Are We Ready for Pandemic Influenza? No.
Why we should care?

- SARS
- Bioterrorism
- West Nile Virus
- Monkeypox in humans
- Avian Flu (e.g. H5N1 AND H7N7)
Role of WHO

- Created Global Agenda for Influenza Surveillance in 2001
  - 1. improve surveillance in humans and animals
  - 2. improve knowledge
  - 3. increase vaccine use
  - 4. accelerate preparedness

- Ideal candidate to facilitate international cooperation if there was a pandemic
Another pandemic is inevitable and perhaps imminent.

It is impossible to create vaccines for all flu strains because there are so many animals. So, we must prioritize strains.

H2, H5, H6, H7, and H9 are most likely to transmit to humans.

H1 and H3 are currently circulating in humans but the last three flu seasons of H1N1 and H3N2 have been mild.
Most Wanted List

1. H2 culprit
   1. 1957 Asian Flu H2N2. People under 30 years are not immune.

2. H5 culprit
   1. 1997 H5N1 moves from aquatic birds to humans via poultry intermediate. H5 is in China’s animal resevoir (duck meat).

3. H7 culprit
Vaccine Challenges

- Limited Supply
  - Problem: Inadequate production capabilities
  - Need tissue culture-based alternatives to supplement

- Slow vaccine development process
  - Since 1970s, vaccines have been made by growing reassorted virus with desirable traits in fertilized eggs
  - Problem: Takes 6 months to organize enough fertile eggs for vaccine production.
  - Problem: Time consuming to select for best reassortment of virus genes
Proposed Vaccine Solutions

- Faster plasmid-based reverse genetic vaccine
  - Clone appropriate H and N in target virus
  - Alter HA connecting peptide if necessary
  - Transfer to appropriate cell line
Proposed Vaccine Solutions

- Limitations of Reverse Genetic Vaccine
  - Still need clinical trials to determine the number and quantity of doses needed
  - Few accredited cell lines exist. Only green monkey kidney cell line meets all criteria for international use
  - Method involves genetic modification which may affect acceptance

- Cooperation between government, industry, and academia can overcome these obstacles
Safety Testing of Possible Vaccines

- Few facilities meet the requirements to test highly pathogenic flu viruses.
- Since we’re already lacking enough facilities, we need a balance between creating more quantity and quality.
- Sometimes people react poorly to vaccine and creates liability issues threatening vaccine company.
  - Need to expand Vaccine Act to apply to all people and encourage companies to create vaccines for scary diseases.
Drugs are Good

- We should stockpile antiretroviral drugs because they are potentially effective as shown by H7N7 outbreak
- Problem: Nobody’s doing it.
Prioritization of Solutions

1. Stockpile anti-influenza drugs to reduce severity or spread of flu
2. Vaccines for each subtype of pandemic flu strain that have been clinically tested. Ability to scale up these vaccines. Will only dampen symptoms
3. Need reverse genetics vaccine
4. Improve vaccine manufacturing capabilities
We should move from talking to doing. We’re not ready.