Pandemic Flu:

Using past pandemics (and the threat of a future one) to guide practical planning

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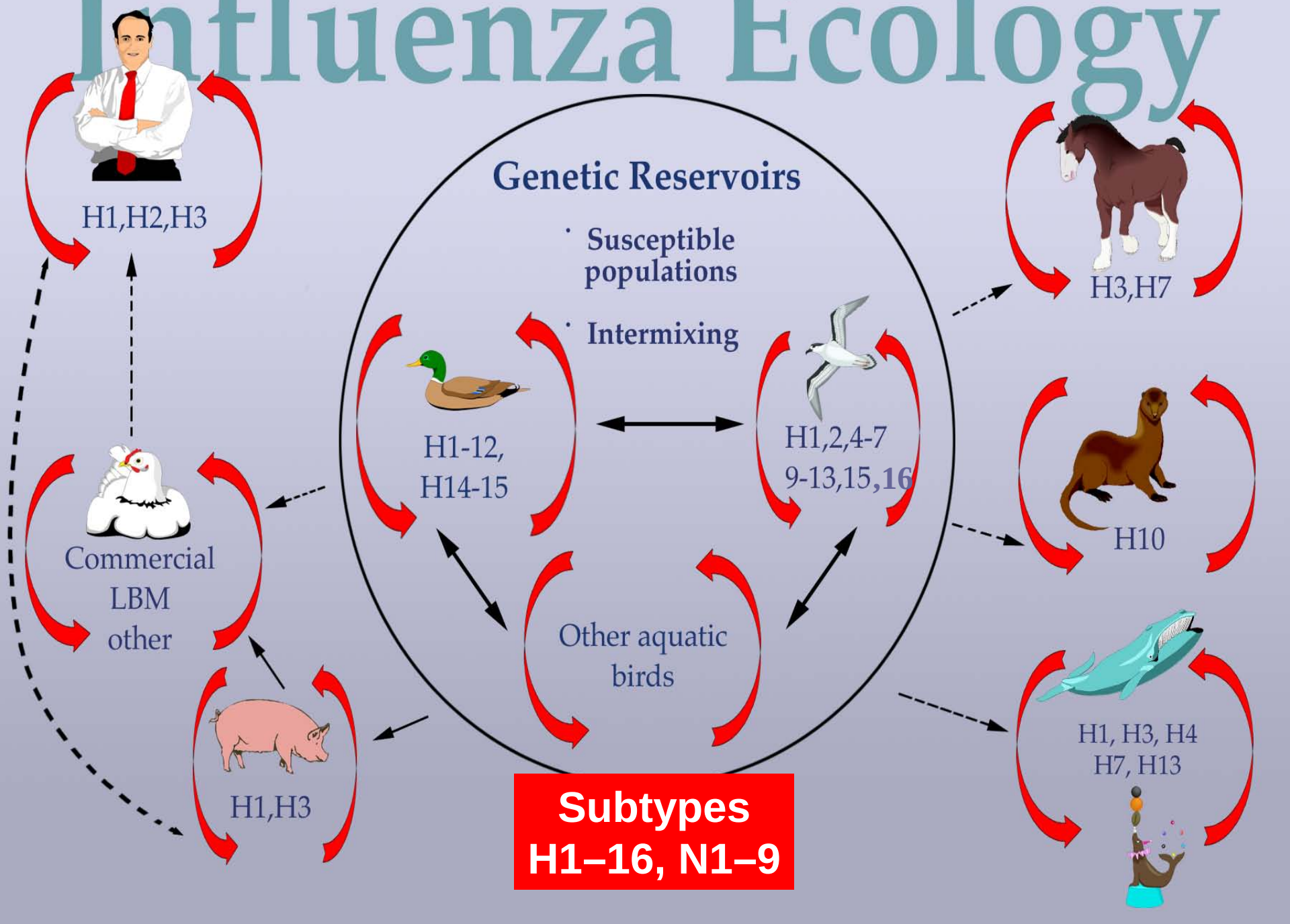
IDHW

Pandemic influenza: why focus on it?

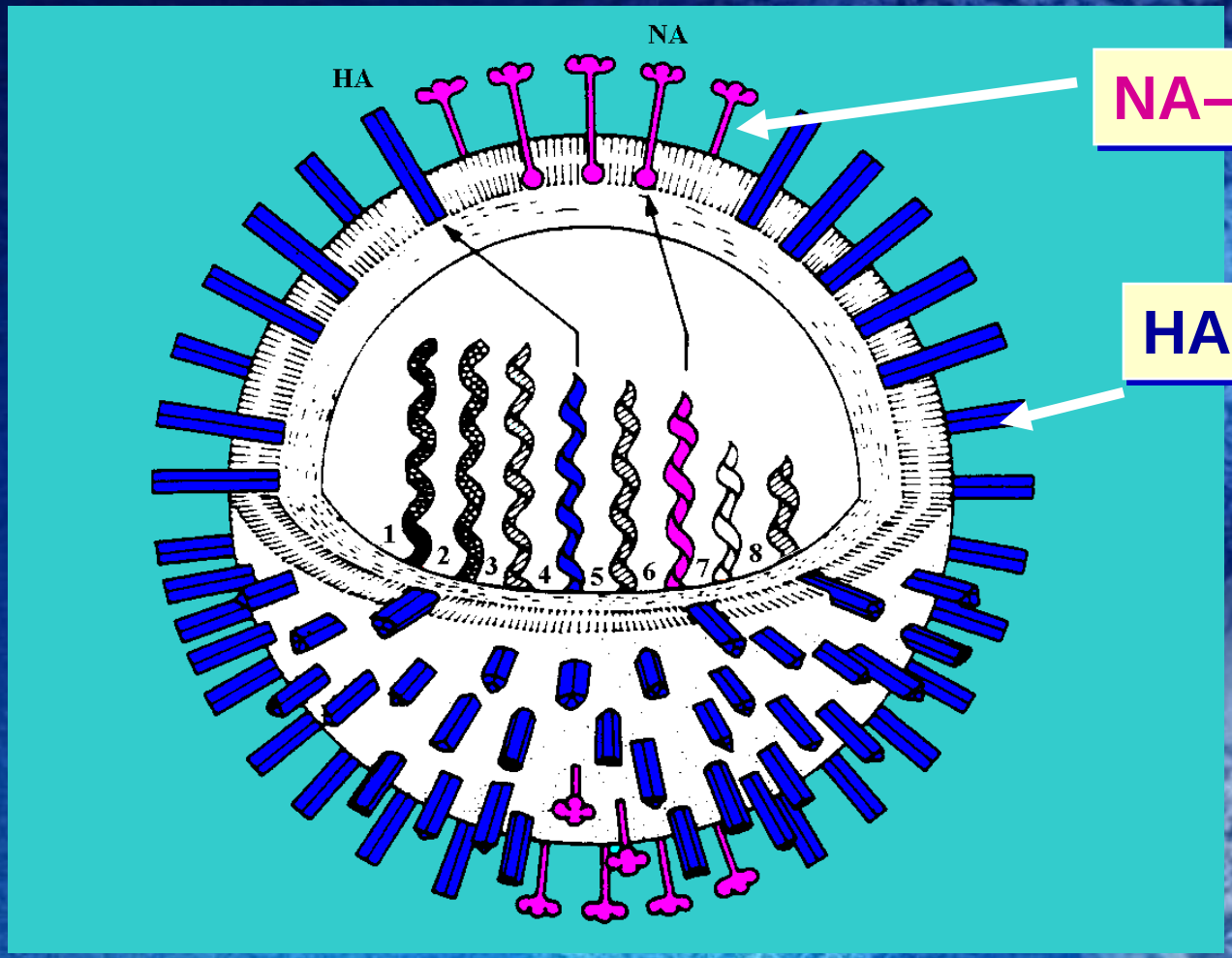
- Is a continued threat based on understanding of how influenza A circulates in wildlife, domestic animals, and humans
- Can be looked at as a model for other diseases or emergencies and planning for it can prepare against these other threats
- Avian influenza H5N1, circulating today, is still considered the most likely source of the next pandemic

