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# Pandemic Influenza Review

## Public Health Best Practices



Sadina Reynaldo, PhD

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4 Main Points...  
Answer FAQs



## Signs point to global flu outbreak, WHO warns

Recent events stir growing concerns among scientists



Dadand

www.timeasia.com

FEBRUARY 9, 2004

# TIME

## BIRD FLU

### TV news health coverage:

- median time = 33 seconds
- coverage disproportionate to affect on public
- often inaccurate
- designed to keep you tuned-in!



IT'S TIME AGAIN FOR  
EVERYONE'S LEAST FAVORITE  
GAME... FEAR OF THE WEEK!

TODAY, WE WELCOME JOHN  
SMIDDLESDORF, A DAIRY FARMER  
FROM WISCONSIN... JOHN,  
GIVE 'ER A SPIN!!





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4 Main Points...  
Answer FAQs



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1. Calming fear.

# Focus on facts... not fear. Why?

Fear: already well known!

- books, TV movies, to sell products...

Fear promotes irrational behavior.

- fear of birds, eating chicken...

Doesn't work! Not appropriate for pan flu prep;  
Promotes only short-term motivation.

The onset of the next pandemic is unknown.

Months from now? Years from now?

Messages should present a balanced/rational approach with an emphasis on overall emergency preparedness.

# Seasonal Flu



2. Understanding seasonal flu is important.



## Importance of seasonal flu

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Many assumptions for **pandemic flu** are based on what we know about **seasonal flu** (e.g., symptoms, transmission, prevention, etc.)

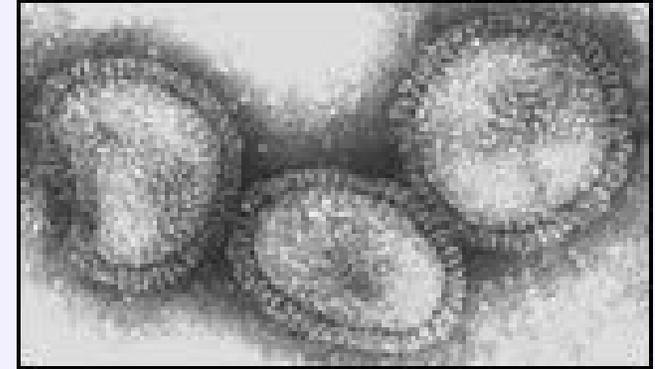
Any problems that exist with **seasonal flu** likely will be magnified when dealing with **pandemic flu** (e.g., impact on hospitals, getting people vaccinated, etc.)

The ultimate impact of next flu **pandemic** is unknown; but even **seasonal** strains of influenza have significant public health impact.

# What is the flu?

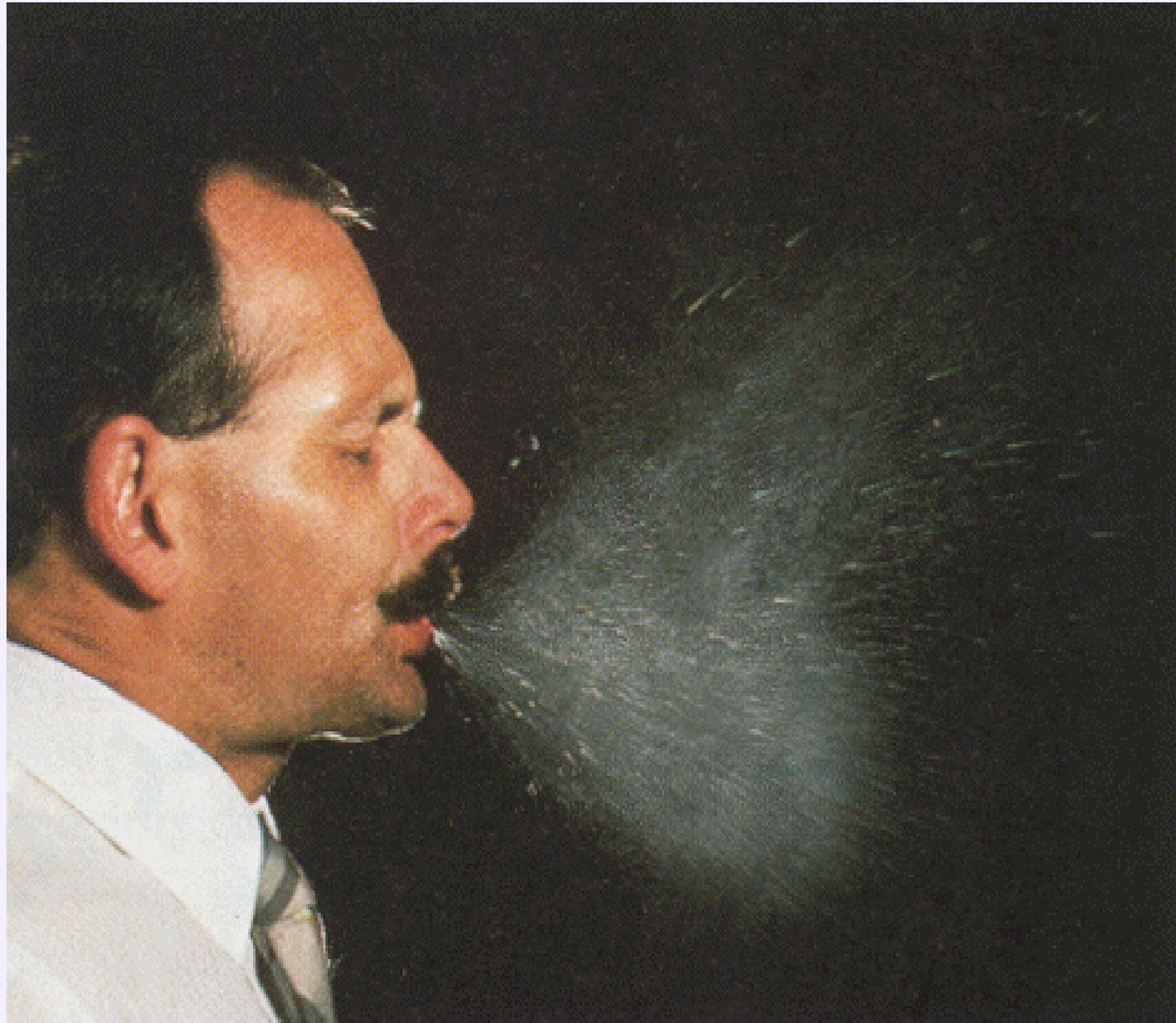
Flu is a virus.

- affects the respiratory tract (nose, throat and lungs)
- proper treatment is antivirals, not antibiotics



Flu is very contagious.

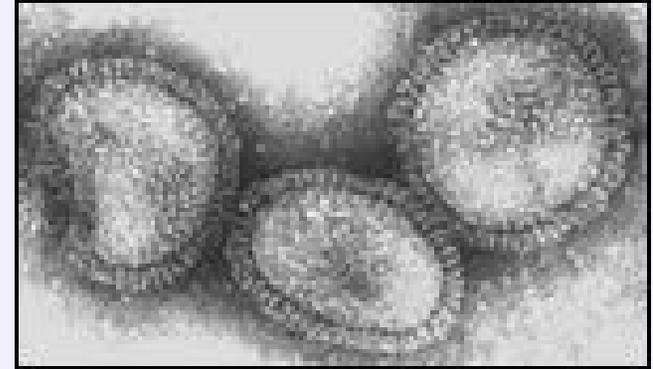
- is easily spread when people sneeze or cough  
(large droplet transmission)



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- is easily spread when people sneeze or cough  
(large droplet transmission)
- also spread by fomites

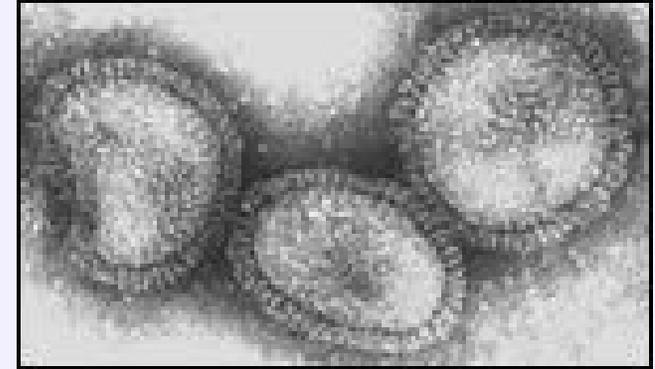
How long survive on surfaces?

Flu is a preventable disease.

- vaccine is very effective
- basic respiratory hygiene is very effective

# What is the flu?

Two types have public health impact.



- Type A:
  - potentially severe illness
  - affects humans and animals
  - can rapidly change
  - associated with epidemics and pandemics
- Type B:
  - usually less severe illness
  - only humans, often children
  - more stable

Type B seasons are usually mild seasons.

## Late-Season Flu Bug Strikes

**Health** An unexpected outbreak of Type B influenza has hit many of county's elementary, middle school students in the last two weeks.

By FREDA HAYASHI  
The Times Staff Writer

It struck 8-year-old Shelby Cooley as she practiced writing cursive and capital Gs for an assignment Wednesday at La Balsa Elementary School in Culver City.

"The words started to get all mixed up and I felt dizzy," she said. "My head started to hurt."

Shelby was the last in her family to catch a late-season flu bug. Her 3-year-old sister was the first, and within days both parents and all five children in the family were coughing and struggling with upset stomachs.

"We all had it so fast," said Shelby's mother, Tammy Cooley-Gonzales. "It was like the plague."

A Type B flu outbreak has hit Los Angeles County unexpectedly, health experts say, striking many elementary and middle school students in the last two weeks.

Until now, the flu season—which traditionally closes at the end of March—had been exceptionally mild, said Dr. David Danney, deputy director of acute communicable disease control for the county Department of Health Services.

Reports started trickling in around March 15, and schools began citing an increased number of student and teacher absences, Danney said. The highest num-



# How do we know it's the flu?

Primary symptoms include:

- fever
- headache / body aches
- cough / sore throat
- very tired / fatigued

Runny nose = colds

Vomiting, diarrhea = GI

Other aspects:

- onset sudden and severe

Only way to really know if it is the flu is by isolating the virus (e.g., throat or NP swab)

# How do we know it's the flu?

Flu peaks during the winter months.

- In LA, most cases occur during late Dec. or early January; earlier than rest of US
- In the So. Hemisphere, flu peaks during our summer
- Why? No one knows.



But there are exceptions!  
(i.e., March 2002 and 2003 in LA  
and the 1918 pandemic)

# Why do we care?

Causes more morbidity and mortality than any other vaccine preventable disease.

One of the most significant  
diseases in human

## 1918–1919 Spanish Flu

20-40 million deaths worldwide

75% of the casualties during WWI



A nationwide casket shortage was evidence of a mounting death toll.

