Introduction to influenza

- Multiple serotypes exist: \( H_xN_y \)
- Only certain serotypes easily infect humans
  - \( H_{1,3}N_{1,2} \)
- Other serotypes may inefficiently infect humans during massive exposures
  - Current avian pandemic strain \( H_3N_1 \)

Influenza mutation

- Antigenic drift
  - Influenza virus constantly mutates as it reproduces...occasionally resulting in a new prevalent strain
- Antigenic shift
  - Influenza viruses can also recombine with other influenza viruses--intra and interspecies...this can result in a pandemic strain

What will the pandemic strain look like?

- Assume it will result from the recombination of unlike viruses
  - Recombination in humans, other animals?
- It cannot be identical to the current avian pandemic strain
  - May be a variant however

Outline

- Background
- WHO plan
- Health Canada plan
- MOHLTC plan
- Toronto plan
- TAHSN hospitals plan
- Discussion
What makes a good pandemic virus?

- Highly infectious
  - Current avian strain needs to become more "human"
- Needs to remain as "foreign" as possible
  - No preexisting population immunity
  - Disproportionate deaths in young in 1918
- Highly virulent but not too virulent

Pandemics last century

<table>
<thead>
<tr>
<th>YEAR</th>
<th>COLLOQUIAL NAME AND SUBTYPE</th>
<th>SOURCE</th>
<th>IMPACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1918</td>
<td>&quot;Spanish flu&quot; (H1N1)</td>
<td>Unknown</td>
<td>Pandemic with ~20 million deaths globally.</td>
</tr>
<tr>
<td>1957</td>
<td>&quot;Asian Flu&quot; (H2N2)</td>
<td>Unknown</td>
<td>Substantial pandemic, H2N2 virus disappeared.</td>
</tr>
<tr>
<td>1968</td>
<td>&quot;Singapore Flu&quot; (H3N2)</td>
<td>Unknown</td>
<td>Substantial pandemic, H3N2 virus discontinued.</td>
</tr>
<tr>
<td>1977</td>
<td>&quot;Swine Flu&quot; (H1N1)</td>
<td>Unknown</td>
<td>New subtype, primarily infecting persons born after 1968.</td>
</tr>
</tbody>
</table>

Avian flu: the current situation

- Avian influenza now endemic in South East Asia
  - 8 countries have had outbreaks
  - 100,000,000 birds have died
- Most human infections have been traced to direct contact with infected birds
- A few cases have resulted from human-human transmission

Officially Confirmed Human Cases of Avian Influenza A (H5N1) from December 2003 to 14 April 2005

<table>
<thead>
<tr>
<th>Date of Onset</th>
<th>Cambodia</th>
<th>Thailand</th>
<th>Vietnam</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>December 2003</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>February 2004</td>
<td>0</td>
<td>1</td>
<td>7</td>
<td>15</td>
</tr>
<tr>
<td>March 2004</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>July to August 2004</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>September 2004</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>October 2004</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>December 2003 to April 2005</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>10</td>
</tr>
</tbody>
</table>

Total: 13, 7, 12, 80, 26, 80, 51

Over all case fatality rate: 50%

False Alarms

- "Swine Flu" (H1N1)
- "Avian Flu" (H5N1)
- "Swine Flu" (H1N1)
- "Other" (H7N7)
- "Other" (H5N1)
- "Other" (H9N2)

Annual Influenza Outbreaks Compared to Pandemic Influenza

- Annual Influenza
- Pandemic 5%
- Pandemic 10%
- Pandemic 15%
WHO pandemic plan 2005

- Role of WHO
  - Planning and coordination
  - Surveillance: Maintain up to date reports re. epidemiology
  - Prevention and Containment: Provide recommendations on vaccination and antivirals
  - Health system response
  - Communication