Influenza Ecology



Subtypes
H1–16, N1–9

Influenza A Virus Surface Structure

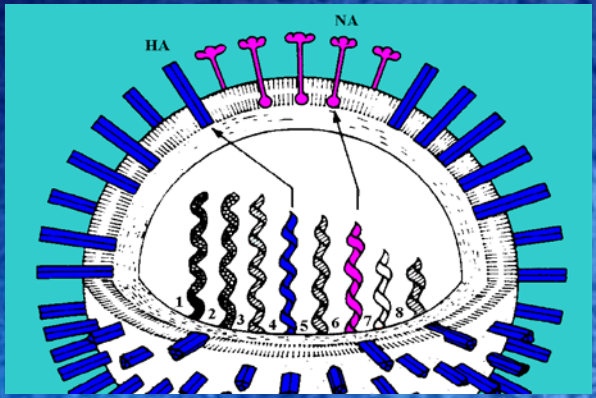


NA–neuraminidase

HA–hemagglutinin

Image source: CDC

Naming Influenza A Viruses



A/Beijing/32/92 (H3N2)

Virus type based on viral genome

Geographic origin

Strain number

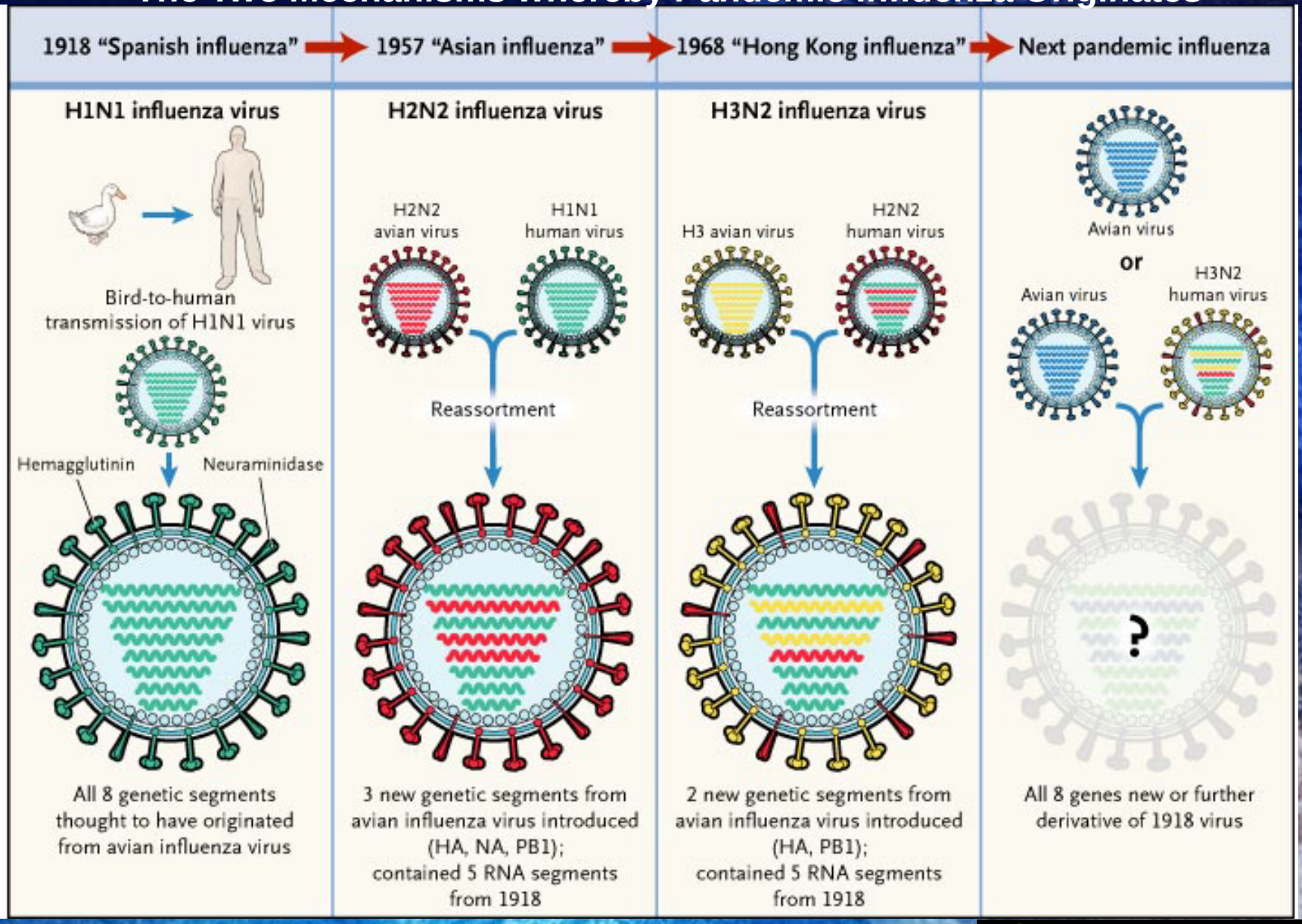
Year virus isolated in lab

Virus subtype based on type of HA and NA

What criteria need to be met to cause a pandemic?

