Presentation Outline

• Influenza- the virus
• Seasonal Influenza
• Novel Influenza Strains
  • Avian Influenza
  • Swine Influenza
• Pandemic Influenza
• Prevention & Preparedness

Influenza

• Three distinct RNA composition types (A, B, and C)
• Certain subtypes of influenza A and influenza B circulate among humans and cause annual outbreaks
• Human disease historically has been primarily caused by influenza A; three subtypes of Hemagglutinin (HA) H1, H2, and H3, and two subtypes of Neuraminidase (NA) N1 and N2
Antigens on the Viral Surface

HEMAGGLUTININ (HA)(H1-H16)
- Essential for virus binding and entry into susceptible cells
- Host immunity to HA through recent infection or vaccination prevents disease

NEURAMINIDASE (NA)(N1-N9)
- Essential for release of newly formed virus from infected cells
- Host immunity to NA through recent infection or vaccination reduces the severity of disease

Influenza Virus Nomenclature

A/Beijing/32/92 (H3N2)
Seasonal Influenza

- Incubation period: 1-4 days, average 2 days
- Whole respiratory tract may be involved
- Viral shedding, thus spreading of infection, occurs before onset of symptoms
- Abrupt onset of fever, chills, malaise and muscle aches followed by sore throat, headache, cough, and possible vomiting/diarrhea
- Duration of severe symptoms: 3-7 days
- Large amounts of virus in respiratory secretions/droplets
Impact of Seasonal Influenza in the U.S.

- 17-50 million people infected each year
- 70 million missed work days
- 38 million missed school days
- More than 200,000 hospitalizations
- 30,000 – 60,000 deaths annually
- $3-15 billion in direct and indirect costs
Influenza Management

- **Treatment**
  - Antipyretics/analgesics
  - Hydration – PO/IV
  - Oxygen - Ventilation (if necessary)
  - Antiviral agents
  - Antibiotics-secondary infection

- **Prevention (the best alternative)**
  - Vaccination
    - Seasonal
    - Pneumococcal
  - Personal Protective Behaviors (PPB) to avoid infection
    - Hand washing
    - Avoid public gatherings
    - Keep 3 feet from ill persons
    - Cough and tissue etiquette
Influenza is the Leading Cause of US Vaccine-Preventable Deaths

<table>
<thead>
<tr>
<th>Disease</th>
<th>Cases</th>
<th>Deaths `89-98</th>
</tr>
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<tbody>
<tr>
<td>Influenza (millions)</td>
<td>~ 500,000</td>
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<tr>
<td>Pneumococcal disease (millions)</td>
<td>~ 120,000</td>
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<tr>
<td>Hepatitis A</td>
<td>282,650</td>
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<tr>
<td>Rubella</td>
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<tr>
<td>Pertussis</td>
<td>53,634</td>
<td>65</td>
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<tr>
<td>Tetanus</td>
<td>486</td>
<td>77</td>
</tr>
</tbody>
</table>

**Vaccine**

*Best defense against influenza is vaccination*

There are two types of influenza vaccine:

- The flu shot - inactivated vaccine (containing killed virus) that is given with a needle, usually in the arm. The flu shot is approved for use in people older than 6 months, including healthy people and people with chronic medical conditions.

- The nasal-spray flu vaccine - vaccine made with live, weakened flu viruses that do not cause the flu (sometimes called LAIV for "live attenuated influenza vaccine" or FluMist®). LAIV (FluMist®) is approved for use in healthy* people 2-49 years of age who are not pregnant.
Seasonal Influenza Immunization Recommendations 2009

- All children ages 6 months to 18 years
- Persons at high risk for influenza-related complications including:
  - Persons aged >50 years
  - Women who will be pregnant during the influenza season
  - Persons who have chronic illness
  - Persons who have immunosuppression
  - Persons who have any condition that can compromise respiratory function
  - Residents of nursing homes and other chronic-care facilities
  - Health-care personnel
  - Household contacts and caregivers of children aged <5 years and adults aged >50 years
  - Household contacts and caregivers of persons with medical conditions that put them at higher risk for severe complications from influenza
- All adults who want to reduce the risk of becoming ill with influenza or of transmitting it to others

