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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**



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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.

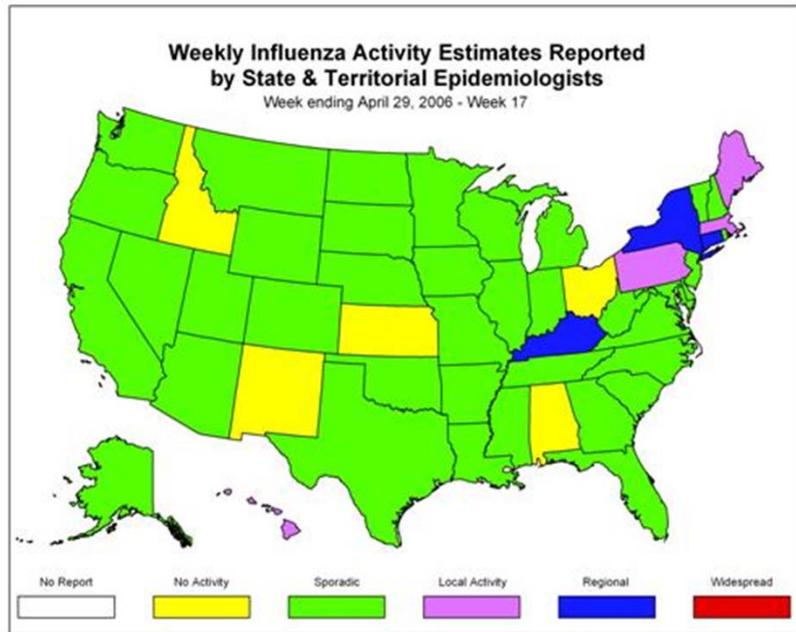


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Background:
Seasonal Influenza

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*



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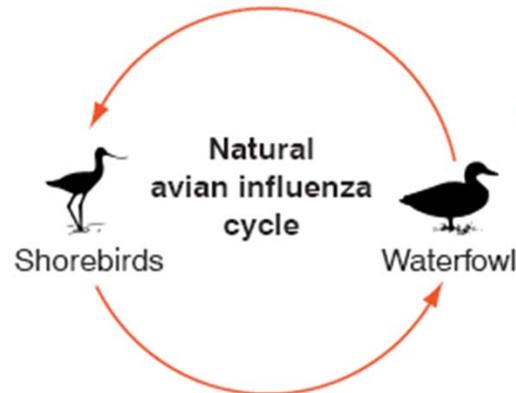
Background: Avian Influenza