# Why do we care?

Even in non-pandemic years,  
considerable morbidity and mortality

+ 36,000 excess deaths/year

+ 200,000 hospitalizations

+ especially serious for: very young, elderly,  
those with chronic health conditions

Affects almost everyone

Normal season = 10-15% population sick

Severe season = more than 20% and more sick

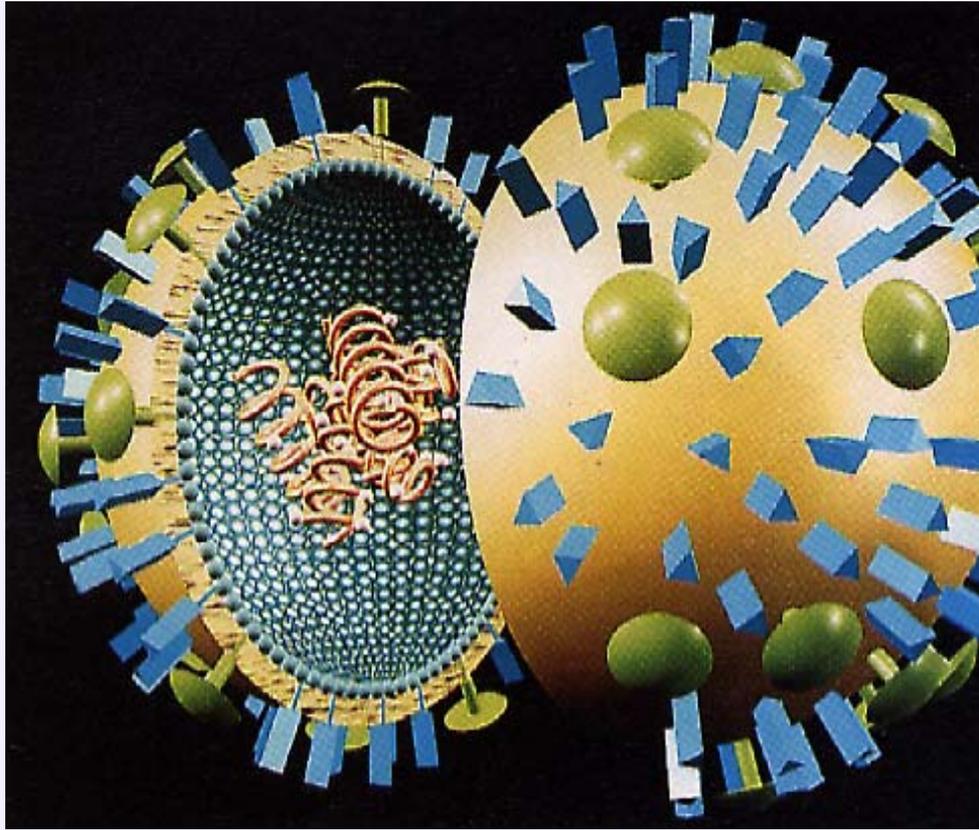
10 million residents in LAC = 1 million sick  
during a mild season



CAROLYN COLE / Los Angeles Times

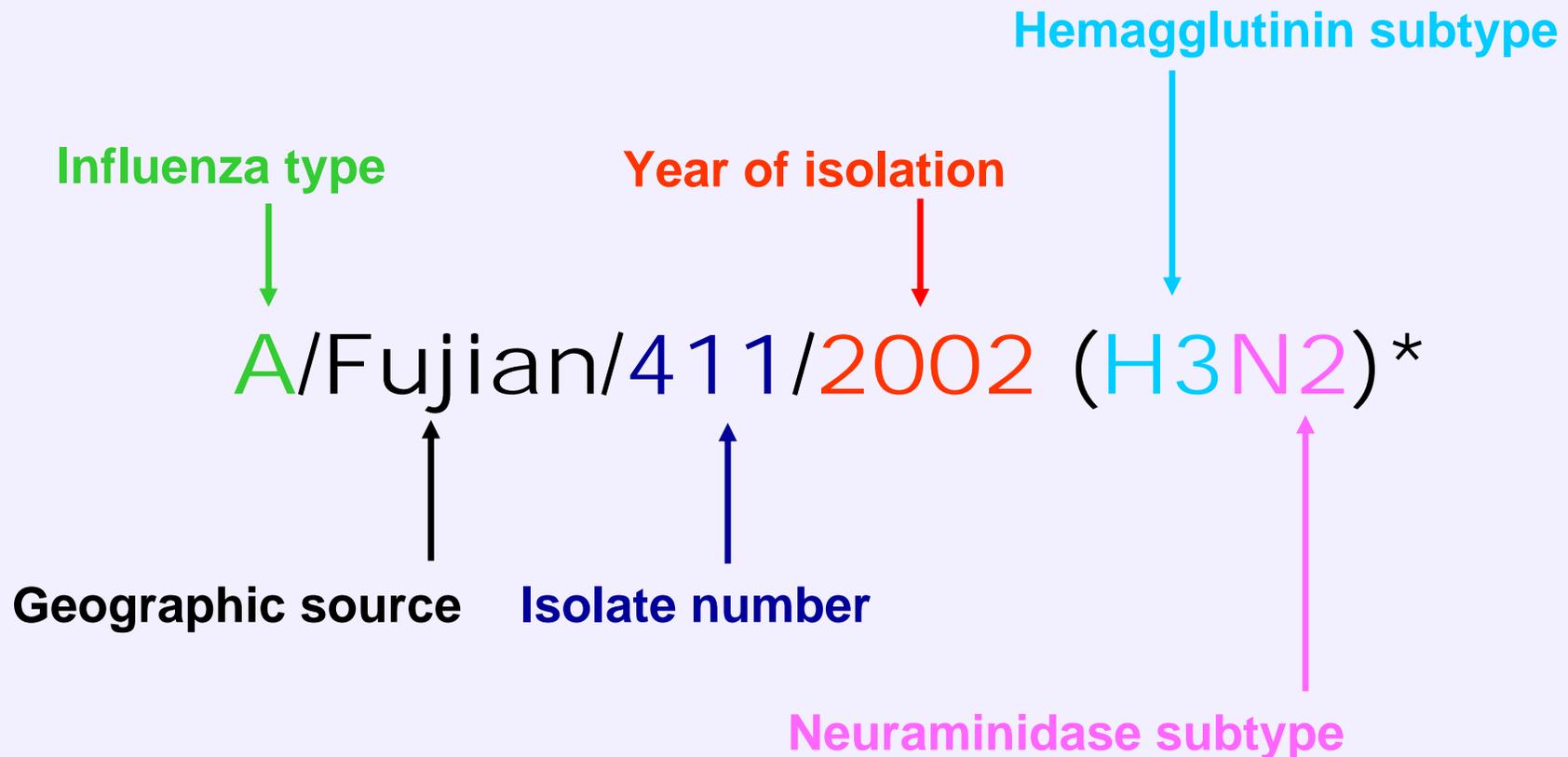
When this photo was taken, Graciela Bello, 87, had already been waiting five hours for a bed at St. Francis Medical Center.

over 100,000 hospitalizations



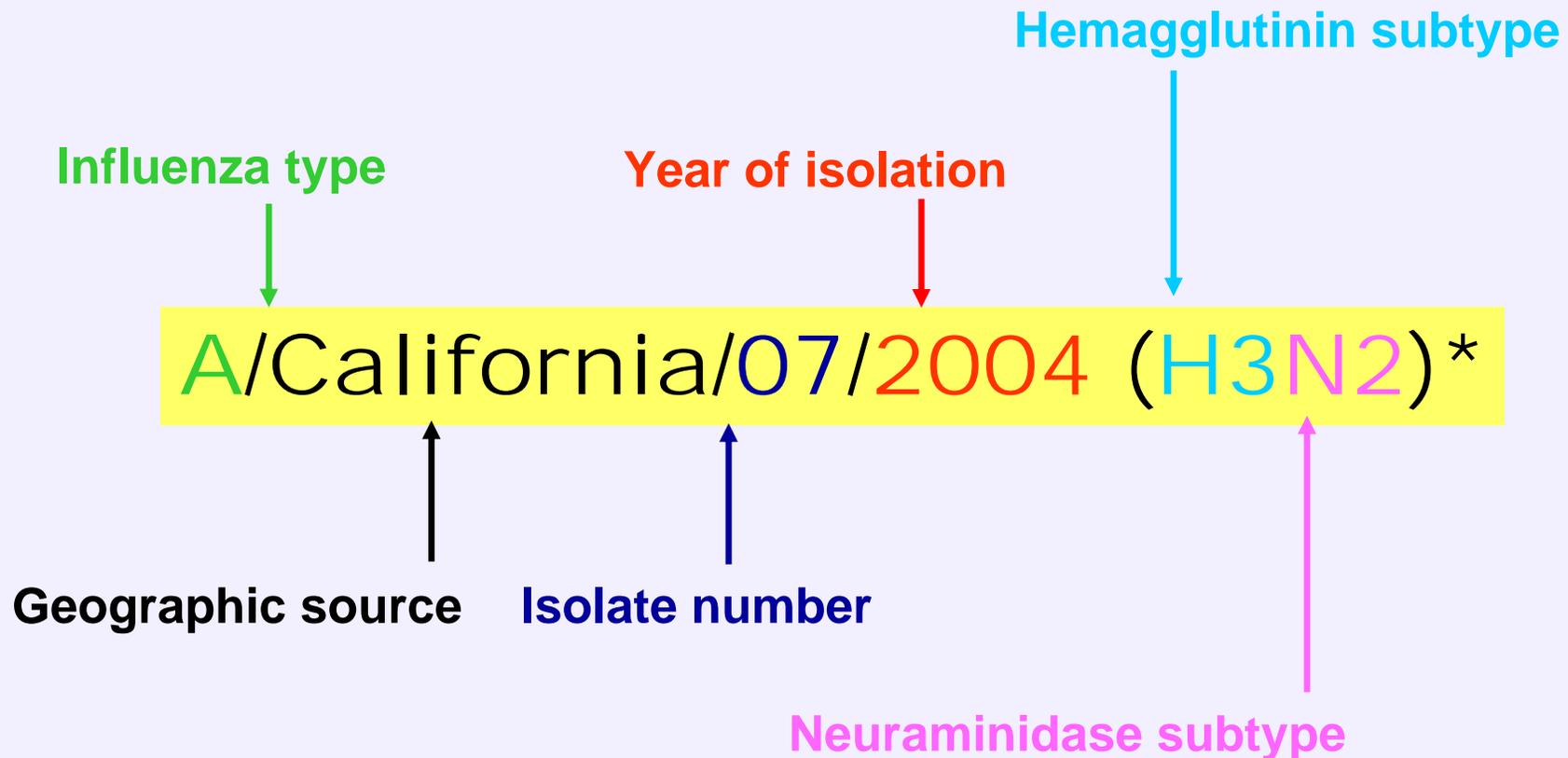
Type A strains further subtyped by:  
Hemagglutinin (HA) and Neuraminidase (NA)