Federal pandemic plan

- Outlines roles and responsibilities of each level of government
- Links WHO phases with specific Canadian planning/operations activities
Federal pandemic plan
• Provides high-level guidance for:
  – Laboratory procedures
  – Vaccine and antivirals
  – Infection control
  – Clinical care guidelines and tools
  – Mass fatalities
  – Non-traditional sites
  – Communications

Infection Control
• Routine practices
  – Hand washing
• Droplet precautions may be useful early on
  – Limited gowns, gloves
  – No single rooms
  – No airborne precautions
    • Negative pressure
    • N95 masks/fit testing

Ontario pandemic plan
• Strategic approach
  – Be ready
  – Be watchful
  – Be decisive
  – Be transparent

Antiviral priority groups
• group 1: treatment of hospitalized persons
• group 2: treatment of ill HCWs, emergency workers
• group 3: prophylaxis of “front-line” HCWs
• group 4: treatment of ill high-risk persons in community
• group 5: prophylaxis of remaining HCWs
• group 6: control of outbreaks in institutions
• group 7: prophylaxis of essential services workers
• group 8: prophylaxis of hospitalized high-risk persons
• group 9: prophylaxis of community high-risk persons

Pandemic influenza is not SARS...
• Influenza:
  – Shorter incubation period
  – Considerably higher reproduction number
  – Widespread community transmission
  – Healthcare workers at similar risk to those in the community

Ontario Health
Pandemic Influenza Plan
Planning assumptions

Extent and severity of illness
- Children and young adults at greatest risk
  - 1/3 of deaths in < 65 age group
- Attack rate of 35%
- Most ill people will not require medical attention
- Those who recover will have immunity

Access to vaccines and antivirals
- Vaccine will not be available for first wave
- Vaccine will be in short supply
- Two inoculations will be necessary
- Efficacy of vaccine in healthy adults 70-90%
- Antivirals will be in short supply
- There will not be enough vaccine and antivirals for all

Impact on healthcare system
- 1/3 of healthcare workers will become ill
- Healthcare services will require supplementation
- Lab services will be reduced
- Demand for inpatient beds will exceed supply
- Longterm care and homecare may off-load hospitals

Impact on healthcare system
- Non-urgent healthcare services will be scaled back
- MOHLTC will provide centralized distribution of protective equipment, drugs, vaccine

Management
- Provincial emergency will be declared early in the pandemic
- Provincial emergency management unit will be activated
- PIDAC will provide ongoing advice
Communications

- Pandemic will be a national issue hence PHAC will coordinate inter-provincial communication
- Communication must be in line with federal
- Intense media attention
- Intense pressure on healthcare workers to provide and receive information

Ontario plan organization

- Surveillance
- Vaccine and antivirals
- Health services
- Emergency response
- Public Health measures
- Communications

Vaccines and antivirals

- Federal govt. responsible for securing supply
- Federal stockpile of 16 million doses of oseltamivir
- MOHLTC to acquire and maintain adequate supply
- Secure storage, distribution

Priority groups for vaccine

<table>
<thead>
<tr>
<th>Priority</th>
<th>Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>&quot;Front-line&quot; health care workers and key decision makers</td>
</tr>
<tr>
<td>2</td>
<td>Essential health care providers, public health responders, and essential health support services</td>
</tr>
<tr>
<td>3</td>
<td>Essential worker</td>
</tr>
<tr>
<td>4</td>
<td>Persons at high risk of fatal outcomes i.e. people living in nursing homes, long-term care facilities and similar settings, people with high risk medical conditions, people over age 65, children between the ages 6 and 24 months</td>
</tr>
<tr>
<td>5</td>
<td>Healthy adults**</td>
</tr>
<tr>
<td>6</td>
<td>Children 24 months to 18 years of age**</td>
</tr>
</tbody>
</table>

Priority groups for antivirals

For Treatment:

1. Persons hospitalized for influenza (within 48 hours of symptoms)

2. Ill health care workers and first responders/emergency service workers

For Prophylaxis:

