Pandemic Influenza: Tackling the Tough Issues

Defining the Threat

continued

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The Spanish Flu Pandemic of 1918

- Killed more people than any other disease in history
The Spanish Flu Pandemic of 1918

- Caused more deaths than WWI, WWII, the Korean War, and the Vietnam War combined
- Unusually high attack rate among young and otherwise healthy adults (soldiers)

Doughboys - 1918
Info.detnews.com
The Spanish Flu Pandemic of 1918 (continued)

• Arose in February 1918 and spread rapidly throughout the spring

• First wave disappeared in the early summer
The Spanish Flu Pandemic of 1918 (continued)

- Second wave appeared in August 1918
The Spanish Flu Pandemic of 1918 (continued)

- The first wave
  - Unusually high mortality rate was not clearly recognized
  - Influenza was not a reportable disease early in 1918

Tent Hospitals—1918
Info.detnews.com
The Spanish Flu Pandemic of 1918 (continued)

- Communication was not optimal to enable tracking of the disease
- Wartime conditions made information sharing difficult

Tent Hospitals—1918
Info.detnews.com
The Second Wave

- Reappeared in late August 1918
- Appeared almost simultaneously in multiple cities around the globe

Military Loss—1918
Info.detnews.com
The Second Wave

- Had mutated to an exceptionally lethal variation
- Spain was the first to report their experience

Military Loss—1918
Info.detnews.com
The Second Wave (continued)

- Over 90% of the deaths occurred during the second wave

- Had significant effect on the war effort in combatant countries
The Second Wave (continued)

• Not a single United States troop transport ship was sunk during the entire war, but thousands died from the flu en route to Europe.

Loading Ambulance—1918

Info.detnews.com
The Second Wave (continued)

• Second wave would strike 30% to 50% of the world population

• 10% of those developed a massive pneumonia

Funeral—1918
Info.detnews.com
The Second Wave (continued)

- 60% of those died
- Death sometimes occurred in 24 hours or less

Funeral—1918
Info.detnews.com
Impact on Life in America

Camp Funston, Kansas Emergency Hospital
Courtesy of National Museum of Health and Medicine

Seattle Daily Times Archives
seattletimes.nwsource.com
Impact on Life...

Iowa State Gymnasium Tent Hospital

Courtesy of National Museum of Health and Medicine

Wartime Poster
1918

The University of North Dakota School of Medicine & Health Sciences
Impact on Life ...

Death Rates in the U.S. by Month (per 1,000 population)

www.pbs.org

www.und.edu
Impact on Life ...

Mortality Rate (per 100,000 per year)

Year

1900 1920 1940 1960 1980
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U.S. Influenza & Pneumonia Deaths by Age

U.S. Life Expectancy 1900 - 1960

American Society for Microbiology News
Fatality Surge

INFLUENZA PANDEMIC
MORTALITY IN AMERICA AND EUROPE DURING 1918 AND 1919

DEATHS FROM ALL CAUSES EACH WEEK
EXPRESSED AS AN ANNUAL RATE PER 1000

Peaks in Death www.pbs.org
The University of North Dakota School of Medicine & Health Sciences
Pandemics and Death – United States

1918 – The Great Pandemic – 675,000

Approximate beginning of the epidemic, 1918

Source: America’s Forgotten Pandemic - The Influenza of 1918 - 1919
Pandemics and Death - United States

• 1957 – Asian Flu – 70,000
• 1968 – Hong Kong Flu – 34,000
• 1976 – Swine Flu – 1
Factors Causing Pandemics—Conditions Favoring a Pandemic

• A novel pathogen arising from a major genetic change (i.e., an antigenic shift)

• A susceptible population with little or no immunity
Factors Causing Pandemics—Conditions Favoring a Pandemic

• A pathogen that is transmitted efficiently from person to person

• A pathogen with the capacity to cause serious illness and death
Other Contributing Factors

- Rate of transmission
- Severity of the illness—Some diseases kill so rapidly that there is minimal opportunity for the spread of the disease (Ebola)

Birds to Live Market
www.swissinfo.org
Other Contributing Factors

- Overall health of a population
- Ease of travel

Birds to Live Market
www.swissinfo.org
## Phases, Levels & Categories

### WHO Phases

<table>
<thead>
<tr>
<th>Phase</th>
<th>Federal Government Response Stages</th>
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<tbody>
<tr>
<td><strong>INTER-PANDEMIC PERIOD</strong></td>
<td></td>
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<tr>
<td>1</td>
<td>No new influenza virus subtypes have been detected in humans. An influenza virus subtype that has caused human infection may be present in animals. If present in animals, the risk of human disease is considered to be low.</td>
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<tr>
<td>2</td>
<td>No new influenza virus subtypes have been detected in humans. However, a circulating animal influenza virus subtype poses a substantial risk of human disease.</td>
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<td><strong>PANDEMIC ALERT PERIOD</strong></td>
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<tr>
<td>3</td>
<td>Human infection(s) with a new subtype, but no human-to-human spread, or at most rare instances of spread to a close contact.</td>
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<tr>
<td>4</td>
<td>Small cluster(s) with limited human-to-human transmission but spread is highly localized, suggesting that the virus is not well adapted to humans.</td>
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<tr>
<td>5</td>
<td>Larger cluster(s) but human-to-human spread still localized, suggesting that the virus is becoming increasingly better adapted to humans, but may not yet be fully transmissible (substantial pandemic risk).</td>
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<tr>
<td><strong>PANDEMIC PERIOD</strong></td>
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<tr>
<td>6</td>
<td>Pandemic phase: increased and sustained transmission in general population.</td>
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*Assumes 30% illness rate and unmitigated pandemic without interventions*
Estimates Based on Examples

The chart shows the relationship between the case fatality ratio (%) and the illness rate (%) for different years:

- **1918**: 3.0, 1,800,000 projected deaths
- **1957**: 2.0, 450,000 projected deaths
- **1968**: 1.0, 90,000 projected deaths

Extraordinary influenza events:
- **Severe Seasonal Influenza**: 1.0
- **1918 Flu Pandemic**: 3.0
- **1957 Flu Pandemic**: 2.0
- **1968 Flu Pandemic**: 1.0

*Based on 300 million U.S. population*