# World Health Organization Influenza Nomenclature



**Seasonal flu vaccination contains 3 strains:  
A (H3), A (H1), B**

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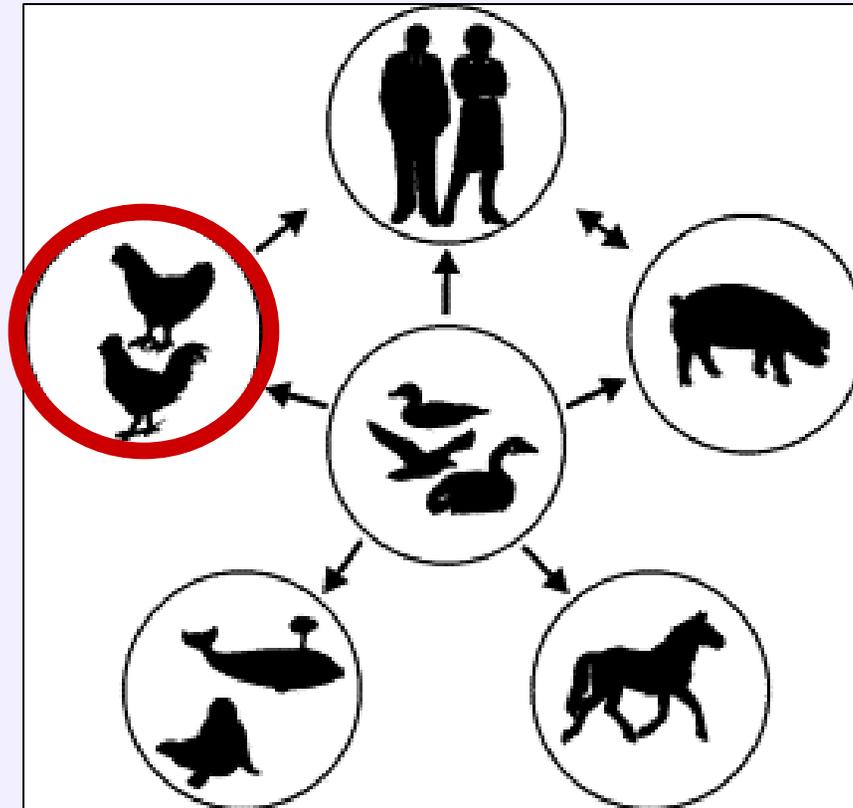
Influenza viruses are described as  
“sloppy, capricious, and promiscuous”

- They lack a proof-reading mechanism to **detect and correct** small errors that occur when the viruses copy themselves.
- This allows for constant stepwise changes in their genetic makeup termed **antigenic drift**.
- Though small, these slight variations keep populations **susceptible to infection**.

**This explains need for a new vaccine for each winter season.**

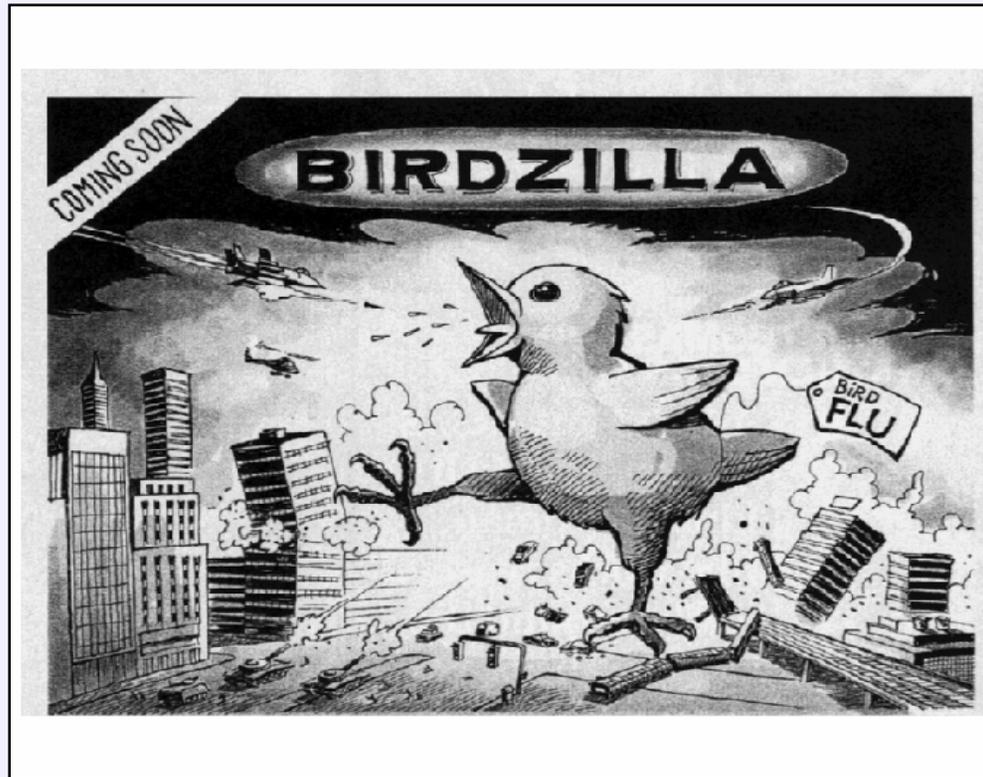
seasonal reassortment in humans = DRIFT

All known subtypes of influenza A can be found in birds.



crosses species = **SHIFT = PANDEMICS**

# Avian (Bird) Influenza



## 3. Clarifying flu terms.

Avian (bird) flu DOES NOT = Pandemic flu

# Distinguish bird flu from pan flu. Why?

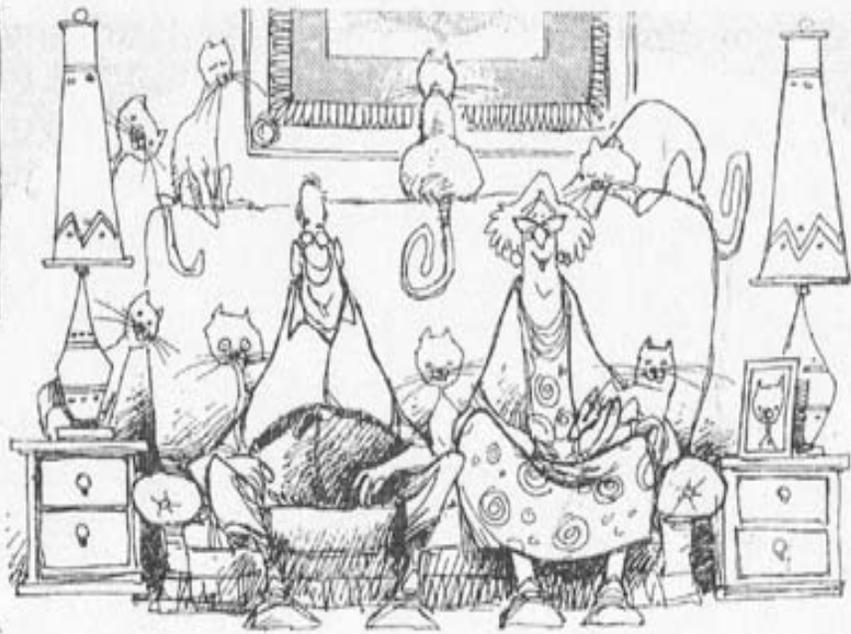
Scientists/PH have been worrying/preparing for pandemic flu years!

Current push to prepare began with avian A H5N1.

That's why we're here!

Caused a confusion of terms that still persists today!

BILL and BETTY'S  
BIRD FLU  
DEFENSE  
SYSTEM..



11-2



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WILEY.MILLER@GMAIL.COM

# Distinguish bird flu from pan flu. Why?

Scientists/PH have been worrying/preparing for pandemic flu years!

Current push to prepare began with avian A H5N1.

That's why we're here!

Caused a confusion of terms that still persists today!

## Problem:

Neglects the fact that flu pandemics may NOT originate in birds.

PIGS!

If H5N1 fizzles... the threat remains!



## Bird flu basics

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Influenza A occurs naturally in all birds.

spread by respiratory secretions and feces

first identified early 1900's

majority pose NO danger to public health

many different HA and NA subtypes

Current concern: avian influenza A (H5N1)



## Bird flu basics

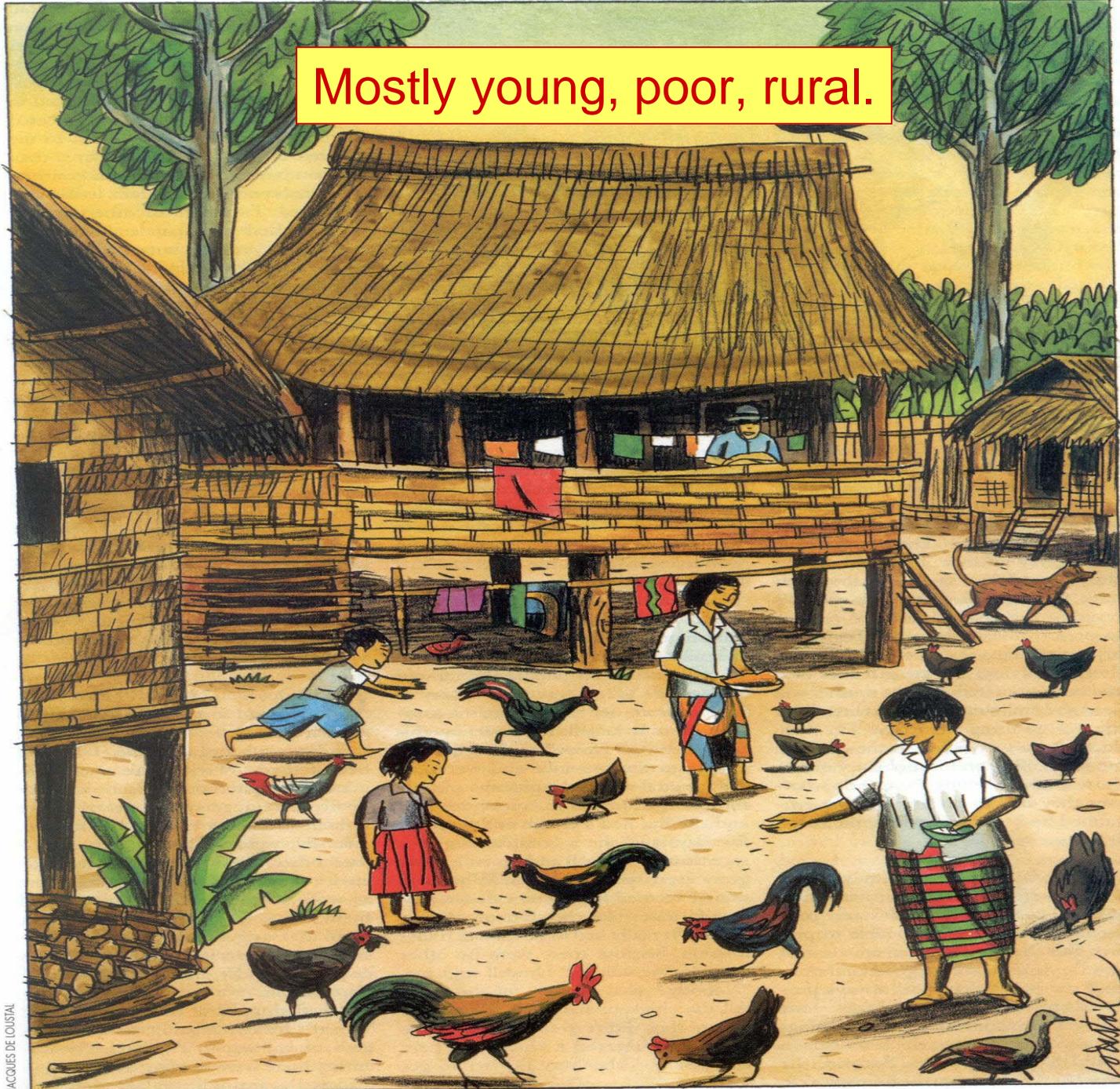
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Why are we concerned about A (H5N1)?