*DOSES PRODUCED (MILLIONS)*

*DOSES DISTRIBUTED* (MILLIONS)

*Doses administered unknown.*
Drift Versus Shift

- **ANTIGENIC DRIFT** – *Seasonal Influenza*
  - Minor antigenic mutations cause new strains which encounter the least human immune resistance
  - Prompts formulation of trivalent influenza vaccine each year

- **ANTIGENIC SHIFT** – *Novel Influenza Strains*
  - Major change-mutation or genetic reassortment of type A virus historically from avian or swine strain
  - New virus encounters minimal host immunity and, if highly contagious, rapidly spreads to pandemic

Novel Influenza Virus Strains
Avian Influenza (AI)

- First described in poultry in Italy in 1878
- Influenza recognized as cause in 1955 outbreak
- Innumerable AI strains in many avian species
- Some strains of low virulence for birds, “low pathogenic AI” (LPAI)
- Some strains highly virulent, “high pathogenic AI” (HPAI)

Clinical Characteristics of Avian Influenza in Birds

- Incubation period 3-14 days
- Highly contagious among birds
- GI infection in birds-high concentration of virus in droppings
- LPAI - low mortality, recover in days to weeks – many become asymptomatic carriers
- HPAI - >95% mortality within 24 - 48 hours - 23 known outbreaks since 1959
Avian Influenza (AI)

- The vast majority of avian influenza viruses do not infect humans
- Waterfowl, seabirds and shorebirds are known reservoirs of AI virus
- Migratory birds and poultry trade spread AI
- H5N1 is the strain of highly pathogenic avian influenza which is epidemic in birds and is causing disease in humans
H5N1 Avian Influenza in Humans

- Most human cases result from close contact with infected poultry
- Rare person-to-person transmission (extremely close contact without precautions)
- Median age of those infected -18 years (90% of cases < 40 years) — the young and healthy
- Incubation ~ 3-5 days - Illness starts out as typical influenza – fever, myalgia, sore throat, cough, etc.
- Over 2-5 days evolves into diffuse viral pneumonia often leading to ARDS and ultimately death

Cumulative Number of Confirmed Human Cases of Avian Influenza A/(H5N1) Reported to WHO

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<thead>
<tr>
<th>Country</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
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<th>Total deaths</th>
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<td>Bangladesh</td>
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<td>0</td>
<td>0</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>1</td>
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<td>105</td>
<td>79</td>
<td>58</td>
<td>115</td>
<td>79</td>
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</tbody>
</table>

Total number of cases includes number of deaths. WHO reports only laboratory-confirmed cases.
Concerns Related to an H5N1 Pandemic

• Currently case fatality (> 60%) is much higher than Spanish Flu (highly virulent)

• Uncertain if and when increased transmissibility will occur and if there will be an associated reduction in mortality
Swine Influenza

- Respiratory disease of pigs caused by type A influenza
- Classical swine flu virus type A H1N1
- First isolated from a pig in 1930
- Regularly causes outbreaks of influenza in pigs.
- Swine flu viruses cause high levels of illness but low death rates in pigs.

Content source: Centers for Disease Control and Prevention

Genetic Relationships Among Human and Relevant Swine Influenza Viruses, 1918-2009

Mechanisms of Influenza Virus Antigenic “Shift”

Steps from Influenza to Pandemic Influenza

- Animal to human transmission
- Person to person transmission
- Efficient person to person transmission
Pandemic Influenza

• Global outbreak that occurs when a new, highly transmissible (human to human) pathogenic influenza A virus emerges due to antigenic shift

• Human population has little or no immunity

• Historically influenza pandemics have emerged from avian or swine strains
Pandemic Influenza History

• First report in Athens ~ 400 BC

• Earliest European epidemics reported in 1173 and 1323 with major epidemic in Florence in 1387

• Severe pandemics occurred in 1580, 1729, 1732, 1781, 1830, 1889 (Russian flu) and 1918 (Spanish flu)