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



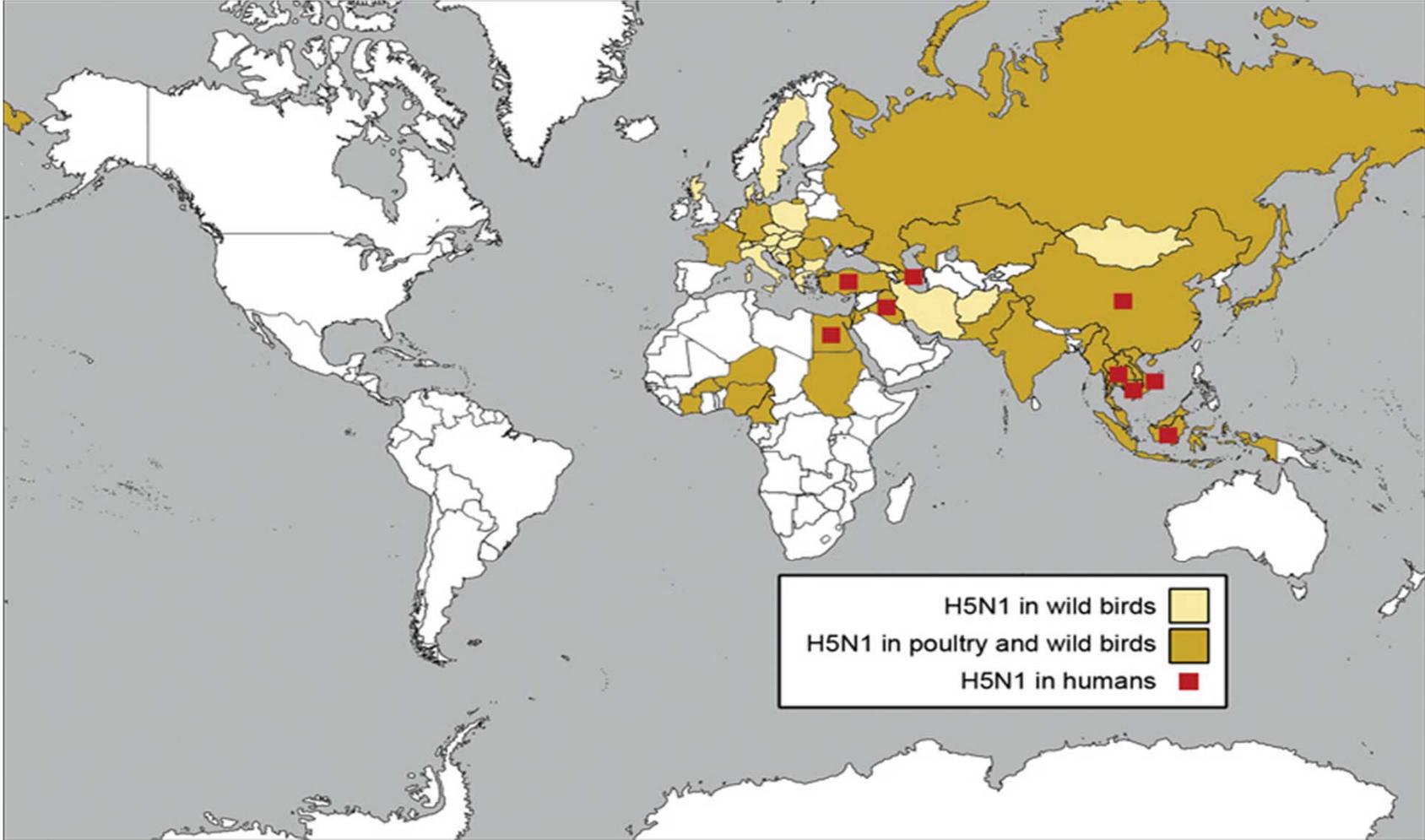
Courtesy: LCDR Lisa Delaney, NIOSH,
Avian Influenza Brief, USPHS Conference , May 2006