Ongoing human infection with A (H5N1).

241 cases and 141 deaths in 10 countries (as of 8/23/06).

Mostly young, poor, rural.



JACQUES DE LOUSTAL



## Bird flu basics

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Why are we concerned about A (H5N1)?

Ongoing human infection with A (H5N1).

241 cases and 141 deaths in 10 countries (as of 8/23/06).

Occurring in countries with poor protective measures.

Co-circulating with human influenza viruses which can increase the odds of genetic reassortment.

Can lead to a new pandemic strain;  
human population would have NO existing immunity.

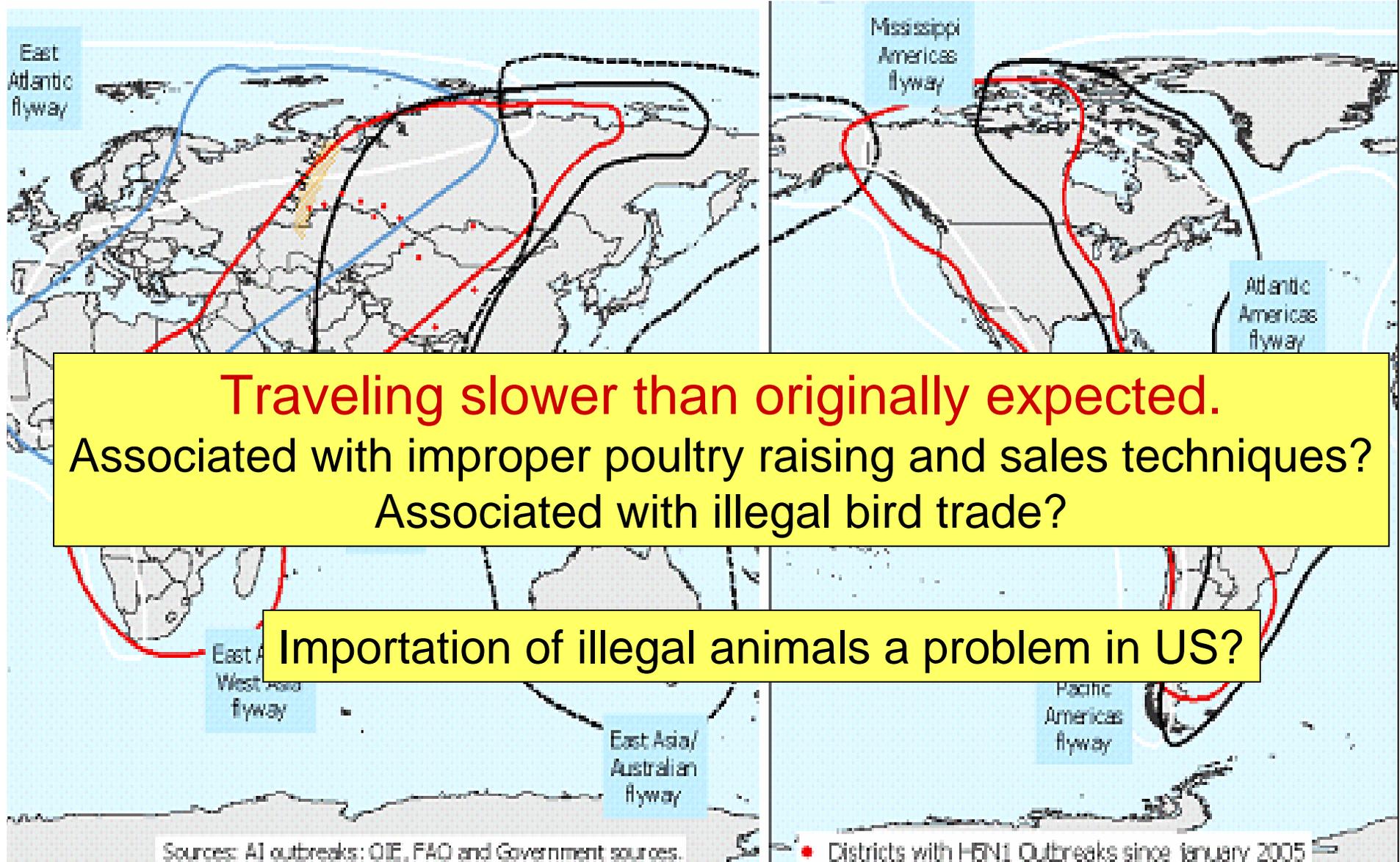
Ongoing reservoir in wild birds.

Migratory patterns make the spread of A (H5N1) to the US inevitable.



## H5N1 outbreaks in 2005 and major flyways of migratory birds

Situation on 30 August 2005



Los Angeles Times

# CALIFORNIA

LOS ANGELES EDITION

Tuesday, September 19, 2006

latimes.com/californ

## Man Arrested for Allegedly Smuggling Rare Asian Cats

By MAEVE RESTON  
AND BOB POOL  
*Times Staff Writers*

His buddy was in line with the flea-scratching pygmy monkeys stuffed in his underwear.

But Chris Edward Mulloy was the one with the sudden itch to flee as he watched his friend being searched by customs upon their arrival in Los Angeles from Indonesia in 2002.

When one of four smuggled birds of paradise fluttered out of his friend's bag and began swooping over the heads of startled incoming passengers at Los Angeles International Airport, Mulloy took advantage of the confusion to duck out of line and flee the Tom Bradley International Terminal, authorities con-

tend.

Hidden in his own backpack, authorities say, were two protected Asian leopard newborns that authorities now allege Mulloy was trying to sneak into this country illegally.

On Monday, federal officials arrested Mulloy, 45, in Palm Springs. Hours later, a federal judge ordered his arraignment next week on four counts of smuggling, fraudulently concealing a protected species and lying to the U.S. Fish and Wildlife Service and U.S. Customs officials.

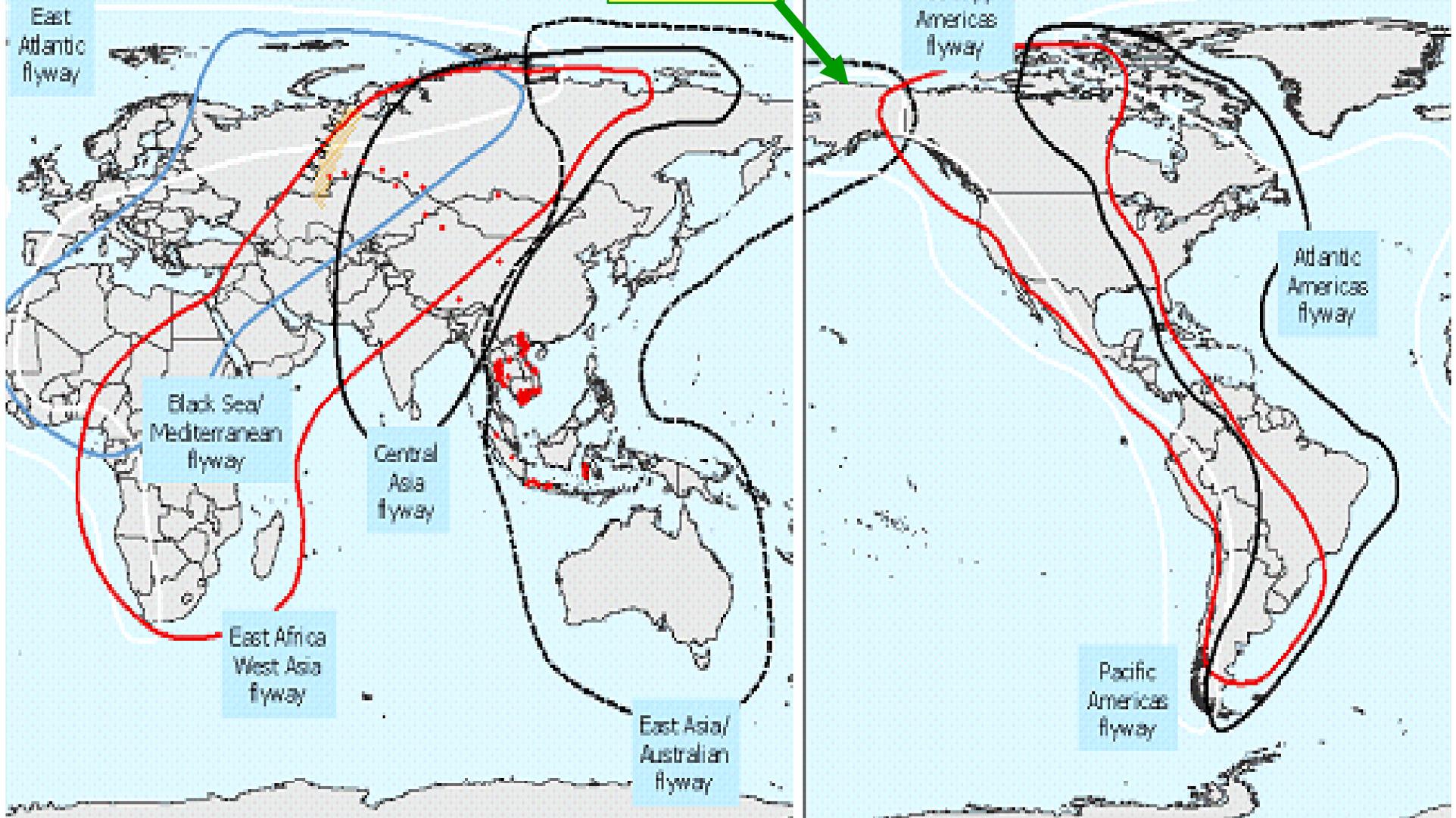
Authorities did not explain why the arrest and court appearance came more than four years after the LAX incident — and three years after his monkey-  
[See Cats, Page B9]