Recent Pandemic Influenza History

• Interval between pandemics is typically 10 - 40 years

• Three pandemics occurred in the last century
  • Spanish Flu, H1N1, 1918
    • killed ~ 50 million (2.8% population) worldwide
    • killed ~ 700,000 (.68% population) U.S.
    • killed ~ 45,000 (1.2%) Massachusetts
  • Fugian ‘Asian’ Flu, H2N2, 1957
    • killed ~ 1.5 million worldwide/70,000 U.S.
  • Hong Kong Flu, H3N2, 1968
    • killed ~ 1 million worldwide/34,000 U.S.
Trends in Deaths from Selected Causes, Massachusetts: 1842-1997

1. The category of infectious disease includes Infectious and Parasitic Diseases, ICD-9 codes 001-139, and Poliomyelitis and Encephalitis, ICD-9 codes 090-098.
2. Heart Disease, ICD-9 codes 390-459, 402, 410-414, 429
3. Cancer, ICD-9 codes 140-208
4. Injuries, ICD-9 codes E880-E959

Year
US MIGRATION OF 1918 PANDEMIC

before sept. 14
between sept. 14 - 21
between sept. 21 - 28
between sept. 28 - oct. 5
after oct. 5

Source: America's Forgotten Pandemic - The Influenza of 1918 - 1919

INFLUENZA PANDEMIC
MORTALITY IN AMERICA AND EUROPE DURING 1918 AND 1919

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

National Museum of Health & Medicine, Reeves 3143-Sanitation, Influenza Pandemic, Mortality in America and Europe 1918 and 1919
Comparison of Age and Attack Rates With Past Pandemics

Timeline of Emergence of Influenza A Viruses in Humans
H1N1 Pandemic of 2009

- 4th generation offspring of the 1918 H1N1
- Reassortment of human, avian and swine flu virus segments

2009 H1N1 Influenza

- First cases of novel H1N1 influenza detected in Mexico in March
- In early April, California, Texas and New York reported the first US cases
- April 26, 2009 - US government declared a public health emergency in response to the novel Influenza virus
- June 11, 2009 –WHO declares a pandemic
2009 H1N1 Influenza
Incubation and Infectious Periods

• Incubation Period
The estimated incubation period ranges from 1-7 days, and more likely 1-4 days

• Infectious Period
A person is infectious before onset of symptoms

The CDC recommends that patients with influenza-like illness remain at home until they are fever free (100.4°F [37.8°C]) for at least 24 hours without the use of antipyretics

Content source: Centers for Disease Control and Prevention
2009 H1N1 Influenza

- Minimal or inadequate immunity in children or young adults
- Younger age groups predominantly affected
- Severity of disease similar to seasonal flu
- As with seasonal flu, H1N1 causes more serious disease in people with underlying medical conditions

Underlying Medical Conditions That Confer A Higher Risk For Flu-Related Complications

- Pulmonary (including asthma)
- Cardiovascular (except hypertension)
- Renal, hepatic, hematologic and metabolic disorders (including diabetes mellitus)
- Cognitive disorders, neurologic/neuromuscular disorders that impair ability to breathe, handle respiratory secretions or increase risk of aspiration
- Immunosuppression (including that caused by medications or by HIV)
Age Distribution of Confirmed Cases of H1N1 Influenza in MA, as of 6/25/09

Content source: Massachusetts Department of Public Health

Novel H1N1 U.S. Hospitalization Rate per 100,000 Population, By Age Group

*Hospitalizations with unknown ages are not included (n=273)*
2009 H1N1 Influenza Clinical Findings

Patients with uncomplicated disease due to confirmed novel influenza A (H1N1) virus infection have experienced:

- Fever
- Chills
- Headache
- Cough
- Sore throat
- Rhinorrhea
- Myalgia
- Fatigue
- Vomiting, or diarrhea

Content source: Centers for Disease Control and Prevention
2009 H1N1 Influenza Management

Treatment – same as seasonal flu

- Antipyretics/analgesics
- Hydration – PO/IV
- Oxygen - Ventilation (if necessary)
- Antiviral agents
- Antibiotics-secondary infection

2009 H1N1 Influenza Antiviral Recommendations

Antivirals prioritized for those patients who are severely ill

- Patients who are hospitalized
- Patients who are ill with influenza-like illness and who are at higher risk for influenza related complications including:
  - Children younger than 2 years old
  - Adults 65 years and older
  - Pregnant women
  - People with certain underlying or chronic medical conditions

