Planning for Pandemic Influenza

John Kobayashi
Faculty, Northwest Center for Public Health Practice, Foreign Advisor with the Field Epidemiology Training Program in Japan
Pandemic Influenza as a Paradigm Emerging Pathogen

- Normal influenza season
  - about 36,000 deaths in US

- Pandemic influenza
  - 1918 -- 20,000,000 deaths worldwide
    -- 500,000 US deaths
  - 1957 and 1968 pandemics
    -- 104,000 US deaths
What is an Epidemic?

- The occurrence of more cases of disease than expected in a given area or among a specific group of people over a particular period of time*.

* Reference: Principles of Epidemiology, Richard Dicker, CDC
What is a Pandemic?

- An epidemic occurring over a very wide area (several countries or continents) and usually affecting a large proportion of the population.

- Examples:
  - Cholera
  - AIDS
  - Pandemic Influenza
What is Pandemic Influenza?

- **Pandemic Influenza**: circulation of strains for which most or all of the world’s population lack’s immunity.

- **Antigenic Drift**: small changes in influenza viruses with partial immunity in the population – occurs routinely.

- **Antigenic Shift**: large changes with little immunity in the population – necessary for pandemic influenza.
Influenza virus structure
HA – hemagglutinin; NA - neuraminidase

Image source: CDC
Influenza Types and Strains

- Types A and B commonly infect humans

- Current vaccine:
  - H3N2: A/Fujian/411/2002
  - H1N1: A/New Caledonia/20/99
  - B/Shanghai/361/2002
Influenza as a Zoonosis
A Potential Source of “Antigenic Shift”

Diagram source: Ben Schwartz;
National Vaccine Program
WHO Influenza Pandemic Phases
Interpandemic Phase 0 (Emergence)

- **Level 0**: Usual influenza viruses circulate, causing yearly outbreaks
- **Level 1**: Novel Virus Alert -- Identification of a novel influenza virus in a person
- **Level 2**: Confirmation that the novel influenza virus has infected two or more people, but rapid person-to-person spread and multiple outbreaks have not occurred.
- **Level 3**: Pandemic Alert: Confirmation of person-to-person spread in the general population with at least one outbreak lasting more than 2 weeks in one country
WHO Influenza Pandemic Phases

- **Phase 1**: The novel influenza virus is causing several outbreaks in one country, and has spread to other countries.

- **Phase 2**: Epidemics occurring in multiple countries and spreading worldwide.

- **Phase 3**: End of the first pandemic wave.

- **Phase 4**: Second or later waves.

- **Phase 5**: End of pandemic.
Problems with Pandemic Preparedness & Surveillance

- Seeing only the “tip of the iceberg” (not all cases seek medical care, not all physicians obtain laboratory specimens, etc)

- Syndromic surveillance for respiratory diseases is difficult

- Lack of “transparency” in international reporting

- Conflicting interests in ministries of health, agriculture and commerce.
Problems with Pandemic Preparedness
Vaccine Development and Production

- Vaccine virus must be made in eggs
- Need adequate supply of eggs
- The pandemic strain may need to be genetically modified so it doesn’t kill eggs
- There are few economic incentives for drug companies to make vaccines
- Who will assume liability for a national vaccination program?
Problems with Pandemic Preparedness
Vaccine Distribution and Administration

- In the first pandemic wave, there will probably not be enough vaccine for all who want it.
- It will be necessary to prioritize who will receive vaccine.
- There may be little advance notice for these priorities and they may change over time.
Summary

- Pandemic influenza is very likely to occur at some time in the future, but when?

- Progress has been made at every level of public health response (pandemic planning, surveillance, vaccine development, distribution and administration).

- However, problems remain at every level.

- What can and is being done at the state, local and tribal level to plan a pandemic response?
Q & A

Expert Panel:
Todd Damrow
Cheryl Juntunen
Susan Keady
Michael Skeels
At what stage of development is your state/local/tribal plan for responding to pandemic influenza?

Compared to other pressing issues, what level of priority does the planning activity have within your jurisdiction? Why?
Pandemic Flu....

Nature’s terrorist attack
“When the dying stopped, ....the forgetting began”.

Dr. Alfred W. Crosby
How does planning for pandemic influenza relate to the components (surveillance, laboratory testing, vaccine distribution, etc) of your routine ongoing inter-pandemic influenza control program?

What is similar? Different? Complementary?
Similar Activities
Annual Flu and Pandemic Flu

- Viral culture surveillance
- Influenza-like illness (ILI) surveillance
- Promote routine influenza and pneumococcal immunization
- Promote appropriate use of antivirals
- Information for clinicians
- Risk communication and public education
How is pandemic flu different?

- Immunization is **not** the primary strategy in the early stages
- Effective immunization (when available) may require two doses
- Need to characterize epidemiology of the specific strain to prioritize immunization and antiviral use
- Increased social and cultural concerns
Pandemic Response Components

Pandemic influenza disease

- Interventions to decrease transmission
- Provide quality medical care
- Infection control in medical & long term care settings
- Maintain essential community services/emergency response activities
- Antiviral treatment & prophylaxis

Vaccination

Diagram source: Ben Schwartz; National Vaccine Program
What are the major barriers to having an effective plan that you are facing (or anticipate facing)? Logistical concerns? Ethical concerns? How are you addressing these barriers?
Local Challenges

- **Vaccine Distribution:**
  - National Coordination, Production Delays and Shortages, Communication with Locals

- **Client Misperceptions:**
  - Efficacy, Contamination, Availability

- **Private/Public Delivery System:**
  - Coordination of Efforts, Targeting High Risk Individuals, Institutional Special Populations, Education of Private Sector

- **Assessment Data:**
  - Measuring Progress
Who needs to be at the table to assure that the planning is effective?

Who is responsible for orchestrating the system of response?
Who needs to be at the table?

- State & local epidemiologists & immunization staff
- Clinical & PH laboratories
- Infection control practitioners
- Hospital administrators
- Clinicians
- Tribal health representatives
- Emergency response agencies
Who orchestrates the response?

**State PH agency**: monitor & distribute information; surveillance & testing for novel strains; manage & distribute support/supplies; create and maintain current/consistent public messages

**Local health departments**: disease surveillance; dispensing pharmaceuticals & vaccines; facilitate cooperation between local parties; provide community PH guidance; isolate or quarantine individuals if necessary
What is your biggest concern about planning for pandemic flu?

Do you have some examples of innovation/creativity in developing your approach to this planning?