- Ability to infect humans
- Global immunologically naive human population
- <u>Efficient human-to-human transmission</u>

The Two Mechanisms whereby Pandemic Influenza Originates



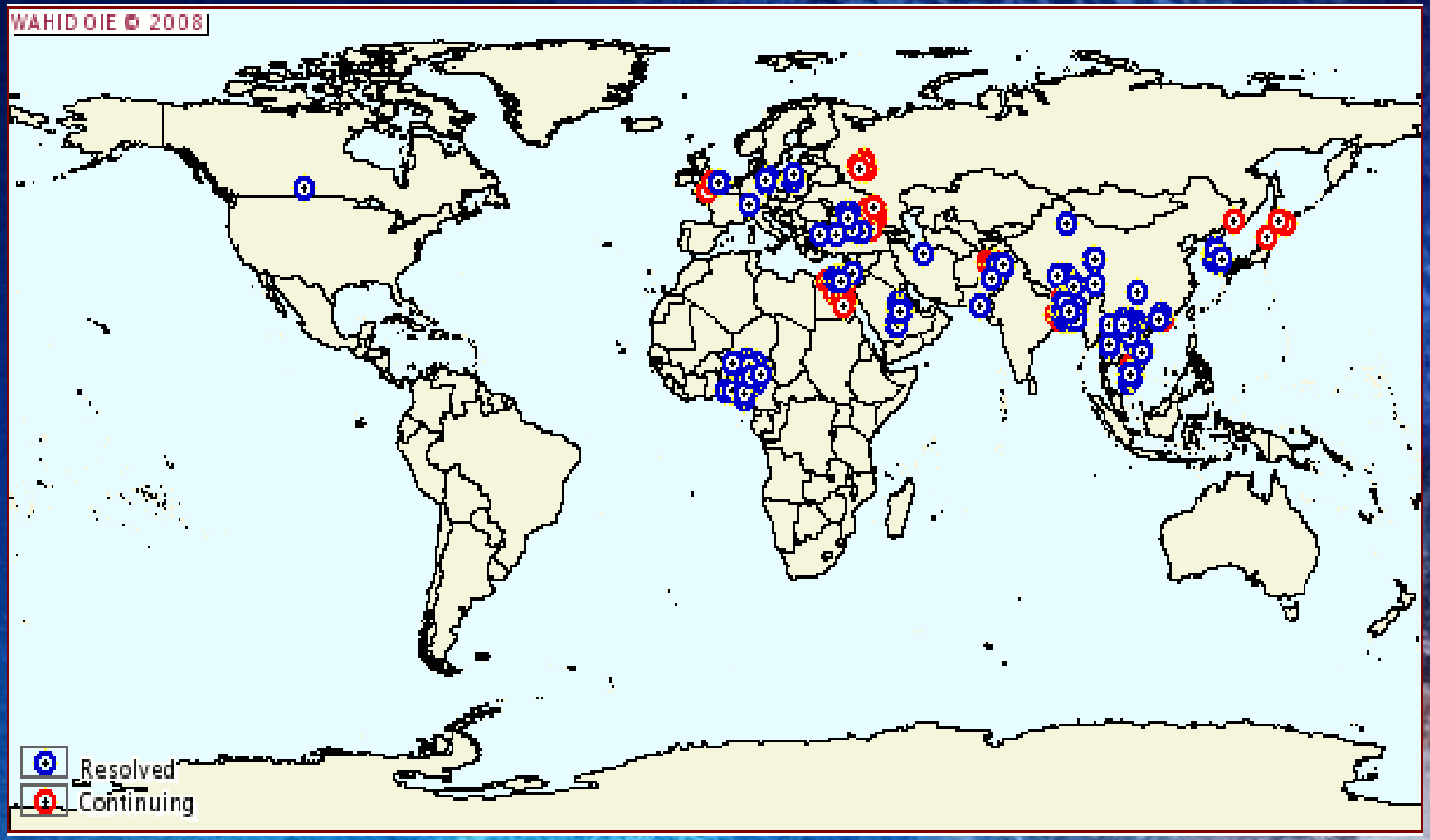
Belshe, R. B. N Engl J Med 2005;353:2209-2211