Content source: Centers for Disease Control and Prevention
2009 H1N1 Influenza Immunization Recommendations 2009

- CDC ACIP recommends vaccine be made available first to the following five groups
  - Pregnant women
  - Health care workers and emergency medical responders
  - People caring for infants under 6 months of age
  - Children and young adults from 6 months to 24 years
  - People aged 25 to 64 years with underlying medical conditions (e.g. asthma, diabetes)
Timing of Seasonal and H1N1 Vaccine

Two Inactivated Vaccines
May administer both inactivated seasonal and H1N1 vaccine at the same visit or in either sequence

Inactivated and Live Vaccines
May administer a live attenuated and an inactivated influenza vaccine at the same visit

Live Vaccines
Do not administer both the live attenuated seasonal and live attenuated H1N1 influenza vaccines at the same visit – due to concerns about competition between the two vaccine viruses.

Content Source: Massachusetts Department of Public Health

Side Effects of Inactivated Flu Vaccine

<table>
<thead>
<tr>
<th>Side Effect</th>
<th>Vaccine</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systemic Complaint</td>
<td>34.1%</td>
<td>35.2%</td>
</tr>
<tr>
<td>Arm Soreness</td>
<td>63.8%</td>
<td>24.1%</td>
</tr>
</tbody>
</table>

Pregnant Women and 2009 H1N1 Influenza

- Pregnancy increases risk of flu complications for the mother and might increase adverse perinatal outcomes or delivery complications
- Pregnant woman should receive the 2009 H1N1 influenza vaccine as well as a seasonal influenza vaccine
- Early empiric treatment with oseltamivir or zanamivir should be considered for confirmed, probable or suspected cases
- Chemoprophylaxis for pregnant women who are close contacts with suspected, probable or confirmed cases
- Treat fever - hyperthermia may pose risk to fetus
  - Acetaminophen best option during pregnancy

Content source: Centers for Disease Control and Prevention

Thimerosal = Merthiolate

- Preservative added to multi-dose vaccine vials since 1930’s
  - prevents bacterial contamination and infection in vaccines
- Question raised about thimerosal mercury load in childhood vaccines contributing to increased incidence of autism
- Multiple large scale studies have failed to demonstrate an association between thimerosal and any neurologic condition, including autism
- May still be most effective and safest preservative
- Both seasonal and pandemic H1N1 vaccine available thimerosal-free, as well as in multi-dose vials

Content source: Centers for Disease Control and Prevention
Guillain-Barré Syndrome (GBS)

- Autoimmune syndrome affecting peripheral nerves and causing “ascending paralysis”
  - Rare: 1-2 per 100,000
  - With treatment most patients achieve full recovery
- Causes:
  - Campylobacter jejuni and other bacterial infections
  - Influenza and other viral infections
  - Vaccines
- Because GBS can occur more than once, people who developed GBS within 6 weeks of any flu shot are advised not to get influenza vaccine again

Pneumococcal Vaccine

- Pneumococcal disease
  - Pneumonia, meningitis, bacteremia
  - Complication of flu
  - Increasing antibiotic resistance
- Vaccinate high risk groups now
  - > 65 years of age
  - Chronic medical conditions
  - New! Asthma, smoking
Where you can find a flu clinic in Massachusetts

- Many seasonal flu clinics and all H1N1 clinics will be listed at: http://flu.MassPro.org

- MA 211 will provide seasonal and H1N1 flu information for the general public including location of flu clinics

Novel Influenza Virus Comparison

<table>
<thead>
<tr>
<th>Avian Influenza H5N1</th>
<th>2009 Swine Influenza H1N1</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 years</td>
<td>7 months</td>
</tr>
<tr>
<td>15 countries</td>
<td>80 countries</td>
</tr>
<tr>
<td>442 cases</td>
<td>&gt; 340,000 cases</td>
</tr>
<tr>
<td>262 deaths</td>
<td>&gt; 4,100 deaths</td>
</tr>
</tbody>
</table>

Content source: World Health Organization
As of 27 September, 2009
World Health Organization (WHO) Pandemic Phases

**WHO Phases**

**INTER-PANDEMIC PERIOD**

1. Recent swine flu swine influenza virus subtypes have been isolated in humans. An influenza A virus subtype that has not been seen in humans. Where the risk of human disease is considered to be low.