# H5N1 outbreaks in 2005 and major flyways of migratory birds

Situation on 30 August 2005

Alaska

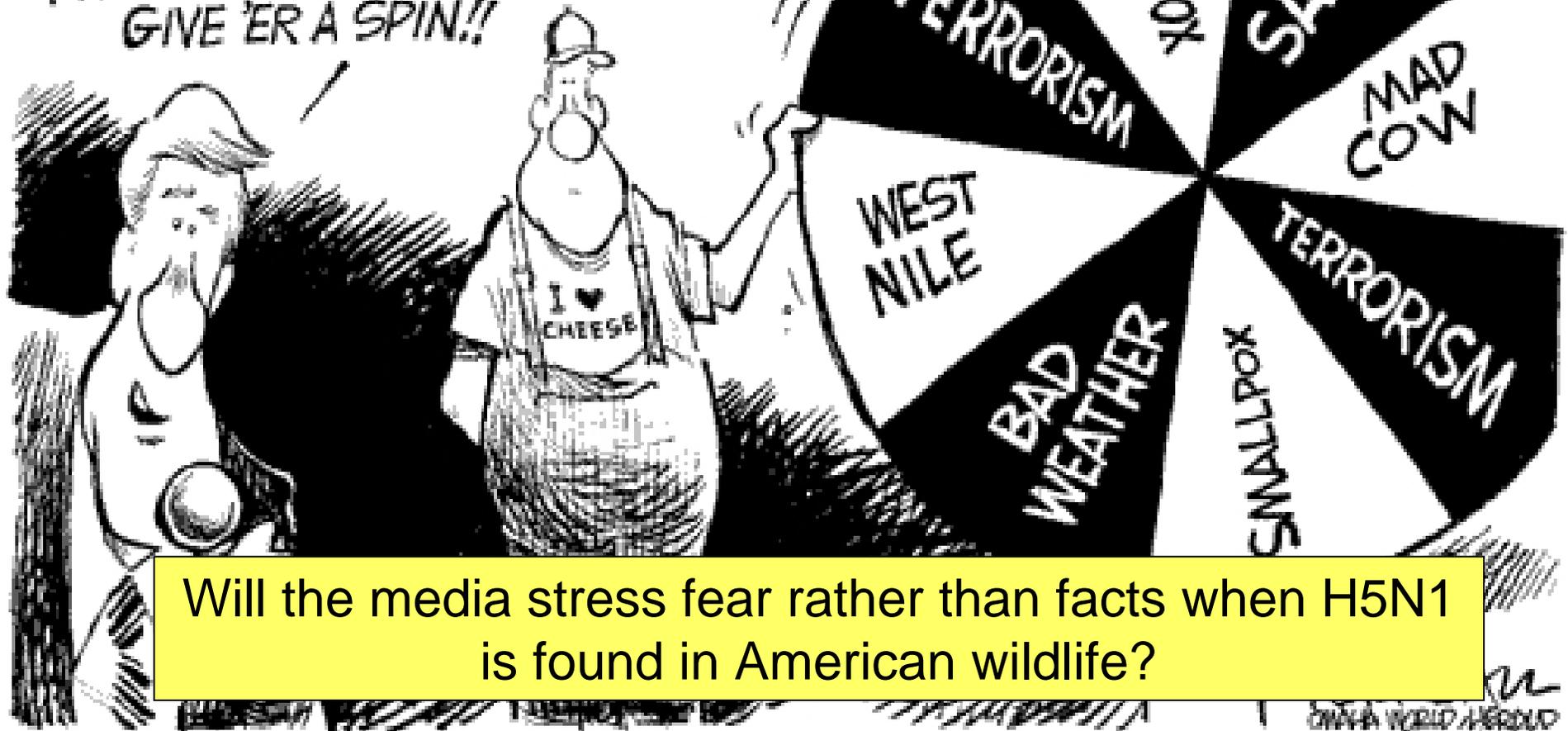


Sources: All outbreaks: OIE, FAO and Government sources.

• Districts with H5N1 Outbreaks since January 2005

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EVERYONE'S LEAST FAVORITE  
GAME... FEAR OF THE WEEK!

TODAY, WE WELCOME JOHN  
SMIDDLESDORF, A DAIRY FARMER  
FROM WISCONSIN... JOHN,  
GIVE 'ER A SPIN!!



Will the media stress fear rather than facts when H5N1 is found in American wildlife?



RICK LOOMIS Los Angeles Times

**NATIVE HUNTER:** Ronnie Peter carries food for his family in Kipnuk, Alaska, which is at the crossroads of an invisible freeway system for migratory birds. Local hunters are providing fowl for H5N1 testing.

# Alaska villagers living in bird flu's flight path

What has brought the Eskimos sustenance for generations now may carry the deadly virus into North America.

By JIA-RUI CHONG  
Times Staff Writer

**T**HE 800 YUP'IK ESKIMOS in this wet and lonely village knew the situation was serious when government scientists began swooping in on bush planes.

Except for a few doctors that fly in each year to give villagers checkups, outsiders rarely visited this outpost of scattered gray plywood homes and prefab structures plopped in the middle of the tundra.

Soon, latex gloves appeared on store shelves and Wild West-style posters started popping up around town: "Wanted: Birds of the Delta." Researchers camped out in the town's tribal council offices, preparing for trips to nearby Kwigluk Island with vials, swabs, nets and needles.

They came bearing a warning: The wild birds that the Yup'ik

Kipnuk, Alaska

"That's like, our food, you know."

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"If it's going to show up in wild birds, Alaska is the most likely place where it's going to happen," said Brian McCaffery, a federal wildlife biologist who was camped a few miles down the coast

**Los Angeles Times**  
(Sunday, October 22, 2006)



## Bird flu basics

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### Why are we NOT concerned about A (H5N1)?

Ongoing human infection with A (H5N1).

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Occurring in countries with poor protective measures.

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No (very rare) human-to-human transmission.



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### **Los Angeles Times**

(April 6, 2006)

## Bird flu and Chicken Littles

The science may not support public health officials' dire predictions.

By Marc Siegel

**I**S BIRD FLU going to transform itself into a massive killer of humans? Or is it simply going to fade

Dr. David Swayne, director of the Southeast Poultry Laboratory at the U.S. Department of Agriculture, has worked on avian influenza for many years. He takes all highly pathogenic bird flus seriously, including H5N1, but he feels they can most often be controlled. Swayne told me that H5N1 might still be eradicated in birds with the help of "better diagnostic tools and improved strategies to protect birds from infection."



## Bird flu basics

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Why are we NOT concerned about A (H5N1)?

No (very rare) human-to-human transmission.

No human or bird cases in the United States.

Even when does arrive.....

- unlikely to affect our food supply;
- human infection from wild birds also unlikely.

While there have been human cases,  
human cases are still very rare/uncommon.

Human infection possibly due to genetic disposition?

bird flu DOES NOT = pandemic flu

If not A (H5N1), then another? .....Maybe.....



