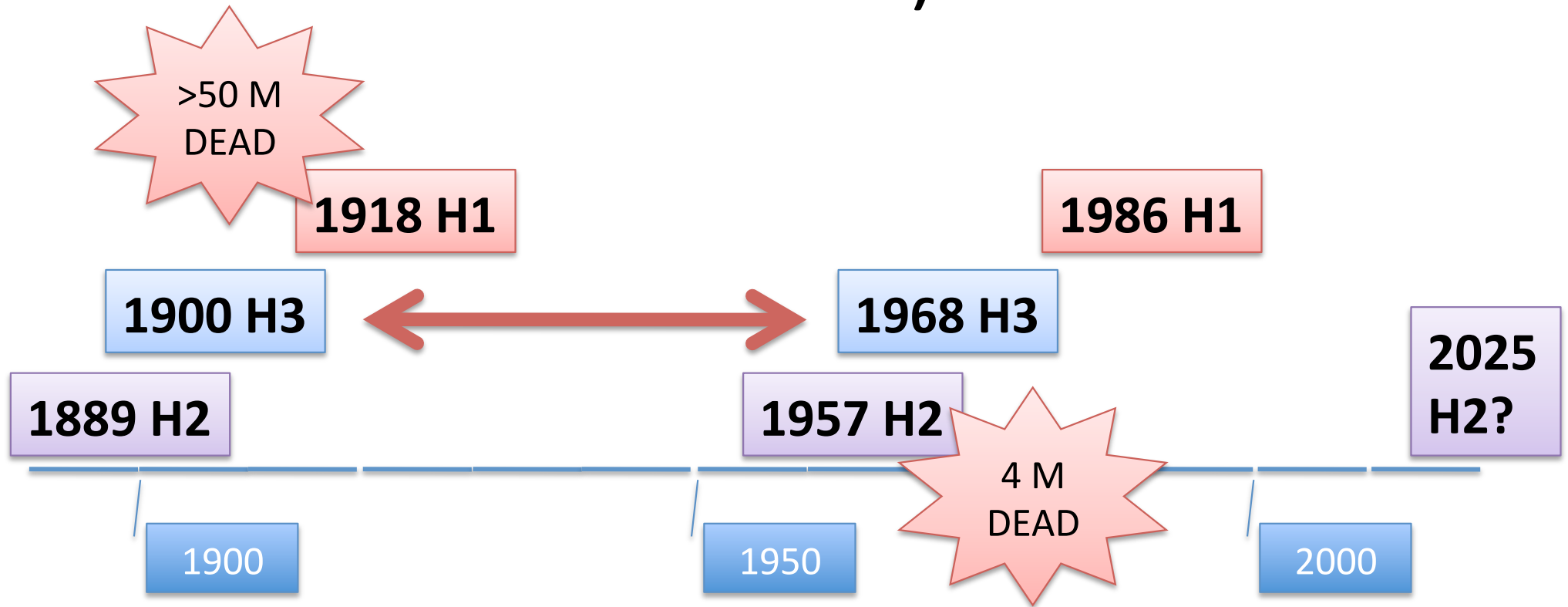


Numbers Game: Interactions among species selects among a huge number of combinations



Moving from host to host the flu virus gets new properties that can initiate new epidemics

Flu Pandemics Every 68 Years (Maurice Hilleman)



**Will the next Flu pandemic be in 2025 by an H2 strain?
New emerging strains ???**

Emerging Viral Diseases

- Dengue
- Monkeypox
- Nipah
- Noroviruses
- West Nile
- Whitewater Arroyo
- Yellow fever
- SARS 2003-2004
-
- **MERS** 2012 Middle East Respiratory Syndrome
Coronavirus
- **Chikungunya**

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The war against cancer can be won through prevention-vaccines have huge impact

- 18% of cancers caused by infections
- Preventing or curing infection decreases cancer burden
- hepatitis B = Liver Cancer
 - Hepatocellular carcinoma used to be the most frequent human tumor; Hepatitis B vaccine had a huge impact
- Papilloma Viruses = Cervical cancer
- Smoking = Lung Cancer
- Obesity

Georgios Papanicolaou (1883-1962)



Pap Test:

