Pandemic Influenza:
Impact and Challenges

Massachusetts Department of Public Health
February, 2007
Why is a Pandemic different from other disasters?

• Every community will experience the Pandemic as a local event
• There will be little help available from the Federal or state government
• No community or hospital will be able to respond alone
• The entire community will need to work together to respond effectively
  – e.g., when schools close, the parents must keep the children at home for the strategy of social distancing to be fully effective
• The ultimate toll the pandemic takes on your community will be a direct reflection of the level of individual preparedness and the use of community containment measures
INFLUENZA PANDEMIC
MORTALITY IN AMERICA AND EUROPE DURING 1918 AND 1919

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

NEW YORK
LONDON
PARIS
BERLIN

BERLIN RATES MISSING FOR AUG. 17, 31,
OCT. 19, 1918.
# Comparison of Pandemic Planning Numbers

<table>
<thead>
<tr>
<th></th>
<th>“Ordinary” Influenza</th>
<th>1957/68-like</th>
<th>MDPH Surge Planning*</th>
<th>1918-like</th>
</tr>
</thead>
<tbody>
<tr>
<td># Ill</td>
<td>0.37 - 1.1 M (12%)</td>
<td>2 M (30%)</td>
<td>2M (30%)</td>
<td>2 M (30%)</td>
</tr>
<tr>
<td>Hospitalizations</td>
<td>4,350 (0.5%)</td>
<td>20,000 (1%)</td>
<td>80,000 (4%)</td>
<td>220,000 (11%)</td>
</tr>
<tr>
<td>Deaths</td>
<td>800 (0.1%)</td>
<td>4,600 (0.23%)</td>
<td>20,000 (1%)</td>
<td>42,000 (2.1%)</td>
</tr>
</tbody>
</table>

*Based on 3X 1968 projections (Trust For America’s health report: A Killer Flu, [www.healthyamericans.org](http://www.healthyamericans.org), June 2005)
Projected Impact for Massachusetts

- Initial “wave” of 8 week duration, followed by 1-2 additional waves
- 2 million ill (30% attack rate)
  - 1 million with mild illness
  - 80,000 requiring “hospital level” care
  - 920,000 needing home based clinical care
  - 20,000 deaths
- Critical shortages of skilled staff, ventilators, and intensive care
### Pandemic Influenza Impact

<table>
<thead>
<tr>
<th>Weeks</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital Admission</td>
<td>Weekly admissions</td>
<td>4,820</td>
<td>8,000</td>
<td>12,000</td>
<td>15,200</td>
<td>15,200</td>
<td>12,000</td>
<td>8,000</td>
<td>4,800</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Peak admissions/day</td>
<td>2,369</td>
<td>2,369</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital Capacity</td>
<td># of influenza patients in hospital</td>
<td>3,528</td>
<td>5,881</td>
<td>8,821</td>
<td>11,173</td>
<td>11,163</td>
<td>10,169</td>
<td>7,799</td>
<td>5,116</td>
<td></td>
</tr>
<tr>
<td></td>
<td>% of hospital capacity needed</td>
<td>27%</td>
<td>44%</td>
<td>67%</td>
<td>84%</td>
<td>87%</td>
<td>77%</td>
<td>59%</td>
<td>39%</td>
<td></td>
</tr>
<tr>
<td>ICU Capacity</td>
<td># of influenza patients in ICU</td>
<td>2,400</td>
<td>5,000</td>
<td>7,816</td>
<td>10,324</td>
<td>11,173</td>
<td>10,869</td>
<td>8,637</td>
<td>5,964</td>
<td></td>
</tr>
<tr>
<td></td>
<td>% of ICU capacity needed</td>
<td>169%</td>
<td>365%</td>
<td>563%</td>
<td>726%</td>
<td>785%</td>
<td>784%</td>
<td>627%</td>
<td>419%</td>
<td></td>
</tr>
<tr>
<td>Ventilator Capacity</td>
<td># of influenza patients on ventilators</td>
<td>720</td>
<td>1,527</td>
<td>2,345</td>
<td>3,097</td>
<td>3,352</td>
<td>3,261</td>
<td>2,591</td>
<td>1,789</td>
<td></td>
</tr>
<tr>
<td></td>
<td>% usage of ventilator</td>
<td>67%</td>
<td>185%</td>
<td>284%</td>
<td>375%</td>
<td>406%</td>
<td>395%</td>
<td>314%</td>
<td>217%</td>
<td></td>
</tr>
<tr>
<td>Deaths</td>
<td># of deaths from influenza</td>
<td>1,200</td>
<td>2,000</td>
<td>3,000</td>
<td>3,800</td>
<td>3,800</td>
<td>3,000</td>
<td>2,000</td>
<td>1,200</td>
<td></td>
</tr>
<tr>
<td></td>
<td># of influenza deaths in hospital</td>
<td>340</td>
<td>1,400</td>
<td>2,100</td>
<td>2,560</td>
<td>2,660</td>
<td>2,100</td>
<td>1,400</td>
<td>340</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
1. All results showed in this table are based on most likely scenario.
2. Number of influenza patients in hospital, in ICU, and number of influenza patients on ventilators are based on maximum daily number in a relevant week.
3. Hospital capacity used, ICU capacity used, and % usage of ventilator are calculated as a percentage of total capacity available (see manual for details).
4. The maximum number of influenza patients in the hospital each week is lower than the number of weekly admissions because we assume...
Example of an Epidemic Curve

