Homeland Response to Pandemic and Avian Influenza

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Outline

- Background
- Pandemic & Avian Influenza Response Plan
- Health & Safety of the Workforce (Proposed)
- DHS Policy Issues on Health & Safety
- Conclusions
- Questions/Comment Period
Background
Background: Influenza Types

- *Seasonal (or common) influenza* is a respiratory illness that can be transmitted person to person. Most people have some immunity and a vaccine is available.

- *Avian (or bird) influenza* is caused by influenza viruses that occur naturally among wild birds. The H5N1 variant is highly contagious in birds and can be deadly to domestic fowl. H5N1 can be transmitted from birds to humans (<207 humans infected with H5N1; 115 Died currently). There is very limited human immunity and although a vaccine has been developed to one subtype of H5N1, it has not been FDA approved.

- *Pandemic influenza* is virulent human influenza virus that causes a global outbreak, or pandemic, of serious illness. Because there is little natural immunity, the disease can spread easily from person to person. Currently, there is no influenza pandemic.
Background: Seasonal Influenza
Background: Seasonal Influenza

- Every year in the US, on average:
  - 5% to 20% people get the “flu”
  - ~200,000 people are hospitalized due to flu complications
  - ~36,000 people die from the flu
- Transmission:
  - Person-to-person through droplets; or
  - Fomite contaminated from someone with the flu virus
- Ranges from Mild to Severe
- Key difference from Avian or Pandemic influenza:
  - Vaccination is available
  - Humans have some level of pre-existing immunity to strain variants
Background: Avian Influenza
Avian Influenza Viruses

- Infect respiratory and gastrointestinal tracts of birds
  - Can cause morbidity and mortality in domestic poultry
  - Does not always cause disease in wild waterfowl
  - Waterfowl are a natural reservoir

- Birds infected with avian influenza viruses can shed virus in
  - Saliva
  - Nasal secretions
  - Feces

Courtesy: LCDR Lisa Delaney, NIOSH, Avian Influenza Brief, USPHS Conference, May 2006
Avian Influenza

As of 28 April 2006
Figure 4-1. Migratory routes of two species that illustrate movements of birds between Asia and North America.
## Avian Influenza

### WHO - Avian Influenza (H5N1) Confirmed Cases

<table>
<thead>
<tr>
<th>Country</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>Total</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>cases</td>
<td>deaths</td>
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<tr>
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<td>12</td>
<td>5</td>
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</tr>
<tr>
<td>Viet Nam</td>
<td>3</td>
<td>3</td>
<td>29</td>
<td>20</td>
<td>61</td>
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<tr>
<td>Total</td>
<td>3</td>
<td>3</td>
<td>46</td>
<td>32</td>
<td>95</td>
</tr>
</tbody>
</table>

Total number of cases includes number of deaths. WHO reports only laboratory confirmed cases.

### 55.6% Case Fatality Rate; 1918 Pandemic ~ 2-5% Case Fatality

As of 8 May 2006
H5N1 Avian Influenza, Who is at Risk

- Poultry Workers
- Workers routinely remove bird fecal material
  - *Coast Guard Aids-to-Navigation Teams*
  - *Public park maintenance*
  - *Others*....
- Customs Inspectors for Import
Background: Pandemic Influenza
Pandemic Influenza

**Concern:** Pandemic version of H5N1 would combine with humans having another influenza A virus, mutation occurs, and then a sustained human-to-human strain is created.

**H5N1**

Concern: Virus is able to bypass mammal directly into human causing illness.
Pandemic Influenza

- Global, timing cannot be predicted, occurs when a new influenza A virus emerges and spreads globally.
- No immunity existing for people.

<table>
<thead>
<tr>
<th>Pandemic</th>
<th>Estimated U.S./World Deaths</th>
<th>Influenza A Strain</th>
<th>Populations at greatest risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>1918-1919</td>
<td>500,000 (US)/5,000,000 (World)</td>
<td>H1N1</td>
<td>Young, healthy adults</td>
</tr>
<tr>
<td>1957-1958</td>
<td>70,000 (US)/1,000,000-2,000,000 (World)</td>
<td>H2N2</td>
<td>Infants, elderly</td>
</tr>
<tr>
<td>1968-1969</td>
<td>34,000 (US)/700,000 (World)</td>
<td>H3N2</td>
<td>Infants, elderly</td>
</tr>
</tbody>
</table>
Pandemic Influenza Planning Assumptions

- Universal susceptibility;
- Efficient & sustained human-to-human transmission;
- 30% clinical disease attack rate in U.S.;
- 40% of the clinical disease attack rate will be children;
- Asymptomatic, but no illness may shed virus;
- Over half of patients expected to seek medical treatment;
- 40% absenteeism estimated;
- 2 day incubation period
- Viral shedding expected greatest 2 days of illness outset;
- 1 infected person will transmit infection to 2 other people;
- Epidemic wave can last 6 to 8 weeks;
- Multiple waves expected to hit