The NEW ENGLAND JOURNAL of MEDICINE

Avian Influenza Transmission from Birds

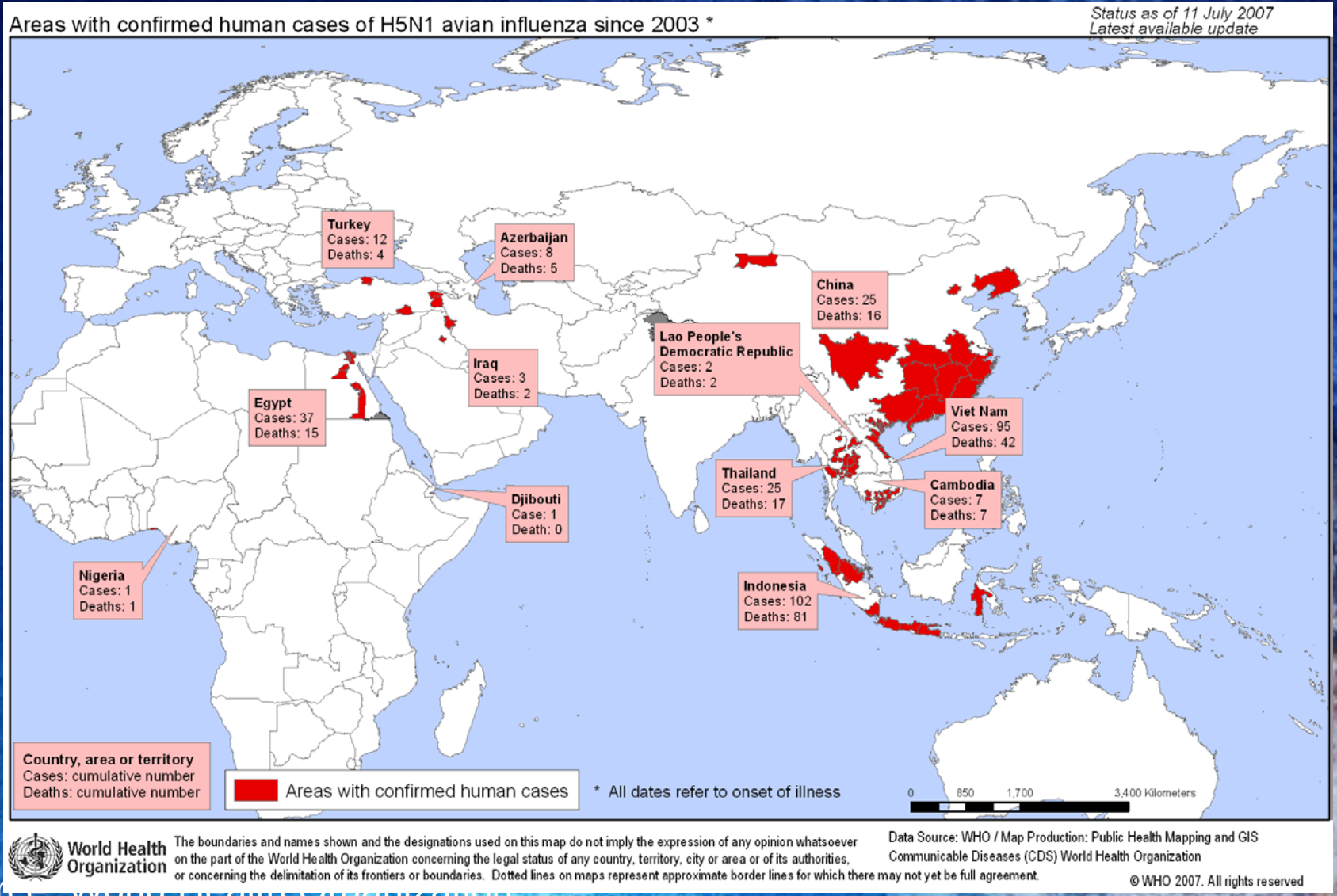
- **Wild birds shed avian influenza virus:** droppings, saliva, and nasal secretions.
- **The avian virus spreads to domestic birds.**
- **Close contact with poultry in bird markets and home settings provide pathways to humans.**

Avian Influenza in Birds Since 2003



Source: World Organization for Animal Health

Human A(H5N1) Human Infections Since 2003



Source: World Health Organization

Confirmed Human Cases of Avian Influenza A/(H5N1) Reported to WHO– 2003-2008ytd

What planning has accomplished so far

New vaccine licensed

- Apr 2007: H5N1 vaccine licensed– not available commercially
  - Included in National Stockpile
  - By the end of 2007, HHS had purchased and stockpiled 13 million courses of pre-pandemic vaccine; anticipated 20 million by end of 2008

FDA U.S. Food and Drug Administration U.S. Department of Health and Human Services

FDA Home Page | Search FDA Site | FDA A-Z Index | Contact FDA

This press release was updated on April 19 due to changes in the last paragraph.

FDA News

FOR IMMEDIATE RELEASE
P07-68
April 17, 2007

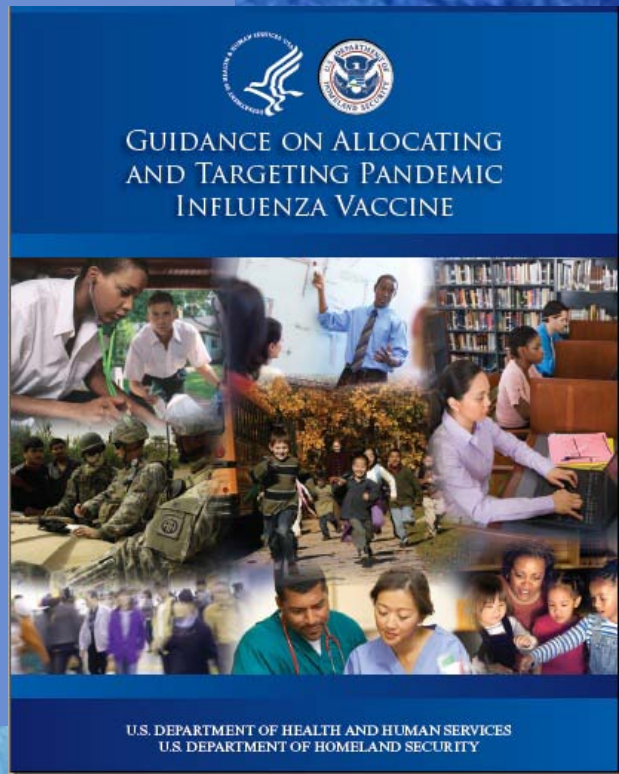
Media Inquiries:
Karen Riley, 301-827-6242
Consumer Inquiries:
888-INFO-FDA

FDA Approves First U.S. Vaccine for Humans Against the Avian Influenza Virus H5N1

Vaccine

- Vaccine trials showed 45% of recipients receiving 2 doses given at a 28 day interval developed antibody levels thought to be protective
- Lesser antibody levels may still be useful in decreasing severity of illness
- Since there is not enough for everyone, priority groups must be established
- Plan released by federal government