2. No new pandemic influenza virus subtypes have been seen in humans. Where the risk of human disease is considered to be low.

**PANDEMIC PERIOD**

3. Human infections without a case subtypes that have been seen in human isolates, or an exclusive case epidemic in a close contact.

4. Small clusters with limited human-to-human transmission that spread is highly efficient, suggesting that the virus is not well adapted for human-to-human transmission.

5. Larger clusters with human-to-human spread still contained, suggesting that the virus is becoming more transmissible than the previous clusters. However, the virus may not be fully transmissible (substantial variation), 8%

6. Pandemic phase, increased and scattered transmission in general population.

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Pandemic Severity

- **Case Fatality Ratio**: Projected number of deaths per 100,000 US Population, 2006
  - **Category 5**: >2.0%
  - **Category 4**: 1.0% - <2.0%
  - **Category 3**: 0.5% - <1.0%
  - **Category 2**: 0.1% - <0.5%
  - **Category 1**: <0.1%

- **2009 H1N1 Pandemic**: Assumes 30% illness rate and unmitigated pandemic without interventions.
### Social Distancing Strategies by Pandemic Severity

<table>
<thead>
<tr>
<th>Interventions* by Setting</th>
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<th>2 and 3</th>
<th>4 and 5</th>
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</thead>
<tbody>
<tr>
<td><strong>Home</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voluntary isolation of ill at home (adults and children), combine with use of antiviral treatment as available and indicated</td>
<td>Recommend</td>
<td>Recommend</td>
<td>Recommend</td>
</tr>
<tr>
<td>Voluntary quarantine of household members in homes with ill persons (adults and children), consider combining with antiviral prophylaxis if effective, feasible, and resources available</td>
<td>Generally not recommended</td>
<td>Consider</td>
<td>Recommend</td>
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<td><strong>School</strong></td>
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<tr>
<td>Child social distancing</td>
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<tr>
<td>-dropping out of school and school based activities, and closure of child care programs</td>
<td>Generally not recommended</td>
<td>Consider</td>
<td>Recommend (3 weeks)</td>
</tr>
<tr>
<td>-reduce out of school social contacts and community mixing</td>
<td>Generally not recommended</td>
<td>Consider</td>
<td>Recommend (3 weeks)</td>
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<td><strong>Workplace / Community</strong></td>
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<tr>
<td>Adult social distancing</td>
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<tr>
<td>-decrease number of social contacts (e.g., encourage telework hours, alternative in-person to-face meetings)</td>
<td>Generally not recommended</td>
<td>Consider</td>
<td>Recommend</td>
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<tr>
<td>-increase distance between persons (e.g., reduce density in public transit, workplace)</td>
<td>Generally not recommended</td>
<td>Consider</td>
<td>Recommend</td>
</tr>
<tr>
<td>-modify, postpone, or cancel selected public gatherings to promote social distancing (e.g., stadium events, theater performances)</td>
<td>Generally not recommended</td>
<td>Consider</td>
<td>Recommend</td>
</tr>
<tr>
<td>-modify work place schedules and practices (e.g., break, lunch, shift length)</td>
<td>Generally not recommended</td>
<td>Consider</td>
<td>Recommend</td>
</tr>
</tbody>
</table>

*Interventions are based on the severity of the pandemic and may be adjusted as necessary.

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### Prevention & Preparedness
Public Education

• AWARENESS
  Provide public with realistic information about influenza to prepare not scare

• EDUCATION
  Provide education about vaccine, personal protective behaviors (PPB), social distancing, and changes in health care access

• COMMUNICATION
  Use risk communication and public information strategies; know how to get accurate, up to date information

• PLANNING
  Achieve broad public “buy in” with planning process/strategies

Prevention and Preparedness
Start Locally

• Individuals
• Households
• Neighborhoods
• Schools
• Workplaces
• Healthcare facilities (hospitals, clinics and medical offices)
• Government (local, state, federal)
Influenza Prevention