Flu Patients in Hospitals

Week of Epidemic

# Patients
2 Million Ill in Massachusetts
(30% Attack Rate, Population 6.4 Million)
Health Care Access

- Home Care (Most)
- Outpatient Care: Provider offices and clinics, community based triage and outpatient care centers
- Hospital Level Care:
  - Acute Care Hospitals: flu patients requiring mechanical ventilation, or those with complex medical management needs
  - Influenza Specialty Care Units (ISCUs): Sickest flu patients not meeting the criteria for hospital admission but for whom home care is not possible
Influenza Specialty Care Units

- Licensed as satellite hospitals
- Planning based on community clusters
  - Clusters determined by hospitals
  - One site per community cluster
  - Provide population base for projections
  - Provide for advance planning and public education
- Level of care: Supportive flu care only
MPDH Emergency Preparedness Regions, MRC Locations, Community Health Centers, and Hospitals with Acute Care Facilities.
Community Containment Strategies

Non-pharmaceutical Interventions as a Means to Counter Pandemic Influenza
Public Health Measures

- The Center for Disease Control and Prevention (CDC) outlines two core strategies for intervening with an influenza pandemic:
  - Pharmaceutical Measures
    - Vaccine
    - Antiviral Medications
  - Non-pharmaceutical Interventions (NPI)
    - Individual Hygienic Measures
      - Respiratory Hygiene / cough etiquette, self-shielding
    - Community-based Measures
      - Social distancing, restrict public gatherings, school closure
Quotes from Government Leaders

• “Depending on the severity of the pandemic, at critical junctures during the spread, the public should expect declaration of emergencies, restrictions on large public events, school closures, and restrictions on non-essential activities.” – MA Governor Romney 2/7/06

• “Any community that fails to prepare with the expectation that the federal government will come to the rescue will be tragically wrong.” – HHS Secretary Leavitt 2006
Community Containment Measures

• The MA Influenza Pandemic Preparedness Plan states:
  – As community outbreaks of pandemic influenza occur, community-wide infection control measures may decrease the overall magnitude of the outbreak.
  – Community-based measures may include school closures, “snow days”, and self-shielding.
School Closing Merits Special Consideration

- Influenza transmission is driven by children
- Children experience infection earliest and have the highest attack rate
- School Closures pose an immediate community-wide impact and the potential for substantial adverse socioeconomic impacts
- Therefore, the Pros & Cons of all stakeholders must be considered
MA School Closure Plan

• Because school closures may be effective in slowing the spread of the pandemic; and
• Because certain school buildings must be adapted for use as Influenza Specialty Care Units (ISCUs)
• Massachusetts has developed a plan for school closures for a two week period of time at the exponential phase of influenza transmission.
• The effectiveness of this strategy is contingent upon the public’s cooperation in restricting public gatherings.
Laboratory-confirmed Influenza Cases (by Specimen Collection Date) and Influenza-Like Illness, Massachusetts 2003-2004

Week Ending Date

1. Influenza cases confirmed via viral culture by specimen collection date.
2. Influenza-like illness (ILI, defined as fever > 100°F and cough and/or sore throat), as reported by Massachusetts sentinel surveillance sites by CDC weekly data.