AP

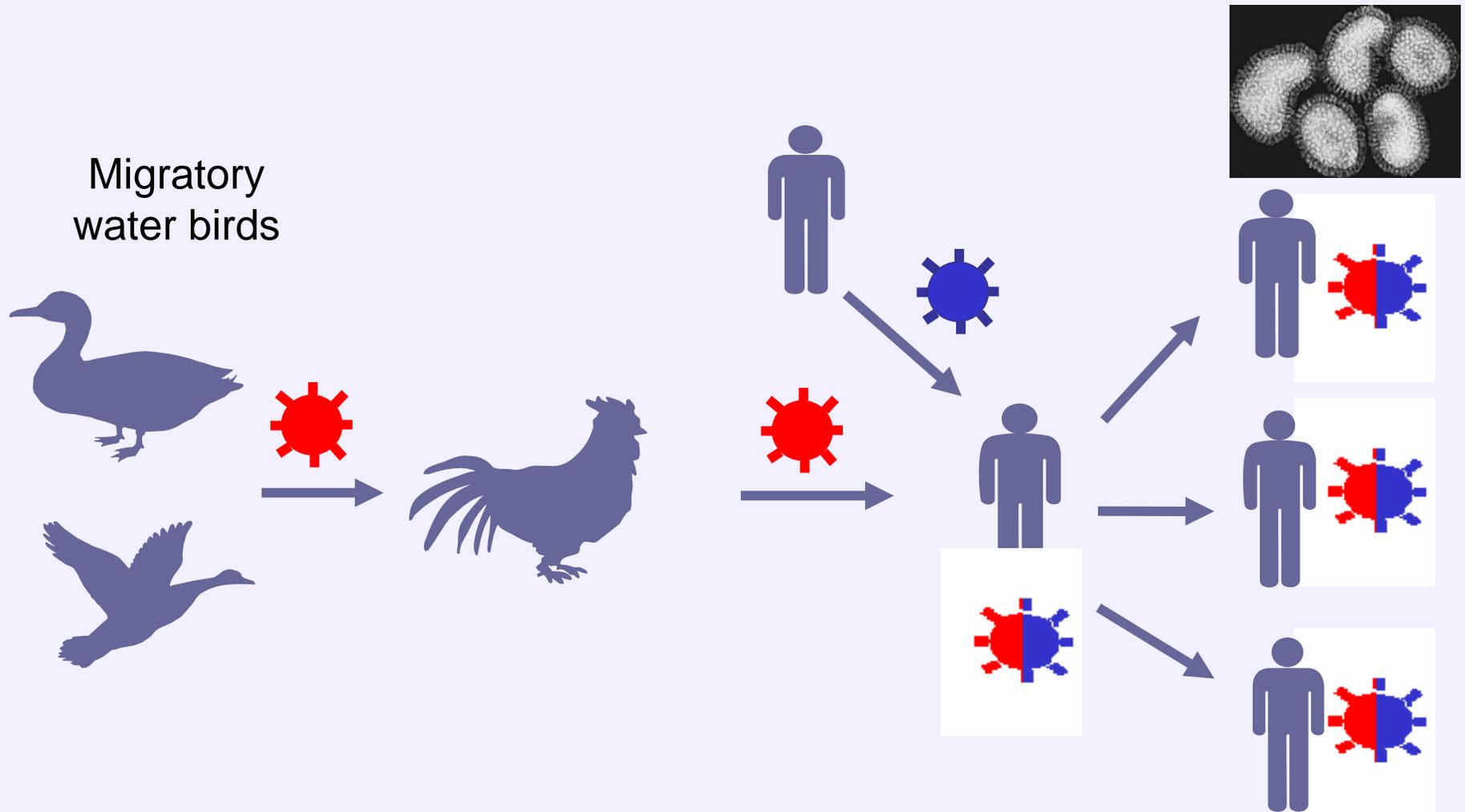


Health

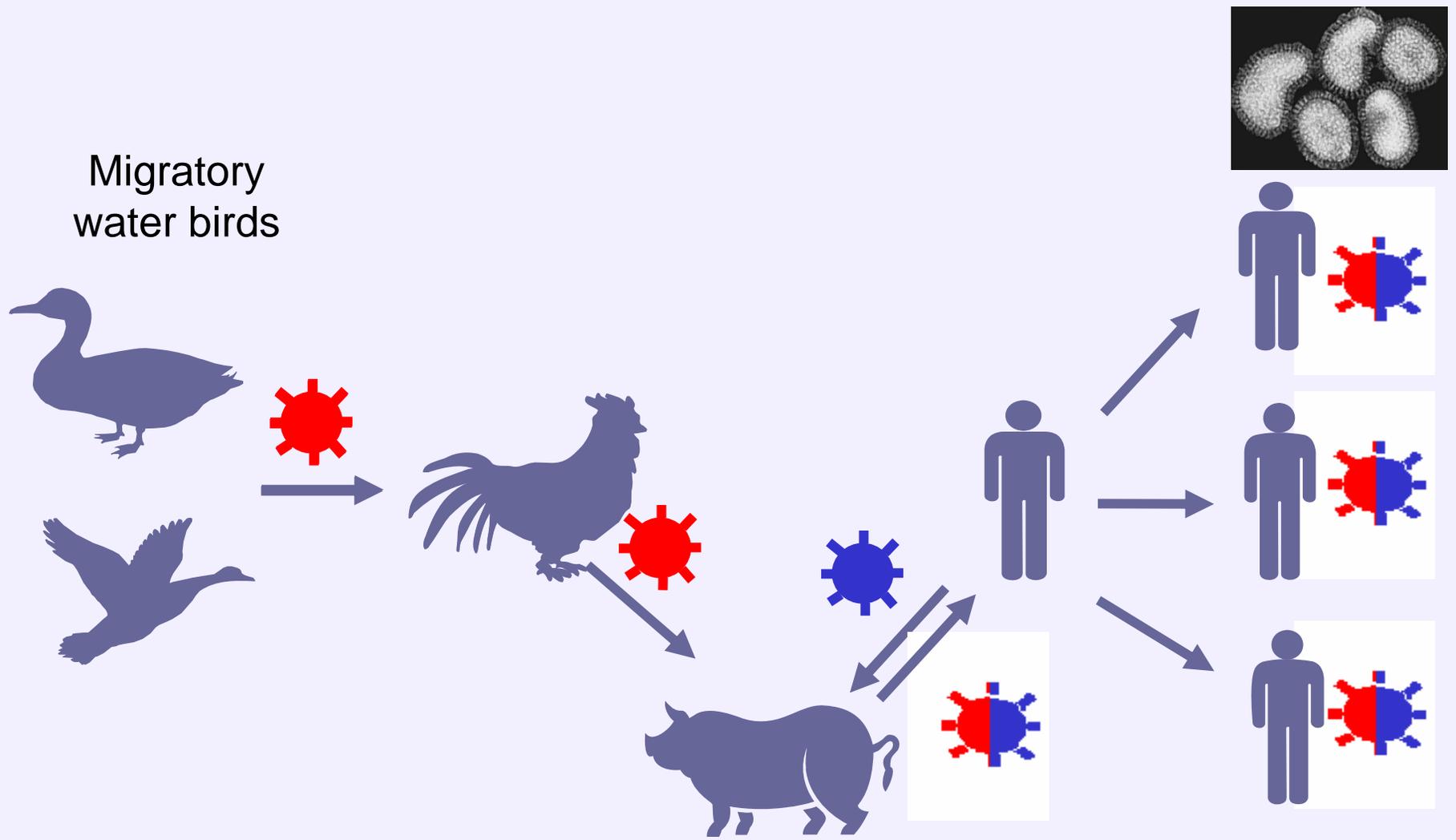




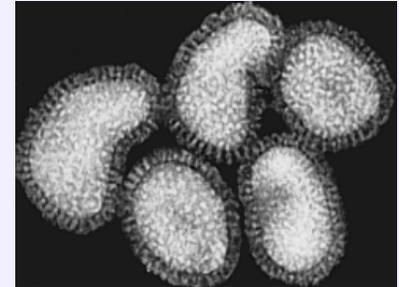
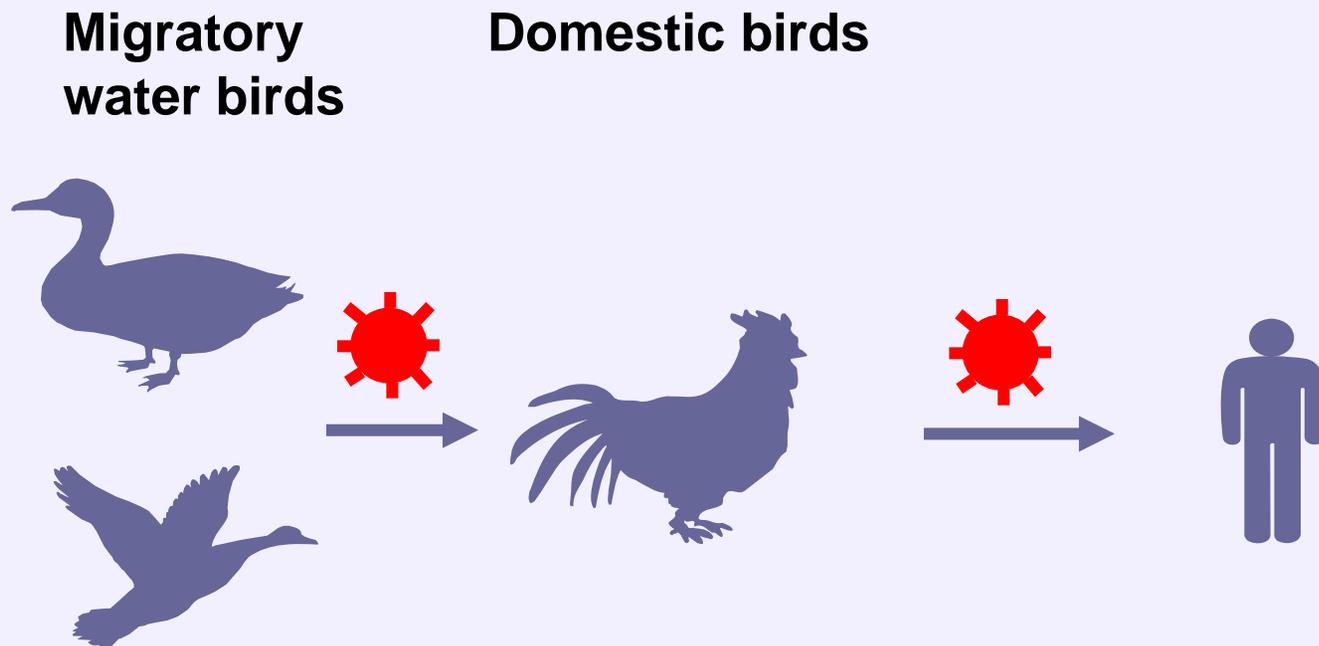
# PANDEMIC STRAIN REASSORTMENT IN HUMANS



# PANDEMIC STRAIN REASSORTMENT IN PIG



# AVIAN INFLUENZA FROM BIRDS TO HUMANS



- Hong Kong 1997, H5N1
- HK, China 1999, H9N2
- Netherlands 2003, H7N7
- Hong Kong 2003, H5N1
- Viet Nam and Thailand, 2004 H5N1

Many reports of transmission of animal influenza viruses that do NOT result in pandemics.

# Pandemic Influenza





# Pandemic Flu Basics

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Pandemic = worldwide illness

Requires many aspects:

- efficient person-to-person spread

- little to no existing immunity in the population

- results in increased mortality morbidity in the young/healthy

These are inevitable: naturally recur in cyclical intervals

- we are “past due” for the next pandemic

- its ultimate onset (when?) and severity is unknown

# INFLUENZA PANDEMICS

## 20<sup>TH</sup> CENTURY

unique situation



1918: “Spanish Flu”

A(H1N1)

20-40 m deaths

675,000 US deaths



1957: “Asian Flu”

A(H2N2)

1-4 m deaths

70,000 US deaths



1968: “Hong Kong Flu”

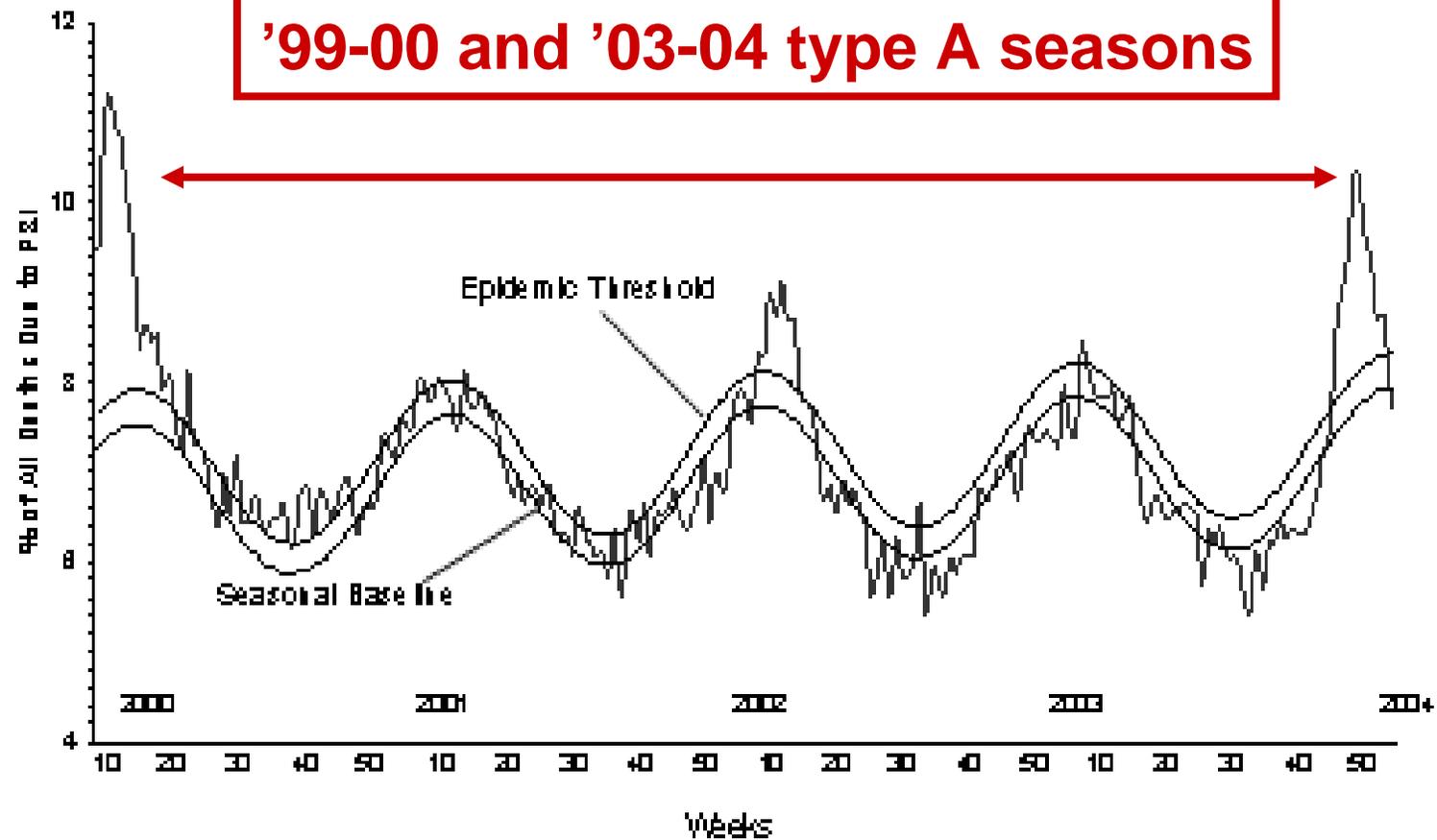
A(H3N2)

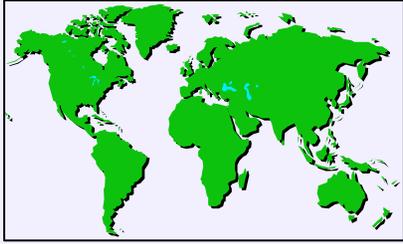
1-4 m deaths

34,000 US deaths

# Pneumonia and Influenza Mortality for 122 U.S. Cities Week Ending 02/28/2004

'99-00 and '03-04 type A seasons





# Pandemic Flu Basics

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“The pandemic influenza clock is ticking.  
We just don’t know what time it is.”