Source: Implementation Plan for the National Strategy for Pandemic Influenza, May 2006
Pandemic & Avian Influenza Response Plan
### WHO Pandemic Influenza Alert Phases

<table>
<thead>
<tr>
<th>Phase</th>
<th>Description</th>
<th>National Strategy Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Interpandemic Period</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Phase 1</strong></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 infection or disease is considered to be low.</td>
<td>Strengthen influenza pandemic preparedness at the global, regional, national and subnational levels.</td>
</tr>
<tr>
<td><strong>Phase 2</strong></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>
<td>Minimize the risk of transmission to humans; detect and report such transmission rapidly if it occurs.</td>
</tr>
<tr>
<td><strong>Pandemic Alert Period</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Phase 3</strong></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>
<td>Ensure rapid characterization of the new virus subtype and early detection, notification and response to additional cases.</td>
</tr>
<tr>
<td><strong>Phase 4</strong></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>
<td>Contain the new virus within limited foci or delay spread to gain time to implement preparedness measures, including vaccine development.</td>
</tr>
<tr>
<td><strong>Phase 5</strong></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>
<td>Maximize efforts to contain or delay spread, to possibly avert a pandemic, and to gain time to implement pandemic response measures.</td>
</tr>
<tr>
<td><strong>Pandemic Period</strong></td>
<td>Increased and sustained transmission in general population.</td>
<td>Maximize efforts to contain or delay spread, to possibly avert a pandemic, and to gain time to implement pandemic response measures.</td>
</tr>
</tbody>
</table>
# U.S. Federal Responses Stages to PI & AI

<table>
<thead>
<tr>
<th>STAGE 0/WHO PH# 1/2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>New Domestic Animal Outbreak in At-Risk Country</strong></td>
</tr>
</tbody>
</table>

**Goals**
- Coordination & technical assistance
- Track outbreaks
- Monitor for reoccurrence

**Actions**
- Support coordinated response
- Prepare to deploy rapid response teams & material
- Offer technical assistance & information sharing

**Policy Decisions**
- Deployment of countermeasures

<table>
<thead>
<tr>
<th>STAGE 1/WHO PH#3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Suspected Human Outbreak Overseas</strong></td>
</tr>
</tbody>
</table>

**Goals**
- Rapidly investigate & confirm
- Coordination & logistics support

**Actions**
- Initiate with WHO
- Deploy rapid response teams
- Amplify lab-based clinical surveillance in region
- Prepare to implement screening and/or travel restrictions

**Policy Decisions**
- Pre-position of US contribution to international stockpile
- Use of pre-pandemic vaccine (*experimental version*)

<table>
<thead>
<tr>
<th>STAGE 2/WHO PH#4/5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Confirmed Human Outbreak Overseas</strong></td>
</tr>
</tbody>
</table>

**Goals**
- Contain outbreak & limit spread
- Activate medical response

**Actions**
- Declare INS
- Support international deployments of countermeasures
- Activate domestic quarantine
- Prepare limited domestic port entry
- Prepare monovalent vaccine production

**Policy Decisions**
- Contribute to countermeasures overseas
- Entry/Exit screening & quarantine
- Revise prioritization of vaccines/antivirals
- Diversion from trivalent vaccine to monovalent vaccine
# Federal Responses Stages to PI & AI

## STAGE 3/WHO PH# 6

### Widespread Outbreaks Overseas

**Goals**
- Delay emergence North America
- Ensure earliest warning 1st case
- Prepare domestic containment and response

**Actions**
- Activate domestic emergency medical personnel (DoD/NDMS/State)
- Maintain layered border screening
- Deploy vaccine/antivirals
- Update EPI models/boost hospital surveillance
- Prepare surge plans at federal medical facilities (e.g., MTFs/VA)

**Policy Decisions**
- Prioritize domestic preparedness & response

## STAGE 4/WHO PH#6

### First Human Case in North America

**Goals**
- Contain first case in NA
- Antiviral treatment & prophylaxis
- Implement National Response

**Actions**
- Activate PI Implementation Plans in US
- Limit non-essential travel
- Deploy diagnostic reagents for PI virus to all clinical laboratories
- Continue PI vaccine development
- Antiviral/Prophylaxis treatment

**Policy Decisions**
- Revision of prioritization and allocation scheme for pandemic vaccine.

## STAGE 5/WHO PH#6

### Spread throughout U.S.

**Goals**
- Support community response
- Preserve critical infrastructure
- Mitigate illness, suffering, death
- Mitigate impact to economy and society