http://www.pandemicflu.gov/vaccine/allocationguidance.pdf



Vaccination Target Groups

Tier 1 | Tier 2 | Tier 3 | Tier 4 | Tier 5 | Not Targeted**

Category	Target Group	Estimated Number*	Severity of Pandemic: Severe	Moderate	Less severe
Homeland and national security	Deployed and mission critical personnel	700,000	Tier 1	Tier 1	Tier 1
	Essential support & sustainment personnel	650,000	Tier 2	Tier 2	Tier 2
	Intelligence services	150,000	Tier 2	Tier 2	Tier 2
	Border protection personnel	100,000	Tier 2	Tier 2	Tier 2
	National Guard personnel	500,000	Tier 2	Tier 2	Tier 2
	Other domestic national security personnel	50,000	Tier 2	Tier 2	Tier 2
	Other active duty & essential support	1,500,000	Tier 3	Tier 3	Not Targeted**
Health care and community support services	Public health personnel	300,000	Tier 1	Tier 1	Tier 1
	Inpatient health care providers	3,200,000	Tier 1	Tier 1	Tier 1
	Outpatient and home health providers	2,500,000	Tier 1	Tier 1	Tier 1
	Health care providers in LTCFs	1,600,000	Tier 1	Tier 1	Tier 1
	Community support & emergency management	600,000	Tier 2	Tier 2	Not Targeted**
	Pharmacists	150,000	Tier 2	Tier 2	Not Targeted**
	Mortuary services personnel	50,000	Tier 2	Tier 2	Not Targeted**
	Other important health care personnel	300,000	Tier 3	Tier 3	Not Targeted**
Critical infrastructure	Emergency services sector personnel (EMS, law enforcement and fire services)	2,000,000	Tier 1	Tier 1	Tier 1
	Mfrs of pandemic vaccine & antivirals	50,000	Tier 1	Tier 1	Tier 1
	Communications/IT, Electricity, Nuclear, Oil & Gas, and Water sector personnel	2,150,000	Tier 2	Tier 2	Not Targeted**
	Financial clearing & settlement personnel		Tier 2	Tier 2	Not Targeted**
	Critical operational & regulatory government personnel		Tier 2	Tier 2	Not Targeted**
	Banking & Finance, Chemical, Food & Agriculture, Pharmaceutical, Postal & Shipping, and Transportation sector personnel	3,400,000	Tier 3	Not Targeted**	Not Targeted**
	Other critical government personnel		Tier 3	Not Targeted**	Not Targeted**
General population	Pregnant women	3,100,000	Tier 1	Tier 1	Tier 1
	Infants & toddlers 6–35 mo old	10,300,000	Tier 1	Tier 1	Tier 1
	Household contacts of infants < 6 mo	4,300,000	Tier 2	Tier 2	Tier 2
	Children 3–18 yrs with high risk condition	6,500,000	Tier 2	Tier 2	Tier 2
	Children 3–18 yrs without high risk	58,500,000	Tier 3	Tier 2	Tier 3
	Persons 19–64 with high risk condition	36,000,000	Tier 4	Tier 3	Tier 2
	Persons >65 yrs old	38,000,000	Tier 4	Tier 3	Tier 2
	Healthy adults 19–64 yrs old	123,350,000	Tier 5	Tier 4	Tier 4

Pandemic Flu Home
General Information
Where You Live
Frequent Questions (FAQs)
Planning & Response
Monitoring Outbreaks
Health & Safety
Tests, Vaccines, Medications, & Masks
Bird & Animal Issues
Global Activities
Economic Impacts
Travel

Flu terms defined — **Seasonal flu, avian flu, and pandemic flu are not the same.**

News

Visit our archive of live online discussions to aid state planners on pandemic preparedness. More>>

- **Guidance Provided for States to Improve Pandemic Operations Plans (April 21)**
- **Human-to-Human Transmission Likely in Pakistan Outbreak (April 3)**
- **Ducks, Rice Play Key Role in Outbreaks (March 26)**
- **Secretary Leavitt Blogs About Pandemic Exercise With Bloggers (March 20)**
- **Fifth Pandemic Planning Update Report Released (March 19)**

News Archive >>

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Nations With Confirmed Cases H5N1 Avian Influenza

Pandemic Alert Phase

- WHO Phase 3: No or very limited human-to-human transmission
- US Stage 0: New domestic animal outbreak in at-risk country

Avian Flu Watch

- Human Cases (WHO)
- Animal Infection (OIE)
- Situation Update (WHO)
- H5N1 Timeline (PDF - 140 KB) (WHO)