# WHO Pandemic Phases



Phase 1: Interpandemic Period  
No new human viruses.  
Low risk of human cases.

Phase 2: Interpandemic Period  
New virus in animals, no human cases.  
Increased, still low risk of human cases.

Phase 3: Pandemic Alert Period  
Human infections with a new subtype;  
But no (or very rare) human-to-human spread.

Phase 4: Pandemic Alert Period  
Small clusters of human-to-human transmission;  
Virus adapted to human, but spread is localized.

Phase 5: Pandemic Alert Period  
LARGE clusters of human-to-human transmission;  
But spread is still localized.

Phase 6: **PANDEMIC**  
Increased and sustained transmsission;  
Throughout the general population.

# Comparison Table (Handout)

Seasonal

Avian A (H5N1)

Pandemic

4. There are **MANY** uncertainties.  
No vaccine, antivirals questionable.  
Pandemics affect everyone.

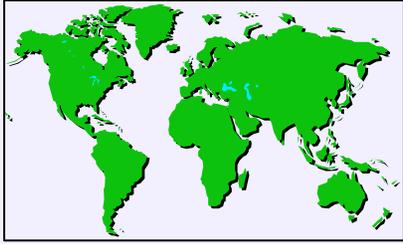
# What is NOT uncertain?

It is unlikely that disease transmission will be limited to the place or origin... or easily contained.

Because of rapid transmission, assistance from multiple jurisdictions is also unlikely.

Spread through the population will occur in several waves; will likely cause fatigue on the system (i.e., maintaining recommendations, etc.).

Even a mild pandemic can be potentially economically devastating.

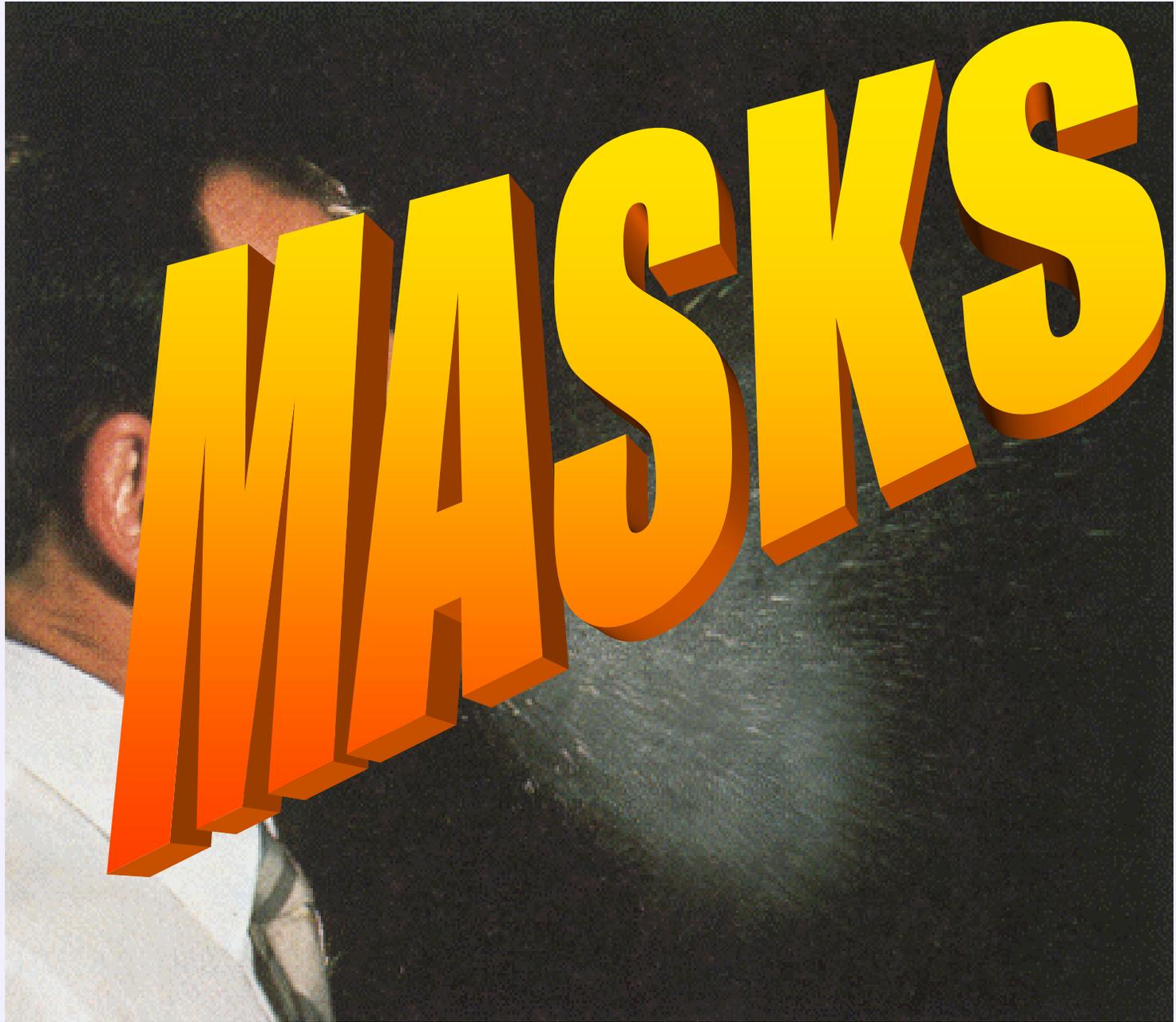


## Pandemic Flu

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# Frequently Asked Questions

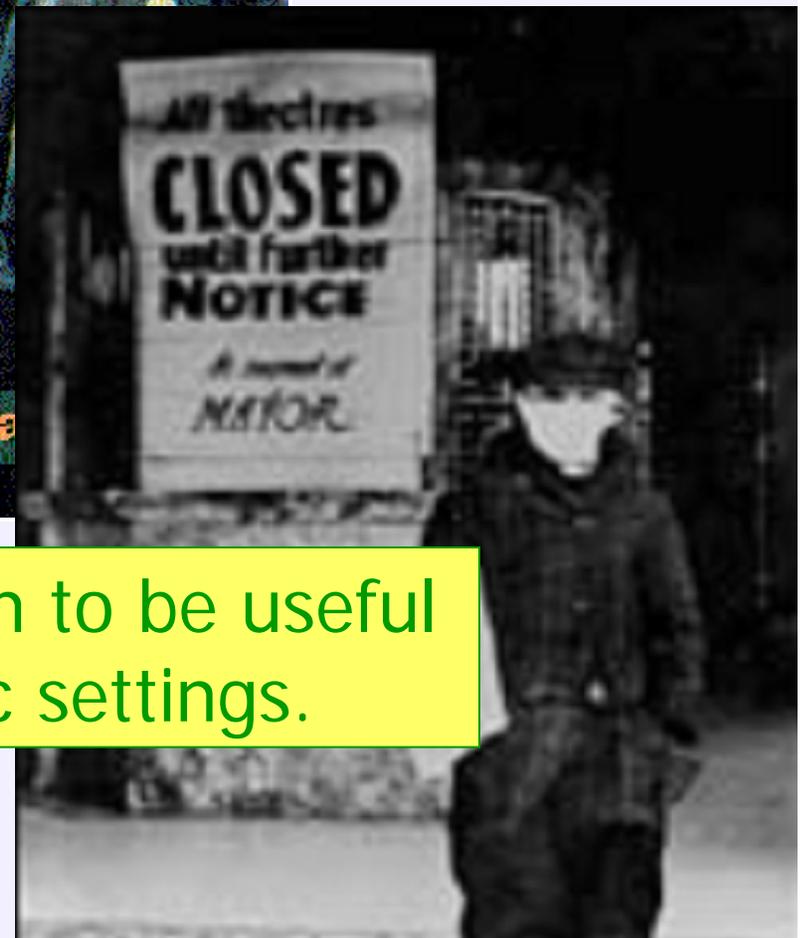
4 major questions 6 months ago...  
Same 4 questions now!







Masks have NOT been shown to be useful in preventing flu in public settings.



## The problem with masks for public prevention of flu.

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Were not helpful during 1918 pandemic.  
Were not recommended during the SARS pandemic.

- Flu virus can be transmitted prior to developing symptoms.
- Typically not worn properly.
- Lead to lapses in other effective methods of disease prevention (washing hands, social distancing).

Cause a false sense of security.

## Type of mask? N95 better?

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- Especially not likely to be worn properly.
- Virus not typically aerosolized; only recommended for those special circumstances (intubating patients).

## Masks ARE recommended for medical settings.

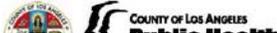
In medical settings, the use of masks is part of their OVERALL system of infection control.

Standard surgical masks for symptomatic patients to apply before entering healthcare facilities.

Are you coughing? Do you have a fever?  
Sneezing? A rash?



**Please put on a mask.**  
Protect the health of others and our staff  
in the waiting room.



**Isolation:** separating ill from well

**Quarantine:** separating exposed from well

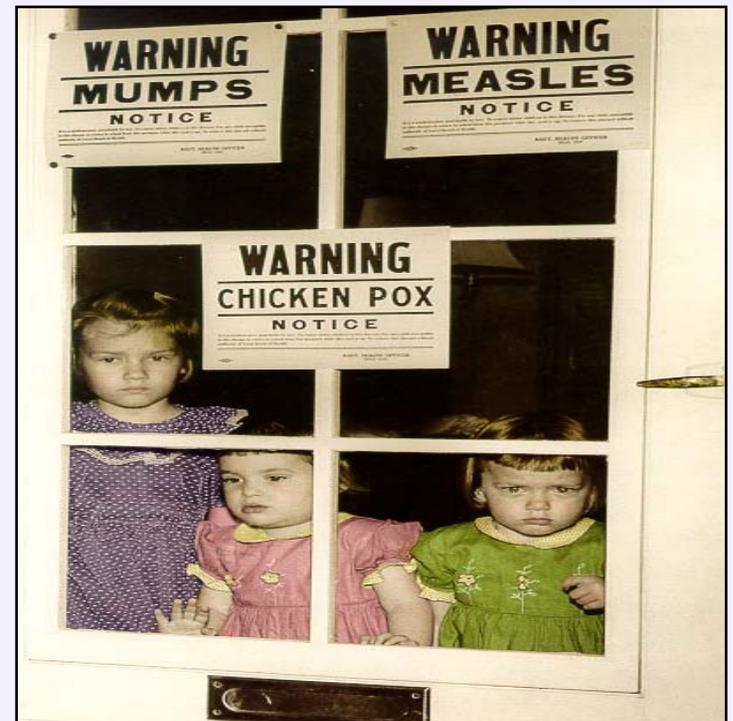
Possible/practical for flu?