**Actions**
- Maintain overall situational awareness
- Evaluate epidemiology; provide guidance on community measures
- Deploy vaccine, if available; prioritization guidance given
- Sustain critical infrastructure; maintain civil order
- Provide guidance on use of key commodities (e.g., oil/gas/water)

**Policy Decisions**
- Federal support of critical infrastructure and availability of goods/services
- Lifting of travel restrictions
Federal Response to Pandemic Influenza

PANDEMIC INFLUENZA:
Regionally-Based JFO Areas of Responsibility

NOTE:
Ten “Standard Federal Regions” were established by OMB Circular A-105 of April 1974, rescinded in June 1995. FEMA, DOT, GSA, HHS, and EPA, among others, still use these Regions (some with slight modifications).
Likely Mission Assignments to DoD during a Pandemic (My Opinion)

- **MA – Additional In-Bed Capability**
  - DoD Medical Assets (e.g., Combat Support Hospitals)
  - **Justification:** Insufficient in-patient bed capabilities in U.S.
    - Already 95% filled at any given time.

- **MA – Security/Military Assets to Augment Law Enforcement**
  - Panic and looting may occur
  - Security of the National Strategic Pharmaceutical Stockpile (SNS)
  - Security at field and fixed facility hospitals
  - Security at key governmental facilities

- **MA – Border Security Augmentation**
  - Airport Security/Security Screening
  - Border Checkpoints
  - Augmentation of Customs Agents

- **MA – Additional Transportation Assets**
  - Patient movement within the U.S.
  - Special transportation of SNS (e.g., vaccines/antivirals)
  - Augmentation of commercial trucking industry
    - Fuel
    - Food
    - Material support of fixed and field hospitals
Health & Safety of the Workforce
(Proposed Policy Requirements)
Workforce Assurance
Working Group D - DHS

Prepare
Protect
Respond
against Pandemic and
Avian Influenza
for
DHS Personnel
Primary & Technical Support
Members of the Working Group D

- Coast Guard (Lead)
- USSS
- CBP
- TSA
- ICE
- IG
- CDC/NIOSH
- FOH
- OSHA
- OCR
- OPA
- ADMIN
- FEMA

@ 200,000 DHS Personnel
Pandemic Influenza Exposure Groups by Operations

- **High Risk Operations:** DHS operations involving consistent public contact on a routine basis.

- **Low Risk Operations:** DHS operations not involving consistent public contact on a routine basis.

- **Mission Critical:** DHS personnel identified as critical to sustaining DHS mission operations.

- **Non-Mission Critical:** DHS personnel identified as important members of DHS, but not critical to performing DHS mission operations.
## DHS Pandemic Influenza Exposure Risk Matrix

<table>
<thead>
<tr>
<th>Mission Critical</th>
<th>High Risk</th>
<th>Low Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBP Agents</td>
<td>Command Center Personnel</td>
<td></td>
</tr>
<tr>
<td>Secret Service Agents</td>
<td>Field Support Personnel</td>
<td></td>
</tr>
<tr>
<td>Coast Guard Military</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Customs Enforcement Agents/Ag Specialists</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TSA Security Specialists</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facility Security Personnel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Investigators</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical Response Personnel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Mission Critical</td>
<td></td>
<td>HQ/Regional Admin Staffs Accountants</td>
</tr>
</tbody>
</table>
Control of Worker Exposures to Pandemic Influenza: Stages 0 thru 3/4

Recognize Influenza-Like Illness ILI Defined as fever (100.04 F or 37.8 C) AND sore throat and/or cough in the absence of a known cause other than influenza.

- Place surgical masks on members of the public exhibiting ILI
- Continue Routine DHS Operation

- If members of the public exhibiting ILI cannot wear surgical masks
  - Cannot Maintain 3-6 feet Social Distance (e.g., body search)
  - Maintain 3-6 feet Social Distance
  - Continue Routine DHS Operation

- DHS Personnel Wear Disposable N95 Respirator & other PPE
Control of Worker Exposures to Pandemic Influenza: Stages 4 to 5

**DHS Personnel wear disposable N95 Respirator & other PPE during entire operational period.**

- During DHS operations where consistent & routine contact with the public
  - Medical treatment/quarantine
  - Border Security
  - Secret Service – Federal Protection
  - Drug Interdiction
  - Transportation Security
  - Federal Air Marshal Operations
  - Maritime Boarding Operations
### Key Measure – Use of PPE by Mission-Critical DHS Personnel Conducting HRO