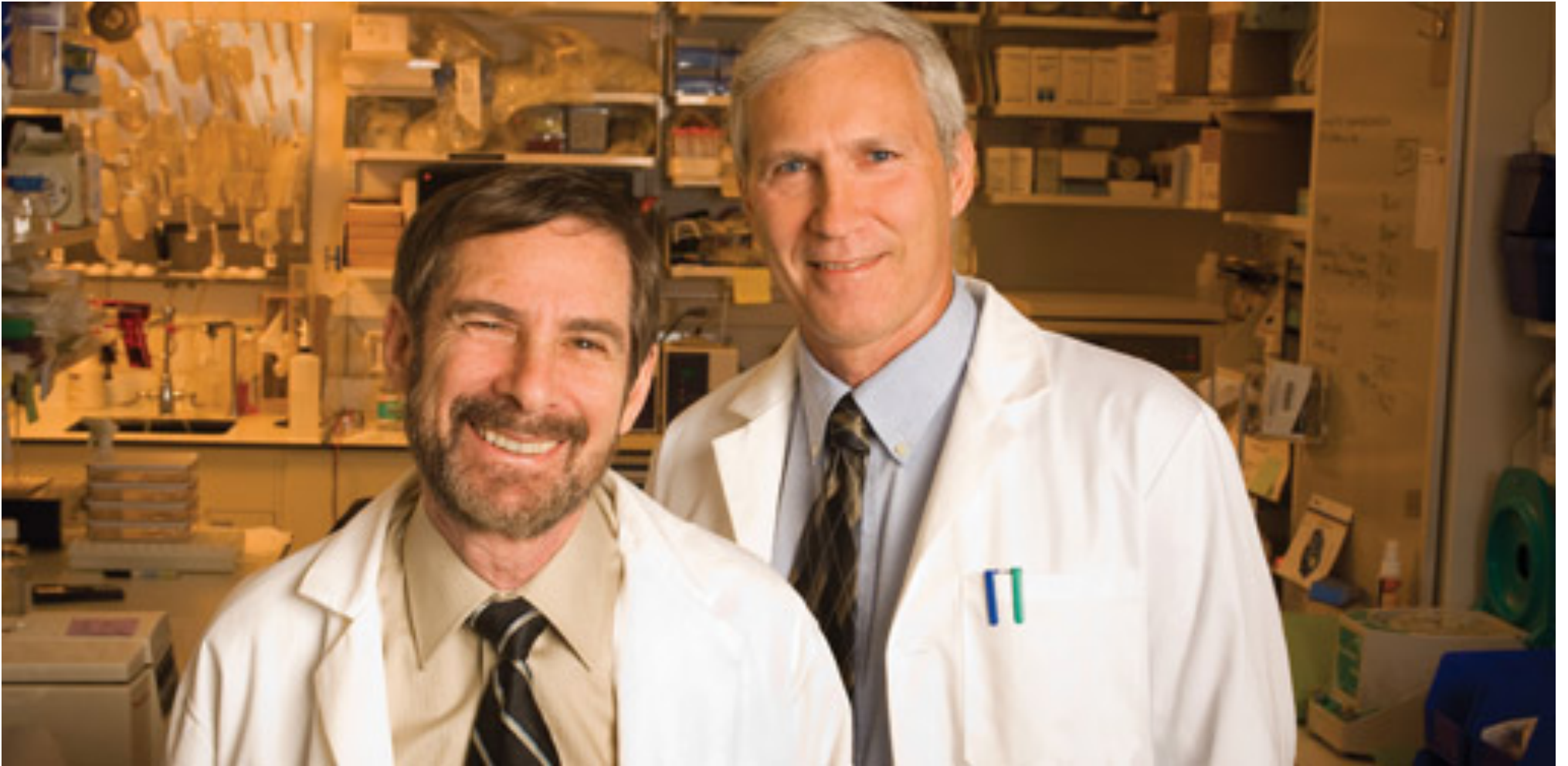
Has saved the lives of millions of women world wide