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Avian Influenza

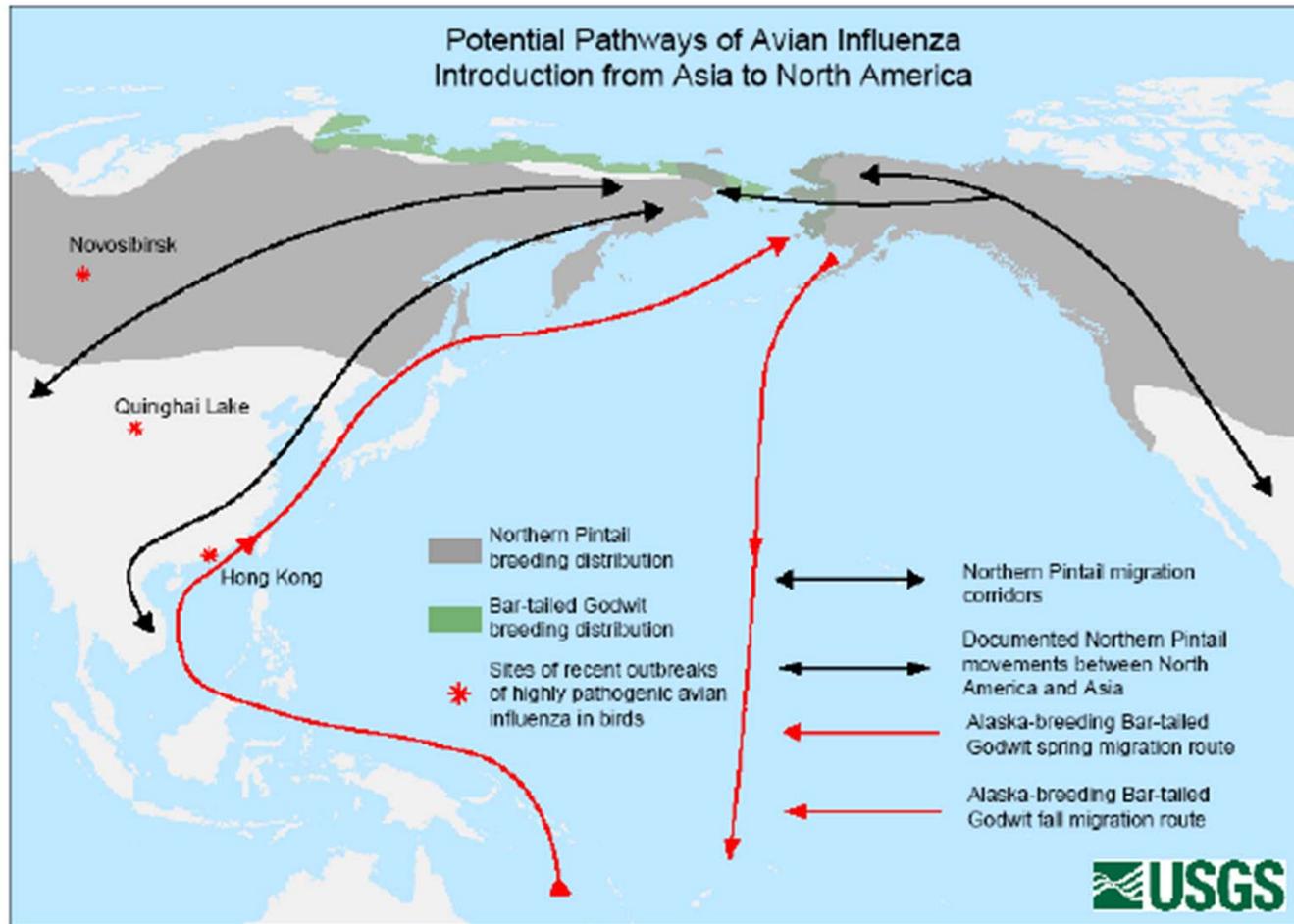


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As of 28 April 2006



Figure 4-1. Migratory routes of two species that illustrate movements of birds between Asia and North America



Courtesy: US Geological Survey:

[Http://www.nwhc.usgs.gov/publications/ai/Final_Wild_Bird_Strategic_Plan_0322.pdf](http://www.nwhc.usgs.gov/publications/ai/Final_Wild_Bird_Strategic_Plan_0322.pdf)



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Avian Influenza

WHO - Avian Influenza (H5N1) Confirmed Cases

Country	2003		2004		2005		2006		Total	
	cases	deaths	cases	deaths	cases	deaths	cases	deaths	cases	deaths
Azerbaijan	0	0	0	0	0	0	8	5	8	5
Cambodia	0	0	0	0	4	4	2	2	6	6
China	0	0	0	0	8	5	10	7	18	12
Egypt	0	0	0	0	0	0	13	5	13	5
Indonesia	0	0	0	0	17	11	16	14	33	25
Iraq	0	0	0	0	0	0	2	2	2	2
Thailand	0	0	17	12	5	2	0	0	22	14
Turkey	0	0	0	0	0	0	12	4	12	4
Viet Nam	3	3	29	20	61	19	0	0	93	42
Total	3	3	46	32	95	41	63	39	207	115

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



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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**



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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.