- **Immunization** - best approach, but difficult due to changing antigenicity, need for multiple doses or adjuvants, and limited duration of immunity
  - No way to predict which specific strain will cause a pandemic
  - Vaccine and new production techniques under development
- **Antiviral chemoprophylaxis** - for exposed persons, and strategic mass administration to contain outbreaks
  - Concerns about misuse and resistance
- **Personal Protective Behaviors**

Influenza Prevention

Personal Protective Behaviors (PPB)

- Frequent hand washing with soap or hand sanitizer (proper technique) Influenza A viruses readily inactivated by soaps, detergents, alcohols, and chlorination
- Stay at least 3 feet from anyone coughing or sneezing
- Get a seasonal flu shot, novel influenza flu shot, and a pneumococcal vaccine as recommended
- If you get sick, stay home from school/work and practice cough and sneeze etiquette to avoid exposing others
- Avoid public gatherings
For information and a materials order form visit: www.mass.gov/dph/flu
Masks

Consider wearing a facemask if …

• You are sick with the flu: to reduce the likelihood of transmission to others

• You are in close contact, or caring with someone who has the flu: to reduce the chance you may contract influenza.

* Guidelines are under development

Household Preparedness

• Maintain general good health and habits and teach children about prevention

• Make a child care plan in case children need to stay home from school

• Obtain an adequate supply of needed medications, including over-the-counter medications

• Keep a supply of non-perishable food in the home

• Develop a household emergency plan and collect supplies
  • www.redcross.org “Get Prepared”
  • www.pandemicflu.gov
Local/Community Preparedness

- Education and communication
- Community surveillance
- Strengthen essential public infrastructure
- Healthcare surge capacity
- Continuity of operations planning

Mitigation

Non-Pharmaceutical Interventions (NPI)
- Social Distancing
  - Use of behaviors and policies to prevent spread of a communicable illness by keeping a safe distance between persons
- Quarantine
  - Separation of persons who have been exposed but who are not ill
- Isolation
  - Separation of persons who are ill

Pharmaceutical Measures
- Vaccine
- Antiviral Medications
School Closures

School closures may be effective in slowing the spread of the pandemic. School closure decisions should be made by local schools in conjunction with their local board of health.

4 factors to consider:
- Higher absenteeism higher than usual for time of year
- Absenteeism is actually due to ILI
- Absenteeism is increasing, rather than stable or decreasing
- Absenteeism is causing an inability for school to function

Content Source: Massachusetts Department of Public Health
HealthCare Preparedness

- Healthcare system cannot meet peak demands at present
- Healthcare surge capacity needs must be addressed
  - Space
  - Supplies
  - Staff
  - Security
  - Systems

Hospital Surge Planning

*Emergency Departments Efforts:*
- Review and update hospital emergency plans
- Test and update plans to ensure timely communication and situational awareness
- Consider establishing “Flu Hotline”
- Define “Code Help” triggers for patient boarding
- Identify appropriate, alternate space for flu screening, evaluation and treatment
Office Based Practices

- Continuity of Operations Planning
- Personal planning for staff, surge staff and volunteers
- Become knowledgeable about local planning for medical surge aspects of a pandemic
- Provide general flu education to patients—order “Flu Care at Home” materials for your office
- Review the CDC checklist for offices and clinics

Continuity of Operations Plans

- Purpose is to provide a comprehensive approach to ensure the continuity of essential services for businesses
- Must address:
  - Safety and well being of employees
  - Emergency delegation of authority
  - Safekeeping of vital records
  - Emergency acquisition of resources necessary for business resumption
  - Ability to work at alternative sites until normal operations can resume
Staffing

- Biggest challenge
- Legal protections are essential
- Potential sources of clinical personnel:
  - Internal hospital strategies
  - MSAR volunteers
  - Medical Reserve Corps that are not included in hospital staff
  - American Red Cross
  - Retired, inactive health professionals
  - Non-traditional providers
  - Students (medical, nursing, pharmacy)
- Need to educate all health care providers
- Large number of non-clinical (support) personnel also needed

MSAR

- Massachusetts System for Advance Registration
- All states developing these programs
- MSAR will utilize a single, non-redundant database of volunteer healthcare professionals
- MSAR to register, pre-credential, and activate volunteers
- When MSAR volunteers are needed, volunteers can accept or decline to serve
- MSAR volunteers encouraged to sign up with MRC as well
- www.mass.gov/msar