Graph notes:
- Influenza B/Sichuan-like
- Influenza B/Hong Kong-like
- Unsubtyped influenza type B
- Influenza A/H1N1/New Caledonia-like
- Influenza A/H3N2/Korea-like
- Influenza A/H3N2/Panama-like
- Unsubtyped influenza type A
- %ILI
Moving from Pandemic Watch to Pandemic Warning: Signal Trigger

- **Pandemic Warning:** Two weeks of exponential growth to peak
- **Trigger:** Two weeks of increased activity
- **Pandemic Watch:** Baseline ILI activity
Percentage of Visits for Influenza-like Illness Reported by Sentinel Providers, Massachusetts, Two Seasons

% Influenza-like Illness

Holiday Vacation Week

MMWR Week

2/27/2007  Community Containment Strategies  Slide 20
Community-based Interventions

1. Delay outbreak peak
2. Decompress peak burden on hospitals/infrastructure
3. Diminish overall cases and health impacts

Days Since First Case

Daily Cases

Pandemic outbreak: No intervention

Pandemic outbreak: With intervention

#1

#2

#3
Stages of the Pandemic Plan

• **Pandemic Watch** will be Triggered by WHO Declaration of a Phase 6 Pandemic (increased and sustained transmission in the general population).

• **Pandemic Warning** is Declared when Surveillance of Influenza Like Illness (ILI) shows an increase from baseline indicating incipient exponential growth.
  – Schools will be closed for 2 weeks
  – ISCUs will be mobilized

• **Pandemic Warning** is Rescinded upon evidence that the Pandemic Wave has passed.
Model of Trigger for Special Containment Measures and Response

- Pre-Pandemic
- Pandemic Watch
- Pandemic Warning!
- Containment and Response
- ISCUs Open
How School Closures Would Occur

• As seen in the “Model Trigger” slide, new terminology will be adopted for implementing school closures based upon increases in (ILI).

• A “Pandemic Watch” will be initiated when World Health Organization (WHO) Phase 6 is declared.

• School Closures will be ordered state-wide by the Governor upon the recommendation of the MADPH Commissioner at the onset of the “Pandemic Warning” period.
Individual Preparedness

• Have a personal/family preparedness plan

• Practice PPB

• Plan to be part of the response, whether at work or in your community. Be sure your employer and your community have your current contact information

• Join a Medical Reserve Corps where you live, or join another response organization

• Register with MSAR
Institutional Preparedness

• Review the CDC checklist for schools
• Complete your CoOP plan
• Plan with your cluster, and attend meetings
• Be sure your staff/employees understand the plan, their roles, and your expectations.
• Be sure you have up to date contact information on your faculty and staff.
Let’s talk flu.

When it comes to seasonal flu, bird flu or the threat of a worldwide flu pandemic, you may have questions and concerns. Any flu is something to take seriously.

Follow these simple steps to protect yourself and your family:

1. Wash your hands often with soap and water or use a hand sanitizer
2. Cover your mouth when you cough or sneeze
3. Talk with your doctor about getting a yearly flu vaccine
4. Make a family emergency plan
5. Volunteer in your community

Massachusetts is preparing for a worldwide flu outbreak. We can lessen the effects of a pandemic if we all prepare ahead of time. The best thing that you can do is to stay informed. Visit our web site to get the facts.

www.mass.gov/dph/flu
Call Toll-Free 1-877-MASS FLU (1-877-627-7358)

Brought to you by the Massachusetts Department of Public Health and your local Board of Health
Final Questions

• What are potential roles that idled staff could play in helping their communities?
  – Sign-up with the local Medical Reserve Corps, CERT teams, Connect & Serve, etc.

• How can schools and their staff get involved with local ISCU planning?
  – Connect with your local health director.

• What are the most important planning steps and alliances to be made now, in advance of a Pandemic?
Links

• Following is the link to the MA Pandemic Community Containment Plan:
  http://www.mass.gov/dph/cdc/epii/flu/pandemic_plan.htm

• Following is the link to the Federal Pandemic Mitigation Strategy:
  http://pandemicflu.gov/plan/community/mitigation.html
Final Comments

- "When it comes to preparing our school community—from pre-school all the way to college—there are three key steps to take: One, talk to your local health officials and work together to develop a plan. Then secondly, train your teachers and administrators to implement the plan. And finally, teach students and parents so they understand what to do in the event of a pandemic.” – HHS Secretary Leavitt 2006

- “Each and every one of us has the opportunity to be a part of the next “Greatest Generation”.
  We must be able to tell our children and our grand children that we did everything possible in the face of the pandemic to assure the health and safety of all.” – Lisa Stone, M.D. Acting Director of MADPH Office of Emergency Preparedness

- Thank You!