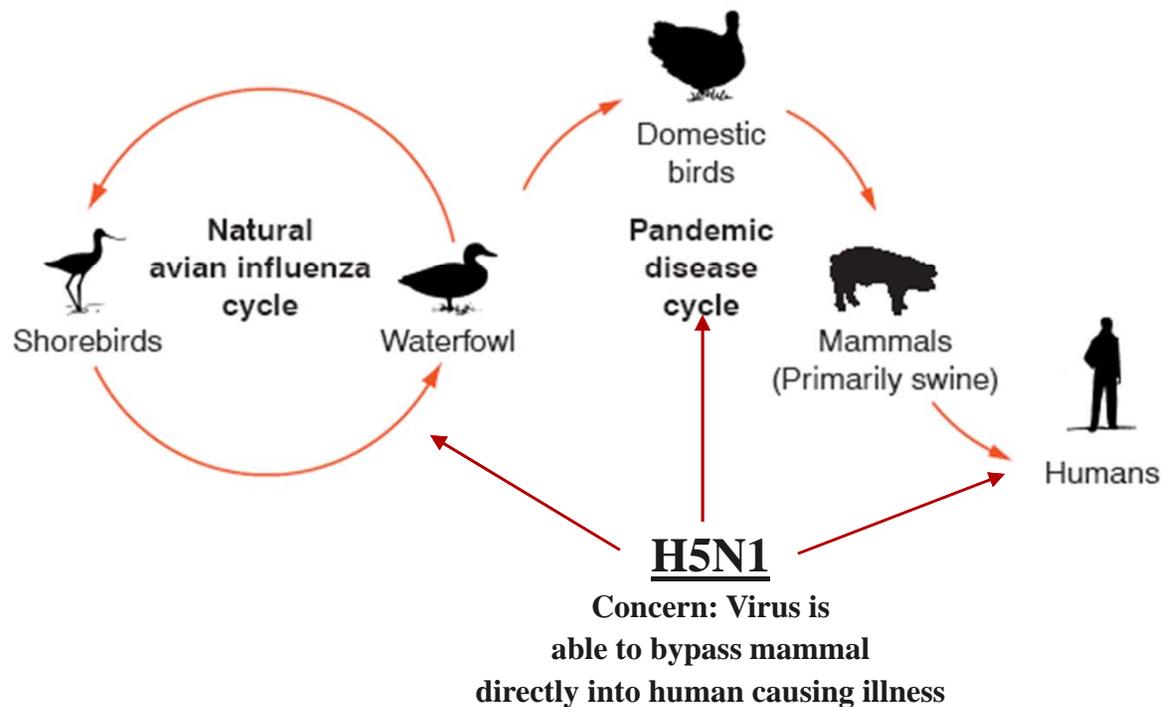


Figure 22.4 Global cycle of avian influenza viruses in animals.



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Pandemic Influenza

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

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



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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



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Source:
*Implementation Plan for the
National Strategy for
Pandemic Influenza, May
2006*



Pandemic & Avian Influenza Response Plan

WHO Pandemic Influenza Alert Phases

Interpandemic Period		National Strategy Goals
Phase 1	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.	Strengthen influenza pandemic preparedness at the global, regional, national and sub national levels.
Phase 2	No new influenza virus subtypes have been detected in humans. However, a circulating animal influenza virus subtype poses a substantial risk of human disease.	Minimize the risk of transmission to humans; detect and report such transmission rapidly if it occurs.
Pandemic Alert Period		National Strategy Goals
Phase 3	Human infection(s) with a new subtype, but no human-to-human spread, or at most rare instances of spread to a close contact.	Ensure rapid characterization of the new virus subtype and early detection, notification and response to additional cases.
Phase 4	Small cluster(s) with limited human-to-human transmission but spread is highly localized, suggesting that the virus is not well adapted to humans.	Contain the new virus within limited foci or delay spread to gain time to implement preparedness measures, including vaccine development.
Phase 5	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).	Maximize efforts to contain or delay spread, to possibly avert a pandemic, and to gain time to implement pandemic response measures.
Pandemic Period		National Strategy Goals
Phase 6	Increased and sustained transmission in general population.	Maximize efforts to contain or delay spread, to possibly avert a pandemic, and to gain time to implement pandemic response measures.