A - Z Index

A B C D E F G H I
J K L M N O P Q R

Continued surveillance in U.S. for avian influenza

Highly Pathogenic Avian Influenza
Early **D**etection **D**ata **S**ystem

HEDDS

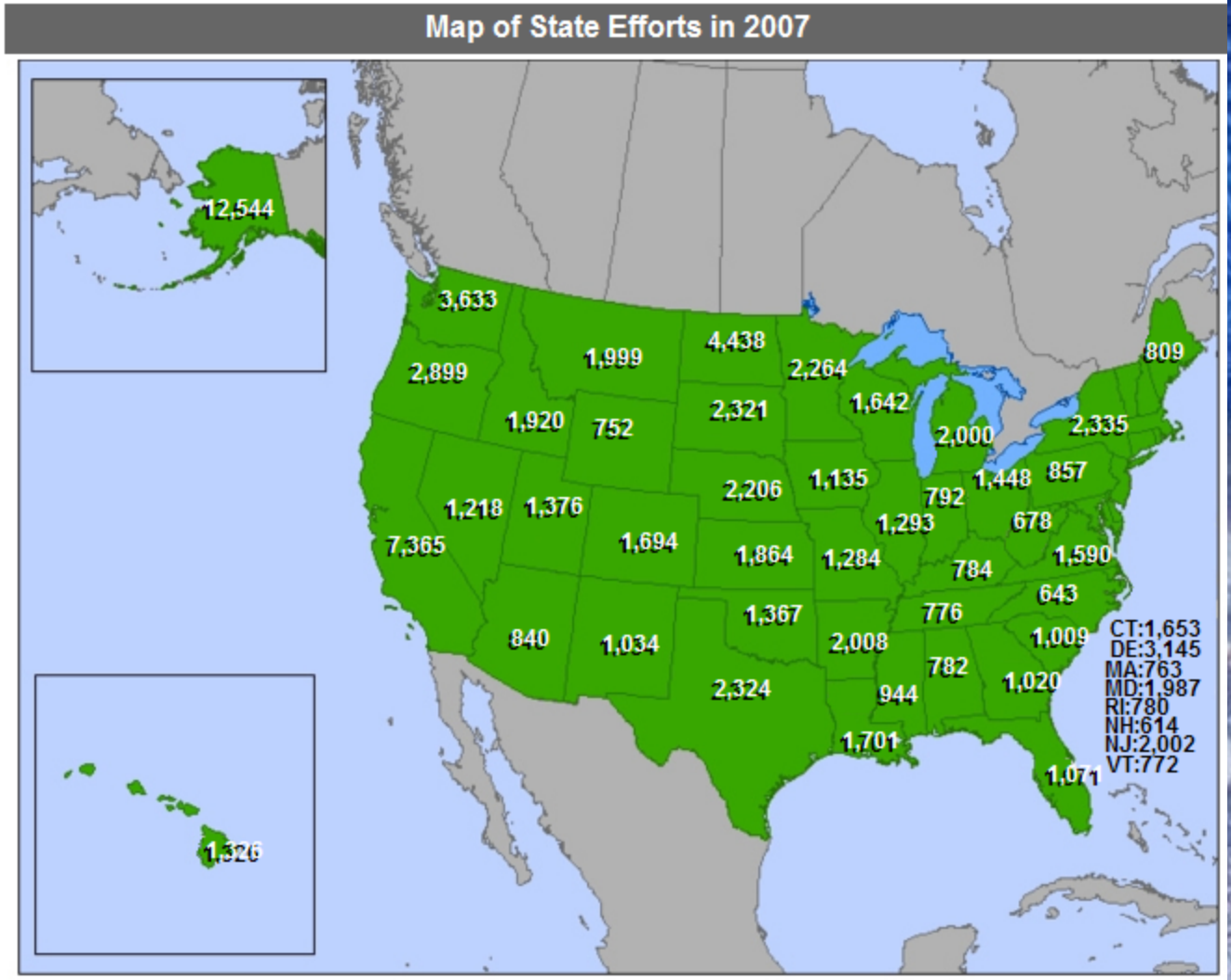


Photo 1 of 2

Japan plans to vaccinate some 6,400 people by next March

Japan to vaccinate medical workers against bird flu

Apr 16, 2008

TOKYO (AFP) — Japan is to vaccinate thousands of medical workers and officials against bird flu to prepare for a possible pandemic, a health ministry official said Wednesday.

The ministry will vaccinate about 6,400 people by next March and plans eventually to expand the programme to about 10 million people including police and military officers, the official said on condition of anonymity.

"I believe it would be the world's first plan to vaccinate thousands of people" for a possible outbreak of a new type of flu, he said.

Japan has stockpiles of so-called pre-pandemic vaccines for 20 million people.

The official said the government will study the effectiveness and side effects of the vaccines, which are expected to be given to volunteers.

"Once the effectiveness and safety of the vaccines are known, the government will consider expanding it to a scale of some 10 million people," he said.

The H5N1 strain has killed more than 230 people worldwide since late 2003.

Experts fear the virus, which is usually spread directly from birds to humans, could mutate into a form easily transmissible between people, sparking a deadly global pandemic.

Mortality with Past Antigenic Shifts

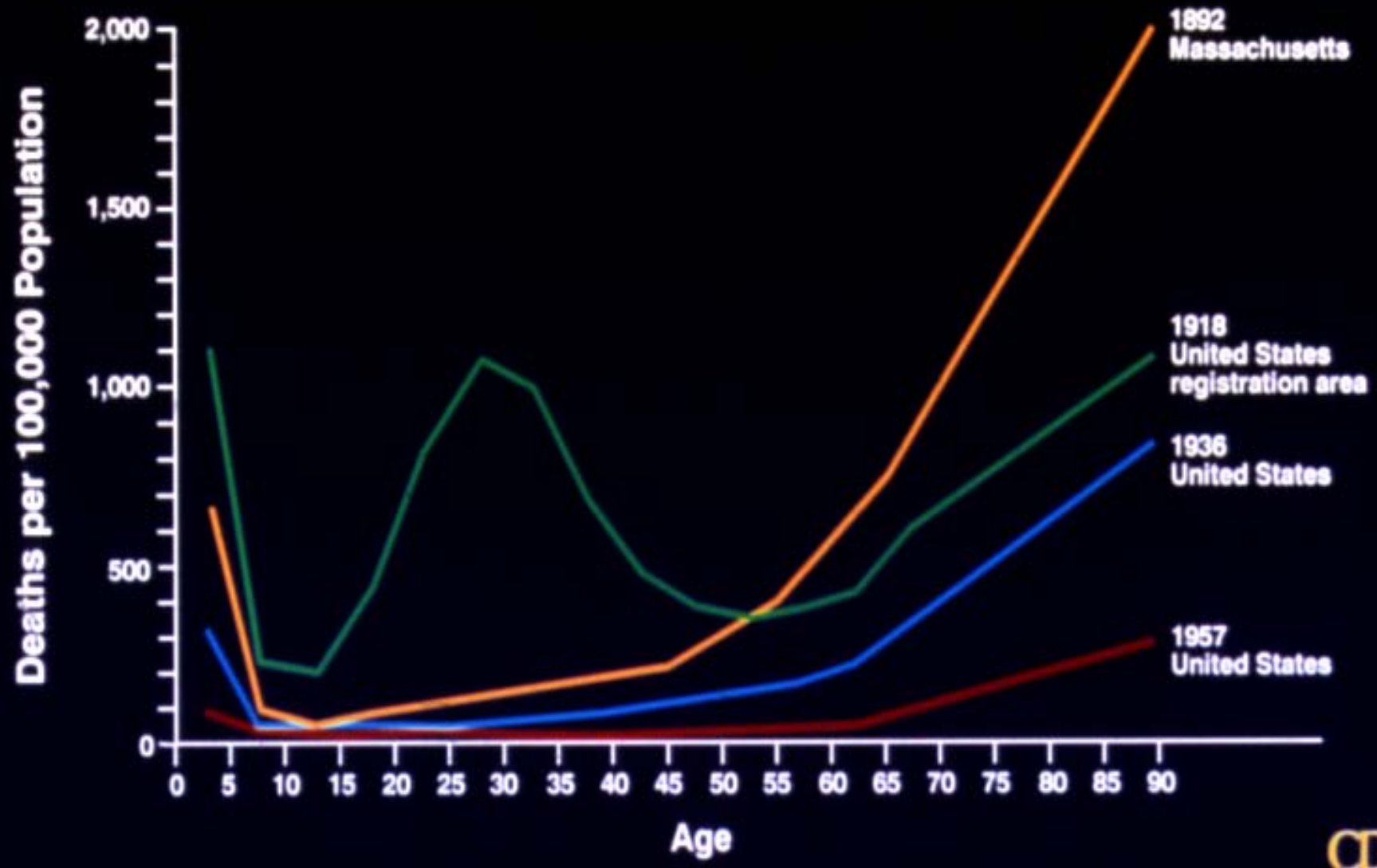
Year* (Subtype)	Deaths Attributed to Influenza	Populations Affected
(A/H1N1)	500,000	Persons 20–65 yrs, infants, elderly
(A/H2N2)	70,000	Infants, elderly
(A/H3N2)	36,000	Infants, elderly
1977–78 (A/H1N1)	8,300	Persons <20 yrs

Modified from 11/05 HHS slides.