1. Front line health care workers and key decision makers

2. Remaining health care workers

3. Emergency/essential service workers

Health Services Objectives

- To maintain worker safety (appropriate OHS and IPAC)
- Targeted health service reductions
- Identify health human resource issues
- Effective supply chain
Droplet precautions

• Hand washing
• Surgical masks/eye protection for patient care
• No N95/negative pressure rooms/PAPR hoods/Stryker suits etc….
• Use of single rooms not possible

Laboratory activity

• Change in priorities to support increased influenza testing
• Recommendations for:
  – Public Health laboratories
  – Hospital laboratories
  – Support hospitalized patients
  – Community laboratories
### Pandemic Influenza Surge Levels

<table>
<thead>
<tr>
<th>Surge Strategies</th>
<th>Pre-Surge</th>
<th>Minor Surge 3% to 10%</th>
<th>Moderate Surge 11% - 15%</th>
<th>Major Surge 16% - 20%</th>
<th>Large Scale Emergency &gt; 20%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Basic</td>
<td>Enhanced</td>
<td>Augmented</td>
<td>Optimum</td>
<td>Over capacity</td>
</tr>
<tr>
<td></td>
<td>Stuffed and operational beds open</td>
<td>Open approved ICU and ventilation-supported beds as staff redeployment/recruitment permits</td>
<td>Establish early discharges; home care transfers; AMG transfers to LTC Homes</td>
<td>Defeat all treatment for non-life threatening conditions if no severe adverse health consequences anticipated from the delay</td>
<td>No more beds available</td>
</tr>
<tr>
<td></td>
<td>Some approved beds closed due to resource constraints</td>
<td>Defuse elective surgery up to 72 hours as per routine surge protocols</td>
<td>Open more ICU ventilator beds where oxygen available (e.g., operating rooms or post anaesthetic care units)</td>
<td>Defuse some treatment for non-life threatening condition if no severe adverse health consequences are anticipated from the delay</td>
<td>Maintain services for life-threatening conditions</td>
</tr>
</tbody>
</table>

### Triage
- Who gets care rather than what type of care and when…
- Hospitalization, ICU admission, futile therapy criteria
  - Based on probability of survival

### Communications
- Communication strategies for Ontarians, healthcare workers, government, WHO etc.
- Ensure access to transparent, accurate real time information

### 4 decision points
- Telehealth Ontario
- Family MD
- Emergency Department
- Intensive Care

- “Push back” strategy will minimize those eligible for oseltamivir treatment
Assumptions

- When pandemic strain identified, it will appear in GTA in 1-3 months
- For the GTA, a pandemic of moderate severity will result in:
  - 1 million people ill
  - 420,000 will require some level of medical assistance
  - 7-8,000 will require hospital admission

Toronto Pandemic Plan

- Business continuity planning
- Role in distribution of vaccine and antivirals
- Role (if any) of alternate care sites
- Establishment of triage centres
- Volunteers
- Mass fatalities planning
- Implementation/enforcement of quarantine, closures etc…

Assumptions

- TAHSN hospital staff, physicians, surgeons and volunteers move among the various hospitals. Given this mobility, it is essential that there be consistency within this grouping
  - Adoption and application of the same HR practices throughout a pandemic.
  - Staff working on more than one site.
  - Staff working 'sick'
  - Provision of antivirals to all staff etc.

Table 1

<table>
<thead>
<tr>
<th>Estimated Direct Health Impact of Pandemic Influenza on the City of Toronto</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinically ill</td>
<td>392,000 - 914,000 individuals</td>
</tr>
<tr>
<td>Require outpatient care</td>
<td>155,000 - 211,000 individuals</td>
</tr>
<tr>
<td>Require hospitalization</td>
<td>2,900 - 12,000 individuals</td>
</tr>
<tr>
<td>Deaths</td>
<td>910 - 5,000 individuals</td>
</tr>
</tbody>
</table>

Assumptions

- Adoption and application of the same precaution/protection practices throughout a pandemic
  - Screening standards
  - Personal Protection Standards
  - Visiting Standards
  - Use of students, volunteers
Assumptions

• Common materials and messages to educate our staff about pandemic influenza, our response to such an event and what people can expect when the event occurs should be used across the TAHSN whenever possible.