MRC

- Medical Reserve Corps
- Program under Citizen Corps initiative
- Local units based in communities
- Medical and non-medical volunteers that have been pre-screened
- MRC members participate in practice exercises and drills, and are notified when a need emerges
- MRC units assist local communities with health response needs in non-disaster times
- www.mamedicalreservecorps.org
State Preparedness

- Space – planning for additional care sites
- Supplies – working to procure adequate and accessible provisions/vaccine
- Staff - professional practice issues:
  - Altered/crisis standards of care
  - licensure
  - liability
  - vaccination
  - family support
- Security - planning and resources
- Systems – surveillance, education, and communication

Summary

- Influenza is a serious disease
  - Those with underlying conditions are particularly vulnerable

- We are in a pandemic - Phase 6
  - Fortunately it is a category 1

- Influenza is unpredictable - Constantly Changing
  - 2009 H1N1 may become more virulent
  - Potential for other novel strains to become a pandemic always exists

- Prevention is the best defense
  - Vaccination
  - Personal protective behaviors
Influenza Web Resources

U.S. Government website for information on influenza:
www.flu.gov

World Health Organization (WHO):
www.who.int/

Centers for Disease Control and Prevention (CDC):
www.cdc.gov

U.S. Health and Human Services (HHS) Pandemic Influenza Plan:
http://www.hhs.gov/pandemicflu/plan/

Massachusetts Department of Public Health influenza website:
http://www.mass.gov/dph/flu

Massachusetts Medical Society website for Flu Advisories, facts, and resources:
www.massmed.org/flu

New England Journal of Medicine:
www.nejm.org

New England Journal of Medicine H1N1 Influenza Center:
http://h1n1.nejm.org/

2009 H1N1 Influenza Resources:
New England Journal of Medicine Articles

Response after One Dose of a Monovalent Influenza A (H1N1) 2009 Vaccine -- Preliminary Report

Comparative Efficacy of Inactivated and Live Attenuated Influenza Vaccines
Monto, Arnold S., Ohmit, Suzanne E., Petrie, Joshua G., Johnson, Emileigh, Truscon, Rachel, Teich, Esther, Rothoff, Judy, Boulton, Matthew, Victor, John C.

Prevention and Treatment of Seasonal Influenza
Glezen, W. Paul

The Persistent Legacy of the 1918 Influenza Virus
Morens, David M., Taubenberger, Jeffery K., Fauci, Anthony S.

Additional Articles Available at the New England Journal of Medicine H1N1 Influenza Center:
http://h1n1.nejm.org/
Avian Influenza Resources:
New England Journal of Medicine Articles

**Current Concepts: Update on Avian Influenza A (H5N1) Virus Infections in Humans**
The Writing Committee of the Second World Health Organization (WHO) Consultation on Clinical Aspects of Human Infection with Avian Influenza A (H5N1) Virus. Update on Avian Influenza A (H5N1) Virus Infection in Humans.

**Focus on Research: H5N1 Influenza – Continuing Evolution and Spread**
R.G. Webster and E.A. Govorkova

**Avian Influenza A (H5N1) Infection in Eastern Turkey in 2006**
A.F. Oner and Others

**Three Indonesian Clusters of H5N1 Virus Infection in 2005**
I.N. Kandun and Others

**Vaccines against Avian Influenza – A Race against Time**
Poland G. A.

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Avian Influenza Resources:
New England Journal of Medicine Articles cont’d

**Safety and Immunogenicity of an Inactivated Subvirion Influenza A (H5N1) Vaccine**
Treanor J. J., Campbell J.D., Zangwill K.M., Rowe T., Wolff M.

**Antiviral Resistance in Influenza Viruses – Implications for Management and Pandemic Response**
Hayden F. G.

**Oseltamivir Resistance – Disabling Our Influenza Defenses**

**Current Concepts: Avian Influenza A (H5N1) Infection in Humans**

**Drug Therapy: Neuraminidase Inhibitors for Influenza**

**Preparing for the Next Pandemic**

**The Threat of an Avian Influenza Pandemic**