Impacts of Previous Pandemics

- 1918-19 Spanish Flu (H1N1)
  - 20-50 million deaths worldwide
  - >500,000 U.S. deaths
- 1957-1958 Asian Flu (H2N2)
  - 2 million deaths worldwide
  - 70,000 U.S. deaths
- 1968-1969 Hong Kong (H3N2)
  - 1 million deaths worldwide
  - 34,000 U.S. deaths

Pneumonia and Influenza Mortality by Age in Certain Epidemic Years



Focus on bacterial complications

- Aug 19– study of 1918 pandemic released by NIH
- In most cases the predominant disease at the time of death appeared to have been bacterial pneumonia.
- Therefore, the authors conclude, “comprehensive pandemic preparations should include not only efforts to produce new or improved influenza vaccines and antiviral drugs but also provisions to stockpile antibiotics and bacterial vaccines as well.”

Products for planning

U.S. Department of Labor
Occupational Safety & Health Administration

www.osha.gov Search GO Advanced Search | A-Z Index

PDF Version

Guidance on Preparing Workplaces for an Influenza Pandemic

OSHA 3327-02N 2007

Employers are responsible for providing a safe and healthful workplace for their employees. OSHA's role is to assure the safety and health of America's employees by setting and enforcing standards; providing training, outreach and education; establishing partnerships; and encouraging continual improvement in workplace safety and health.

This handbook provides a general overview of a particular topic related to OSHA standards. It does not alter or determine compliance responsibilities in OSHA standards or the Occupational Safety and Health Act of 1970. Because interpretations and en-forcement policy may change over time, you should consult current OSHA administrative interpretations and decisions by the Occupational Safety and Health Review Commission and the Courts for additional guidance on OSHA compliance requirements.

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This information is available to sensory impaired individuals upon request. Voice phone: (202) 693-1999; teletypewriter (TTY) number: (877) 889-5627.

How a Severe Pandemic Influenza Could Affect Workplaces

Unlike natural disasters or terrorist events, an influenza pandemic will be widespread, affecting multiple areas of the United States and other countries at the same time. A pandemic will also be an extended event, with multiple waves of outbreaks in the same geographic area; each outbreak could last from 6 to 8 weeks. Waves of outbreaks may occur over a year or more. Your workplace will likely experience:

- **Absenteeism** - A pandemic could affect as many as 40 percent of the workforce during periods of peak influenza illness. Employees could be absent because they are sick, must care for sick family members or for children if schools or day care centers are closed, are afraid to come to work, or the employer might not be notified that the employee has died.
- **Change in patterns of commerce** - During a pandemic, consumer demand for items related to infection control is likely to increase dramatically, while consumer interest in other goods may decline. Consumers may also change the ways in which they shop as a result of the pandemic. Consumers may try to shop at off-peak hours to reduce contact with other people, show increased interest in home delivery services, or prefer other options, such as drive-through service, to reduce person-to-person contact.
- **Interrupted supply/delivery** - Shipments of items from those geographic areas severely affected by the pandemic may be delayed or cancelled.

- Stockpile items such as soap, tissue, hand sanitizer, cleaning supplies and recommended personal protective equipment. When stockpiling items, be aware of each product's shelf life and storage conditions (e.g., avoid areas that are damp or have temperature extremes) and incorporate product rotation (e.g., consume oldest supplies first) into your stockpile management program.

  Make sure that your disaster plan protects and supports your employees, customers and the general public. Be aware of your employees' concerns about pay, leave, safety and health. Informed employees who feel safe at work are less likely to be absent.

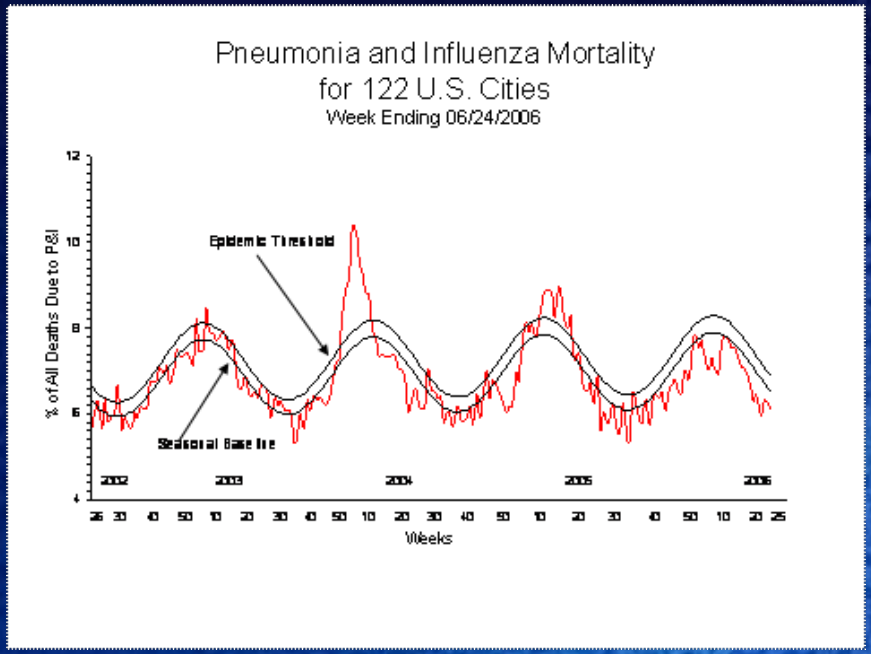
- Develop policies and practices that distance employees from each other, customers and the general public. Consider practices to minimize face-to-face contact between employees such as e-mail, websites and teleconferences. Policies and practices that allow employees to work from home or to stagger their work shifts may be important as absenteeism rises.

- Organize and identify a central team of people or focal point to serve as a communication source so that your employees and customers can have accurate information during the crisis.