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U.S. Federal Responses Stages to PI & AI

STAGE 0/WHO PH# 1/2
New Domestic Animal Outbreak in At-Risk Country
<u>Goals</u> <ul style="list-style-type: none"> • Coordination & technical assistance • Track outbreaks • Monitor for reoccurrence
<u>Actions</u> <ul style="list-style-type: none"> • Support coordinated response • Prepare to deploy rapid response teams & material • Offer technical assistance & information sharing
<u>Policy Decisions</u> <ul style="list-style-type: none"> • Deployment of countermeasures

STAGE 1/WHO PH#3
Suspected Human Outbreak Overseas
<u>Goals</u> <ul style="list-style-type: none"> • Rapidly investigate & confirm • Coordination & logistics support
<u>Actions</u> <ul style="list-style-type: none"> • Initiate with WHO • Deploy rapid response teams • Amplify lab-based clinical surveillance in region • Prepare to implement screening and/or travel restrictions
<u>Policy Decisions</u> <ul style="list-style-type: none"> • Pre-position of US contribution to international stockpile • Use of pre-pandemic vaccine (*experimental version)

STAGE 2/WHO PH#4/5
Confirmed Human Outbreak Overseas
<u>Goals</u> <ul style="list-style-type: none"> • Contain outbreak & limit spread • Activate medical response
<u>Actions</u> <ul style="list-style-type: none"> • Declare INS • Support international deployments of countermeasures • Activate domestic quarantine • Prepare limited domestic port entry • Prepare monovalent vaccine production
<u>Policy Decisions</u> <ul style="list-style-type: none"> • 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

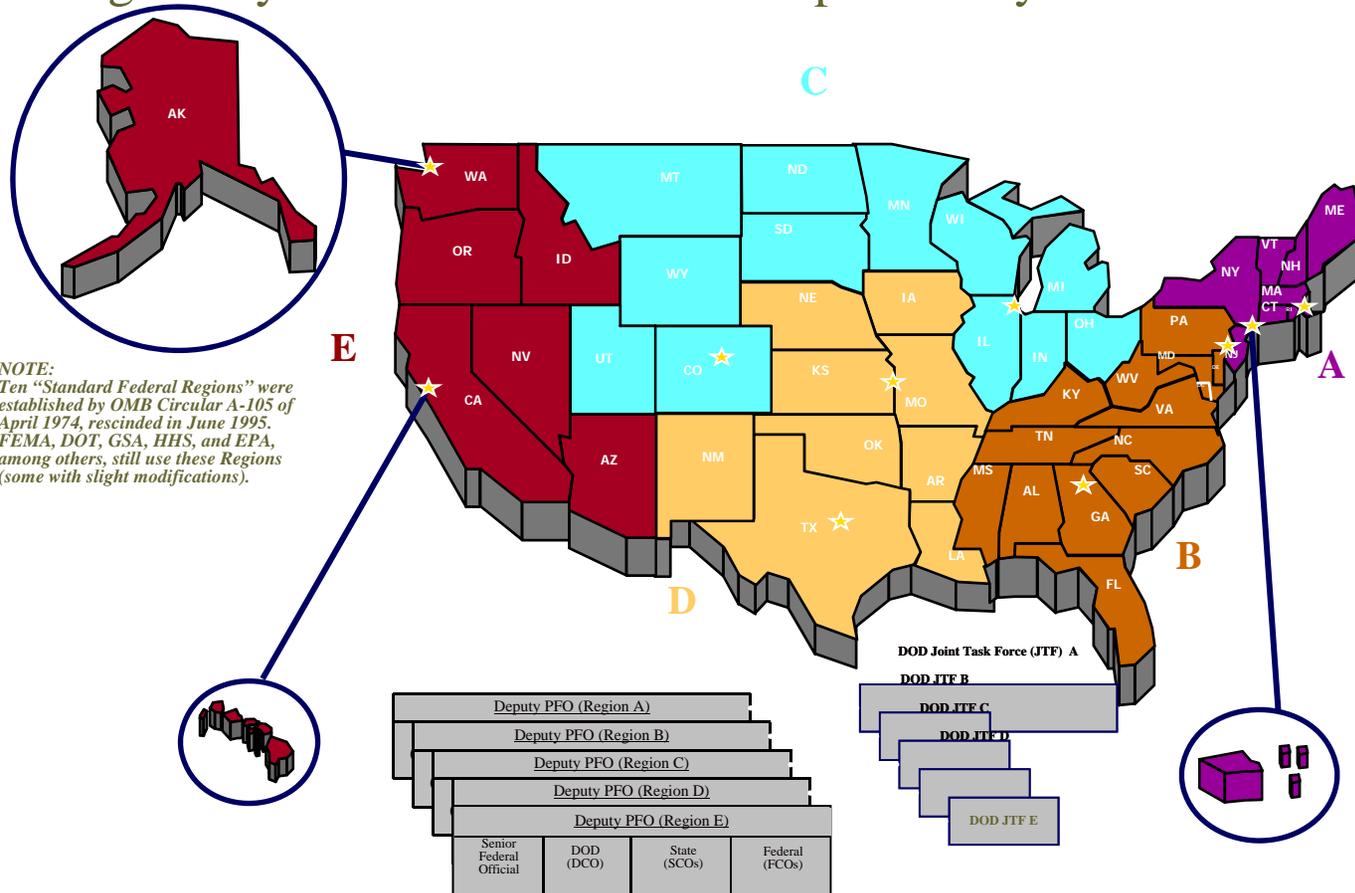
STAGE 3/WHO PH# 6
Widespread Outbreaks Overseas
<u>Goals</u> <ul style="list-style-type: none"> • Delay emergence North America • Ensure earliest warning 1st case • Prepare domestic containment and response
<u>Actions</u> <ul style="list-style-type: none"> • Activate domestic emergency medical personnel (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)
<u>Policy Decisions</u> <ul style="list-style-type: none"> • Prioritize domestic preparedness & response