Assumptions

• The definitions of the phases of a pandemic and the teaching hospitals responses to those phases are established and must become familiar to our staff pre-pandemic.

Assumptions

• Selected “elective” programs within the T hospitals will be reduced/eliminated. There is a need to coordinate this reduction to maximize patient access.

Assumptions

• It will be important to communicate the ethical framework which has been used to support the development of triage protocols in such areas as Emergency, ICU etc. There will be huge benefit in following the same protocols and in making the public aware that this planning has been done in advance.

Assumptions

• Given the expectations that were set during SARS, there is a need to prepare our workers and the population at large for the precautions which would be used during a pandemic. This will be a particularly difficult task and we can begin setting those expectations now.

Assumptions

• Directives/guidelines will be provided through other organizations. WE can anticipate that interpretation and adherence to these will vary across the TAHSN hospitals in the absence of coordination.
Human Resources

- Strategies to maximize staffing
  - activate redeployment centre: centralized or facility specific
  - redeployment from pre-defined, non-urgent work
  - redeployment from administration, education, research
  - recent retirees (≤ 5 years), final year students, volunteers
  - employment of staff outside of health care

Creating Capacity: Beds

- How/where will you create the ability to increased capacity by 10%; 20%, 30%
- Which programs will you scale down to accommodate this capacity?
- What is your breaking point?
  - With your restructuring, at what point will you run out of beds?

Human Resources

- Licensing/liability/Union issues
- Stress management: employee assistance
- Role of JOHSC, MOL
- Childcare/eldercare
  - healthcare worker considered essential worker in family

Creating Capacity: Staff

- Staff shortages: who and how will they be managed?
  - Common staff
  - Common pool
  - Students
  - Retirees
  - Care by friends/families

Occupational Health

- Fit to work / return to work policies
  - HCWs with mild ILI may work with patients with ILI
  - only well, immune or prophylaxed HCWs may work with high risk patients
  - e.g. elderly, dialysis, immune compromised, neonatal ICU etc.
- Surveillance of staff illness?
- Vaccine administration
- Antiviral administration (if available)
  - e.g. tracking of distribution, compliance
- Documentation

Creating Capacity: Drugs/Supplies/Services

- Vaccines: purchase & distribution
- PPE: purchase and allocation
- Contractors/consultants/specialty services/vendors
- Lab services
- Morgue services
Triage
- What activities will you decrease to accommodate additional patients?
- Where will you triage patients presenting to your facility?
- How will you staff triage?
- Where will patients go once triaged?
- Do you have an IT system to manage the triage?

Capacity- Outpatient
- Determine elective versus non-elective visits.
- Reassignment of staff?
- Will you attempt to separate possible influenza patients from others?
  - Flu clinics?

Capacity- Wards, ED
- Where will you house influenza patients?
- How will you maintain your emergency department?

Capacity: role of Long Term Care
- Try to “isolate” facility as long as possible?
- “Infirmary” area to manage patients who would normally be transferred to acute care?
- Criteria for transfer to acute care during pandemic
  - Decision to transfer may well be made by “accepting” facility

Capacity-Ventilated beds
- How many beds can be freed up following restructuring?
- How many ventilators are available?
- Who will staff these beds?

(MOHLTC will provide triage & discharge criteria)

Clinical management
- Standard assessment sheets?
  - admission criteria for medical and ventilated beds
- Standard order sheets?
- Direct admission process to influenza beds?
- Self-care education sheets for non-admitted patients?
Infection Control

• Role of infection control during the pandemic?

• Pandemic influenza really isn’t about us…. 

Next steps

1. Common communications plan
2. Facility-specific planning
3. Presentation of facility plans to the task force
4. Plan coordination
   1. Additional common planning
   2. Updating process

Questions?