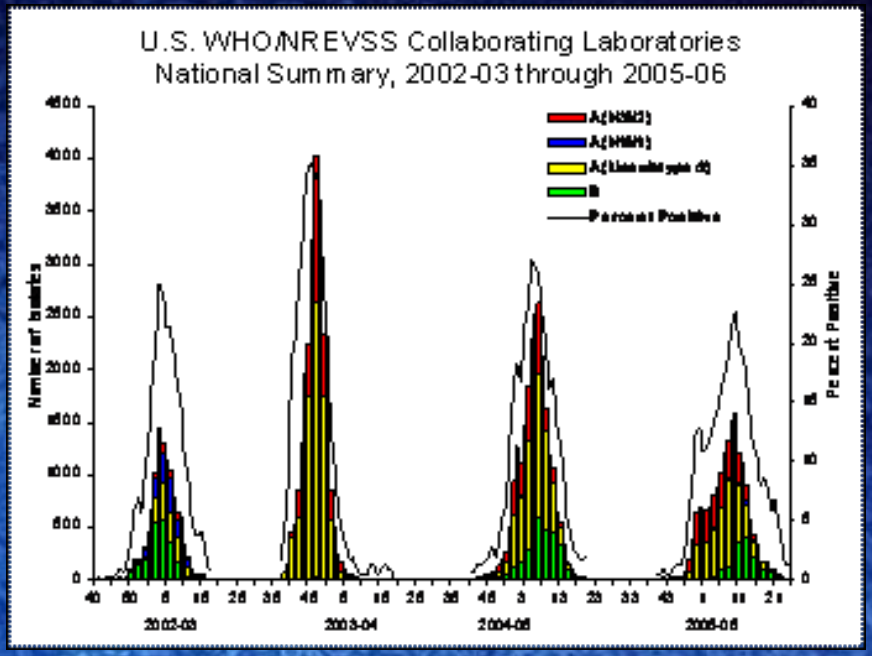
- Work with your employees and their union(s) to address leave, pay, transportation, travel, childcare, absence and other human resource issues.

What benefits have we seen so far from all the planning?

- General:
  - Awareness among public about respiratory diseases increased (“Cover your cough” campaigns etc)
  - Disease reporting, including to CDC and to the WHO from other countries, has improved
  - Plans being developed for continuity of operations
- Pandemic-specific:
  - Tools have been developed for more rapid testing of suspected cases
  - New anti-influenza medications available
  - Vaccine stockpiled
  - Progress in figuring out reasonable allocation priorities and plans to distribute vaccines and drugs
  - Exercises on rapid administration of large numbers of shots
  - Better tracking of flu cases, with potential to detect unusual patterns more quickly

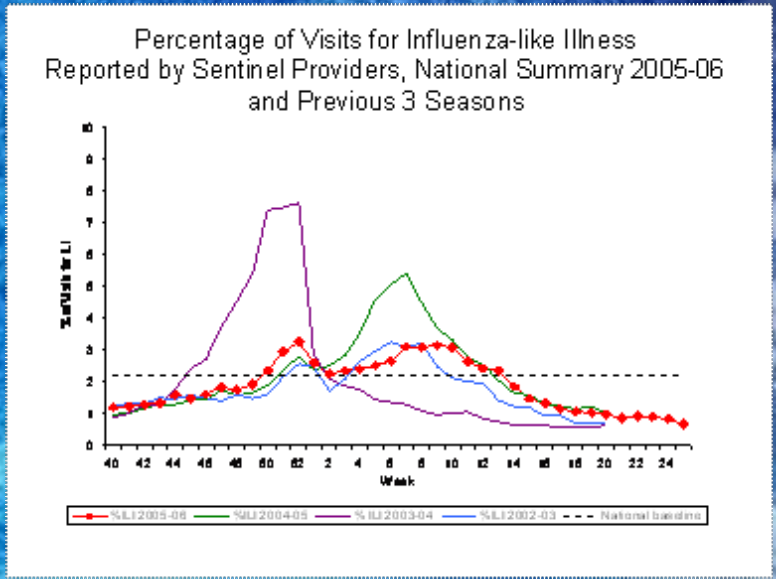


MORTALITY DATA



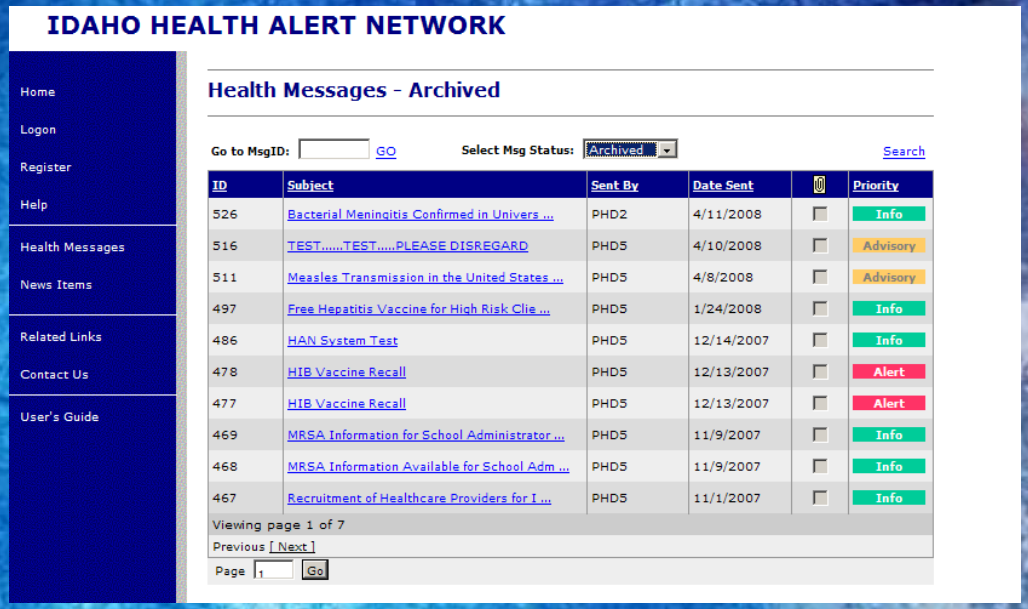
LABORATORY DATA

PHYSICIAN DATA



Is all this planning helping?

- Improved response to local and statewide outbreaks and public health threats
  - e.g., recent response to hepatitis A in foodworker
- More timely health alerts to providers and others



Questions?

South Korean health officials walk to bury chickens at the infected chicken farm in Gimje, 162 miles south of Seoul on April 4, 2008. South Korea has started culling thousands of chickens after an outbreak of bird flu was confirmed to be the deadly H5N1 strain, officials said.