STAGE 4/WHO PH#6
First Human Case in North America
<u>Goals</u> <ul style="list-style-type: none"> • Contain first case in NA • Antiviral treatment & prophylaxis • Implement National Response
<u>Actions</u> <ul style="list-style-type: none"> • 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
<u>Policy Decisions</u> <ul style="list-style-type: none"> • Revision of prioritization and allocation scheme for pandemic vaccine.

STAGE 5/WHO PH#6
Spread throughout U.S.
<u>Goals</u> <ul style="list-style-type: none"> • Support community response • Preserve critical infrastructure • Mitigate illness, suffering, death • Mitigate impact to economy and society
<u>Actions</u> <ul style="list-style-type: none"> • 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)
<u>Policy Decisions</u> <ul style="list-style-type: none"> • 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).



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Likely Mission Assignments to DoD during a Pandemic (My Opinion)

- **MA – Additional In-Bed Capability**
 - DoD Medical Assets (e.g., Combat Support Hospitals)
 - **Justification:** In sufficient 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



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Health & Safety of the Workforce (Proposed Policy Requirements)

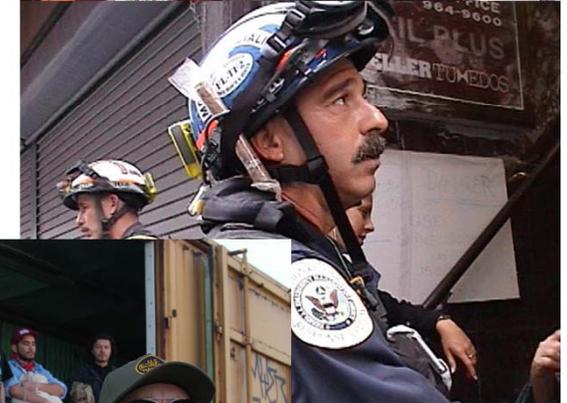


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Workforce Assurance Working Group D - DHS

**Prepare
Protect
Respond**
against Pandemic and
Avian Influenza
for
DHS Personnel



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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**



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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.