Continues to be as important as ever in cancer prevention

Prof. Dr. Harald zur Hausen Nobel Prize for Medicine 2008



Doug Lowy and John Schiller, National Cancer Institute USA



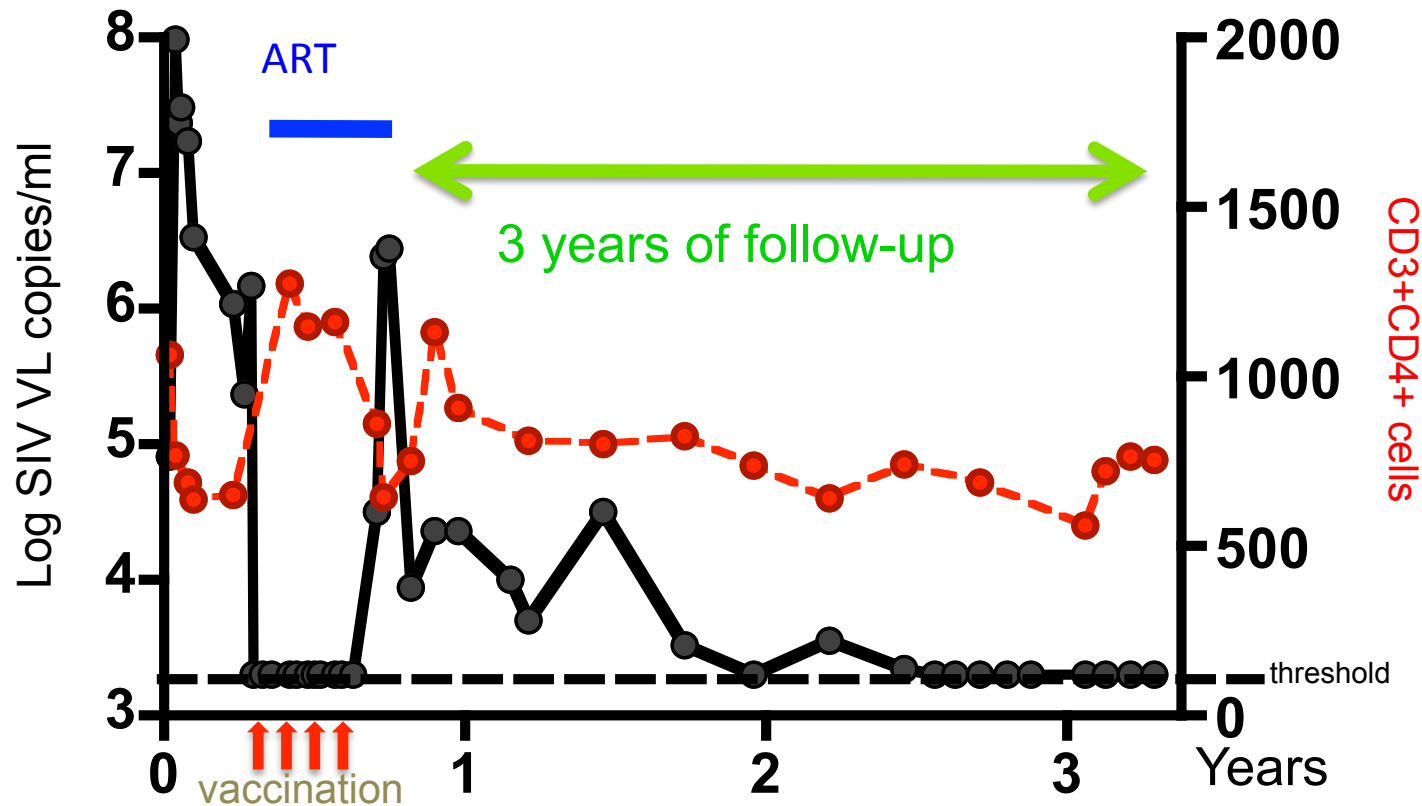
Continuous Effort Is Essential

Health Care Workers Are An Essential Part And Need To Be Effectively Addressed

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Μακροχρονια Καταστολη του Πολλαπλασιασμου του Ιου Μετα Απο Θεραπευτικο Εμβολιασμο με DNA Εμβολιο



Long-term virus reduction (3-4 years follow-up), supports potency of vaccine-induced recall responses

Προφυλακτικό DNA Εμβολιο Προστατευει Πιθηκους Απο Την Παραγωγη Υψηλου Ιικου Φορτιου