Flu can be transmitted before development of symptoms...

Who is ill? Who has been exposed?

Isolation (cohorting the sick) is a critical step for infection control in medical settings (hospitals and nursing homes).

Possible on college campuses?





# Antivirals

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Effectiveness of antivirals for pan flu is unknown!

- Waiting for a mutation, so type/strain/attributes are unknown.
- Seasonal strains showing resistance.

Antivirals **will not** be useful for community-wide prophylaxis (prevention).

- The duration (start/stop time) would be atypical or unknown.
- The duration would be longer than typically recommended.

Pandemics last for months; prolonged treatment is not feasible and the consequences/side effects for long-term dosage are unknown!

Indiscriminate use and overuse will lead to viral resistance.

Focus on use in critical medical situations.



# School Closures

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When? How long? How will schools be notified?

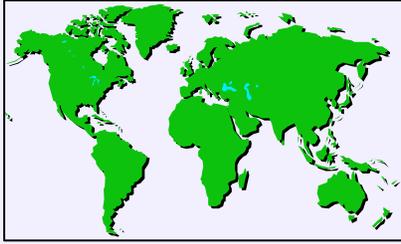
These issues have not been resolved.

Effectiveness of school closures for pan flu is unknown!

For infection control, requires students will not congregate elsewhere; which is unlikely.

More likely is absenteeism (both students and staff) dictating when schools close.

Preparation (for all emergencies) is essential.



# Pandemic Flu **PLANNING**

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Is business ready for pandemic flu? (NY Times)

Can your organization survive with a depleted workforce?

- imagine activities if 40% out sick
- can employees work out of their home?

How reliable are your contingency plans?

Can your organization continue to provide vital services?

- if your office(s) closed today, could business still function?
- are responsibilities handled by multiple people, duplication of roles?
- to what extent are responsibilities/needs outsourced and how reliable are those others?

How does your organization currently handle infection control?

- are ill staff discouraged from coming to work?
- is vaccination and good health encouraged?



# Pandemic Flu **PLANNING**

Are pre-existing plans available?

[www.pandemicflu.gov](http://www.pandemicflu.gov)

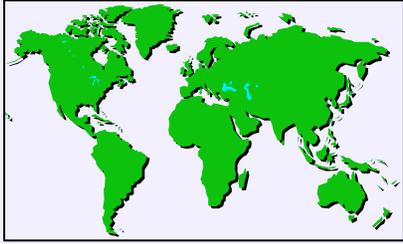
## **Pandemic Flu Planning Checklist for Individuals & Families**



You can prepare for an influenza pandemic now. You should know both the magnitude of what can happen during a pandemic outbreak and what actions you can take to help lessen the impact of an influenza pandemic on you and your family. This checklist will help you gather the information and resources you may need in case of a flu pandemic.

### ***1. To plan for a pandemic:***

- Store a two week supply of water and food. During a pandemic, if you cannot get to a store, or if stores are out of supplies, it will be important for you to have extra supplies on hand. This can be useful in other types of emergencies, such as power outages and disasters.
- Ask your doctor and insurance company if you can get an extra supply of your regular prescription drugs.
- Have nonprescription drugs and other health supplies on hand, including pain relievers, stomach remedies, cough and cold medicines, fluids with electrolytes, and



# Pandemic Flu **PLANNING**

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## Other preparations YOU can do...

Spread facts not fear.

Promote good health.

Get vaccinated for seasonal influenza.

Get or encourage pneumococcal vaccination.

Teach good hygiene to your friends and family.

Don't go out if you're sick!  
Practice social distancing.



# Pandemic Flu **PLANNING**

**LOS ANGELES EDITION**

**Daily News**

WEATHER: Partly sunny, High: 64-70, Low: 42-50, Back of Business

Online: [dailynews.com](http://dailynews.com) THURSDAY, DECEMBER 27, 2001 50 Cent

## So where's the flu?

By Harrison Sheppard  
*Staff Writer*

At what is supposed to be the peak of flu season, influenza has yet to hit Los Angeles County, with confirmed cases at their lowest level in at least a decade, health officials said Wednesday. The trend is similar across the state and the nation, where, despite some experts' predictions of an early and heavy flu season, the bug has been a virtual no-show so far.

"Where is it?" asked Dr. David Dassey, deputy chief of acute communicable disease control with the Los Angeles County health department.

"Clearly, by this time virtually every year we're in the midst of pretty substantial respiratory disease, of which influenza is the big one. At the moment, there's nothing going on."

The reasons are unknown, officials say, and the speculation runs from greater public awareness of diseases and viruses after the anthrax scare to less travel as a result of the Sept. 11 attacks. But there are still at least two months left in the flu season and Dassey noted that the virus could easily strike any time through the end of February.

Doctors at local hospitals report they are still busy handling other types of respiratory illness and other viruses that mimic flu symptoms, although they are no more busy than in a typical winter.

"Most people are coming in with coughs and colds and viral respiratory infections, but they're not having any true flus yet," said Dr. Erin Wycoff with Kaiser Permanente's Panorama City.

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# Pandemic Flu **SUMMARY**

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## The Good, The Bad, and The Ugly

### GOOD

People/Govt./businesses are motivated to take action and prepare.

SARS and Katrina – warning and lessons learned.

Govt. is committing lots of \$ to this pending problem.

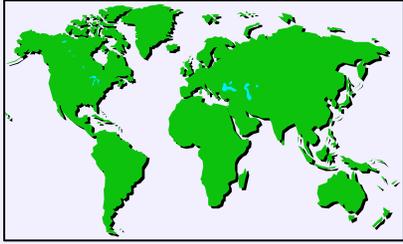
Scientists and medical corps. working hard to develop new and better vaccines and antivirals.

Our ability to identify/classify a new virus is very rapid.

### BAD

We're currently NOT prepared.

Govt., scientific and community agencies...  
as well as individuals and families (we live day-to-day).



# Pandemic Flu **SUMMARY**

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## The Good, The Bad, and The Ugly

### UGLY

There are many complicated factors that suggest that the impact of pandemic flu would be great if not devastating.

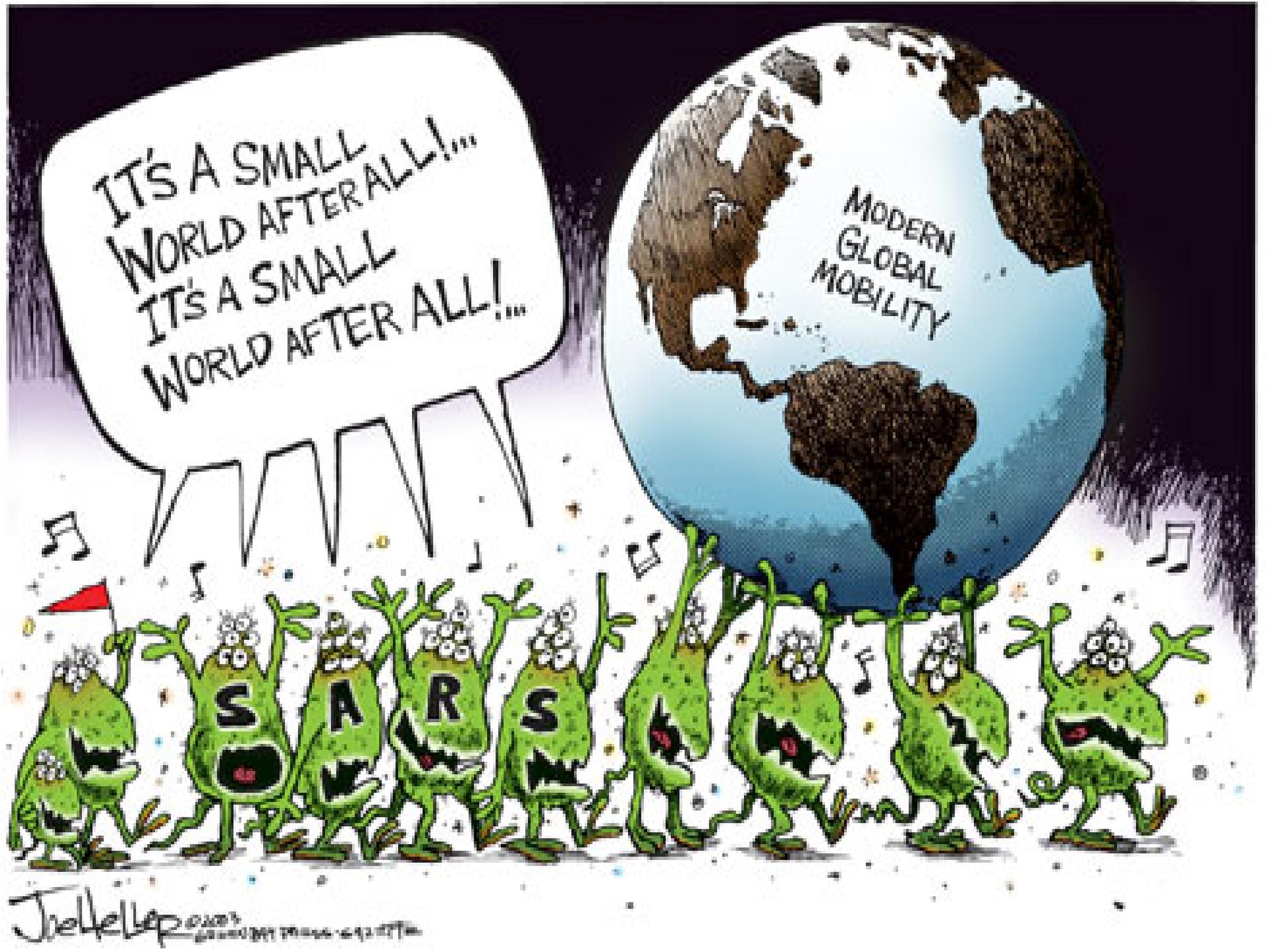
Vaccine production still a 1950's model.

Would take many months to develop and distribute.

Antivirals are becoming ineffective. Only four types currently available and several seasonal flu strains are already showing resistance.

We live in a global community.

As SARS demonstrated, the global spread would be VERY rapid and there will be numerous focal points over a short period of time.



IT'S A SMALL  
WORLD AFTER ALL!...  
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WORLD AFTER ALL!...

MODERN  
GLOBAL  
MOBILITY

SARS

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Sadina Reynaldo, PhD

Acute Communicable Disease Control  
Los Angeles County Dept. of Public Health



Pandemic Influenza Review  
Public Health Best Practices