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DHS Pandemic Influenza Exposure Risk Matrix

	High Risk	Low Risk
Mission Critical	<p>CBP Agents</p> <p>Secret Service Agents</p> <p>Coast Guard Military</p> <p>Customs Enforcement Agents/Ag Specialists</p> <p>TSA Security Specialists</p> <p>Facility Security Personnel</p> <p>Investigators</p> <p>Medical Response Personnel</p>	<p>Command Center Personnel</p> <p>Field Support Personnel</p>
Non-Mission Critical		<p>HQ/Regional Admin Staffs</p> <p>Accountants</p>



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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**

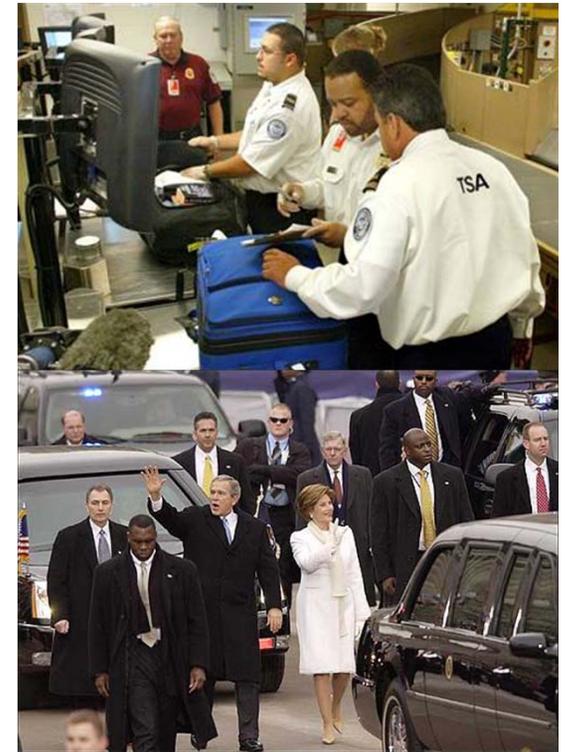


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Control of Worker Exposures to Pandemic Influenza: Stages 4 to 5

- **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*



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Key Measure – Use of PPE by Mission-Critical DHS Personnel Conducting HRO

Avian Influenza

- **N-95 Respirator, Disposable**
- **Water impermeable gloves**
- **Outer disposable coveralls**
- **Splash Goggles**
- **Personal Hygiene**

Pandemic Influenza

- **N-95 Respirator,
Disposable**
- **Water impermeable
gloves**
- ~~**Outer disposable
coveralls**~~
- **Splash Goggles**
- **Personal Hygiene**



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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**



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DHS Policy Issues on Health and Safety

Issue#1: N95 or Surgical/Procedure Masks

N95

Surgical/Procedure Masks

Designed to capture 95% efficiency aerodynamic diameter sizes \leq .3 microns	Used to prevent large particles expelled by wearer (e.g., spit, mucous) from getting into work environment.
Designed for fit over worker's face to create a seal, and therefore, validated by qualitative fit-test.	Not designed for qualitative fit-test validation; designed to fit loosely over the face leaving gaps between face and mask.
Designed to be worn during a period of exposure (e.g., TSA operations)	Designed to be worn for only specific procedures.
Tested and approved by NIOSH	Only cleared for SALE by FDA, but efficacy is not subject to testing and approval.
Testing Protocol: Filtration Efficiency	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.

Source: 3M document titled "Respirators and Surgical Masks, 12/28/2005"



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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



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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.**