<table>
<thead>
<tr>
<th>Avian Influenza</th>
<th>Pandemic Influenza</th>
</tr>
</thead>
<tbody>
<tr>
<td>- N-95 Respirator, Disposable</td>
<td>- N-95 Respirator, Disposable</td>
</tr>
<tr>
<td>- Water impermeable gloves</td>
<td>- Water impermeable gloves</td>
</tr>
<tr>
<td>- Outer disposable coveralls</td>
<td>- Outer disposable coveralls</td>
</tr>
<tr>
<td>- Splash Goggles</td>
<td>- Splash Goggles</td>
</tr>
<tr>
<td>- Personal Hygiene</td>
<td>- Personal Hygiene</td>
</tr>
</tbody>
</table>
Key Measure for Others if Pandemic Influenza - Human-to-Human U.S. or Worldwide

- Priority: STAY HOME (“Snow Days”)
  - Telecommuting
  - Teleworking

- Alternate Work Schedules
  - Night shift work when public is asleep

Focus: DHS Non-Mission Critical Personnel Conducting Low Risk Operations
DHS Policy Issues on Health and Safety
### Issue#1: N95 or Surgical/Procedure Masks

<table>
<thead>
<tr>
<th>N95</th>
<th>Surgical/Procedure Masks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designed to capture 95% efficiency aerodynamic diameter sizes ≤ .3 microns</td>
<td>Used to prevent large particles expelled by wearer (e.g., spit, mucous) from getting into work environment.</td>
</tr>
<tr>
<td>Designed for fit over worker’s face to create a seal, and therefore, validated by qualitative fit-test.</td>
<td>Not designed for qualitative fit-test validation; designed to fit loosely over the face leaving gaps between face and mask.</td>
</tr>
<tr>
<td>Designed to be worn during a period of exposure (e.g., TSA operations)</td>
<td>Designed to be worn for only specific procedures.</td>
</tr>
<tr>
<td>Tested and approved by NIOSH</td>
<td>Only cleared for SALE by FDA, but efficacy is not subject to testing and approval.</td>
</tr>
<tr>
<td>Testing Protocol: Filtration Efficiency</td>
<td>Particle Filtration Efficiency-Tests only quality of mask; Bacterial FE-Tests only ability to prevent expelling large particles from wearer; Fluid Resistance-Determines mask resistance to synthetic blood squirted on mask.</td>
</tr>
</tbody>
</table>

Source: 3M document titled “Respirators and Surgical Masks, 12/28/2005”
Issue#2: Mandatory Usage of PPE for DHS Personnel

- @ 85% civilian employees in DHS
  - Many not required to wear respirators as part of their normal job

- Union issues with mandatory usage
  - Will failed medical qualification disqualifier for employment?
  - Will shaving be required?

- Extensive training, medical qualification, and fit-testing requirements
Issue #3: Transmission Mode

- **3 Modes of Transmission:**
  - *Droplet*
  - *Contact with droplets on surfaces*
  - *Aerosol*

- **CDC Assumption:** PI viral transmission primarily through droplet exposures (e.g., ≥ 5 microns), which can fall 3-6 feet from an infected person.

- **Issue:** No scientific literature can rule out transmission through aerosol.
I. Aerosol Size Range

Particle size is often determined by the process that generated the particle. Combustion particles usually start out in the 0.01-0.05 μm size range, but combine with each other (agglomerate) to form larger particles. Powder is broken down into smaller particles and released into the air; it is difficult to break down such particles smaller than ~0.5 μm. Biological particles usually become airborne from liquid or powder forms, so these particles are usually larger than ~0.5 μm.

Source: http://www.cdc.gov/niosh/topics/aerosols/pdfs/aerosol_101.pdf
**Issue#3: Transmission Mode**

- **Point#1**: Droplet sizes 1-3 μm can take 12 hours to 1.5 hours to settle, respectively.

- **Point#2**: Large droplet radius should be required beyond 6 feet (e.g., used by CDC Quarantine Officers)
  - *Entire flight quarantine/contact investigations VICE just quarantining persons 6 feet away.*

- **Point#3**: Viral clumps released from coughing or sneezing not ruled out
Conclusions

- Extensive AI and PI Response at Federal/State/Local Levels.

- N-95 Respirators are effective for workers who are performing high risk operations and/or are mission-critical.

- DoD will likely play a significant role in planning and response in the domestic level **WHILE PROTECTING THEIR OWN**.

- Significant education and risk communication will be necessary before, during, and after an AI or PI outbreak.
Summary Conclusion

Industrial Hygienists, Safety, and Environmental Health Professionals will be on the front-line troops in the Prevention and Containment Control of Avian and Pandemic Influenza.

Reason:

No verifiably efficacious medical treatments against Avian and Pandemic Influenza at this time.
Points of Contacts for Workforce Assurance Working Group

- RADM Paul Higgins – Work Group Leader

- CG-11 Staff:
  - Mr. Al Kotz (Akotz@comdt.uscg.mil)
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Questions