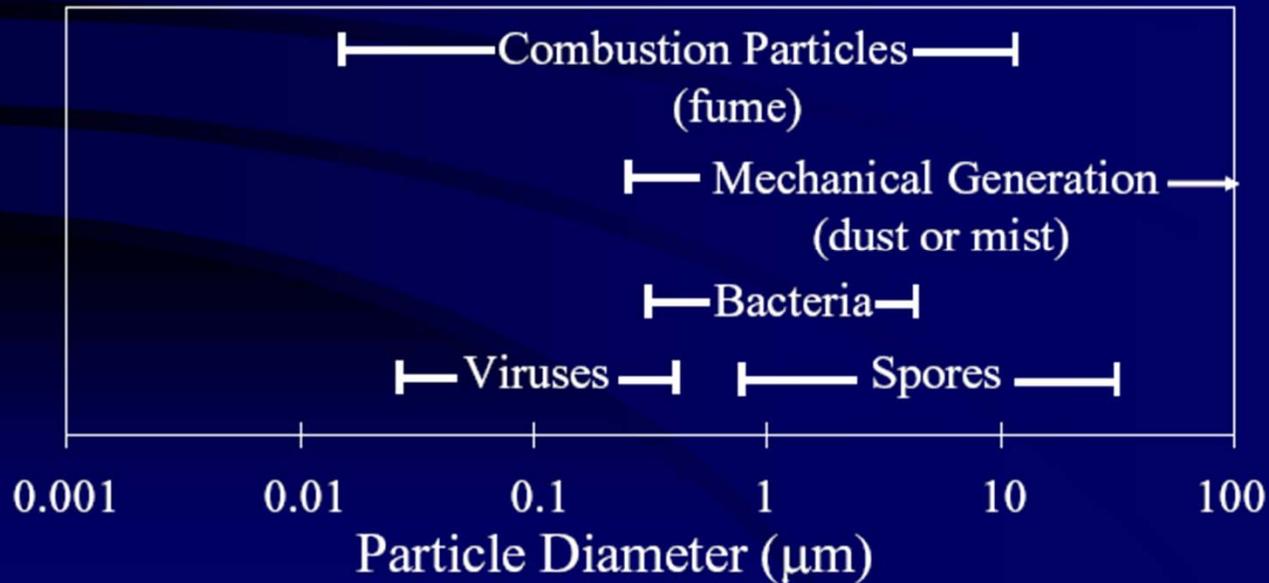


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I. Aerosol Size Range

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 $\sim 0.5 \mu\text{m}$. Biological particles usually become airborne from liquid or powder forms, so these particles are usually larger than $\sim 0.5 \mu\text{m}$.



Source: http://www.cdc.gov/niosh/topics/aerosols/pdfs/aerosol_101.pdf

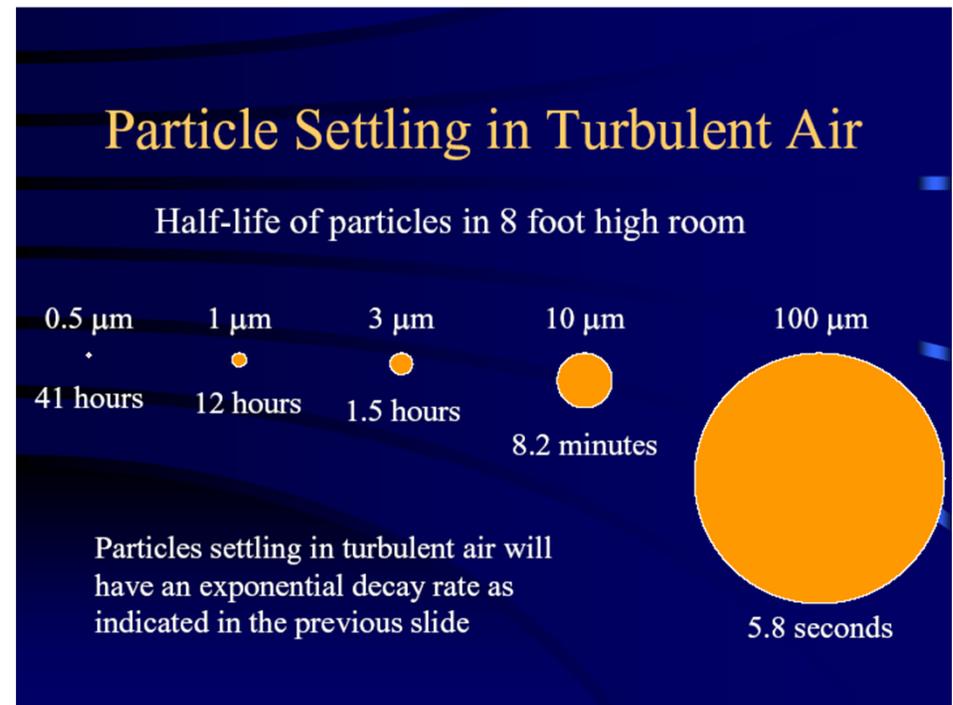


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Issue#3: Transmission Mode

- 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



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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.**



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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.



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Points of Contacts for Workforce Assurance Working Group

- **RADM Paul Higgins – Work Group Leader**

- **CG-11 Staff:**
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Questions



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