

*Avian Flu Preparedness
in Refugee and Migrant Community Workshop
27 January 2006, Tak*

Avian Influenza: An update

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What will be presented

- The problem (focus on human H5N1 pandemic risk)
- The past Pandemics
- Pandemic Preparedness Plan
- Where to get more information



Haemagglutinin subtypes			Neuraminidase subtypes		
H1		N1			
H2		N2			
H3		N3			
H4		N4			
H5		N5			
H6		N6			
H7		N7			
H8		N8			
H9		N9			
H10					
H11					
H12					
H13					
H14					
H15					

Subtypes of Influenza A Virus

- Many subtypes (H and N)

- 3 subtypes have caused human epidemics

- H1N1

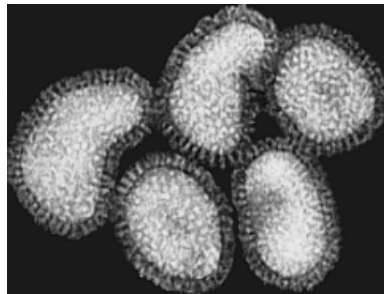
- H2N2

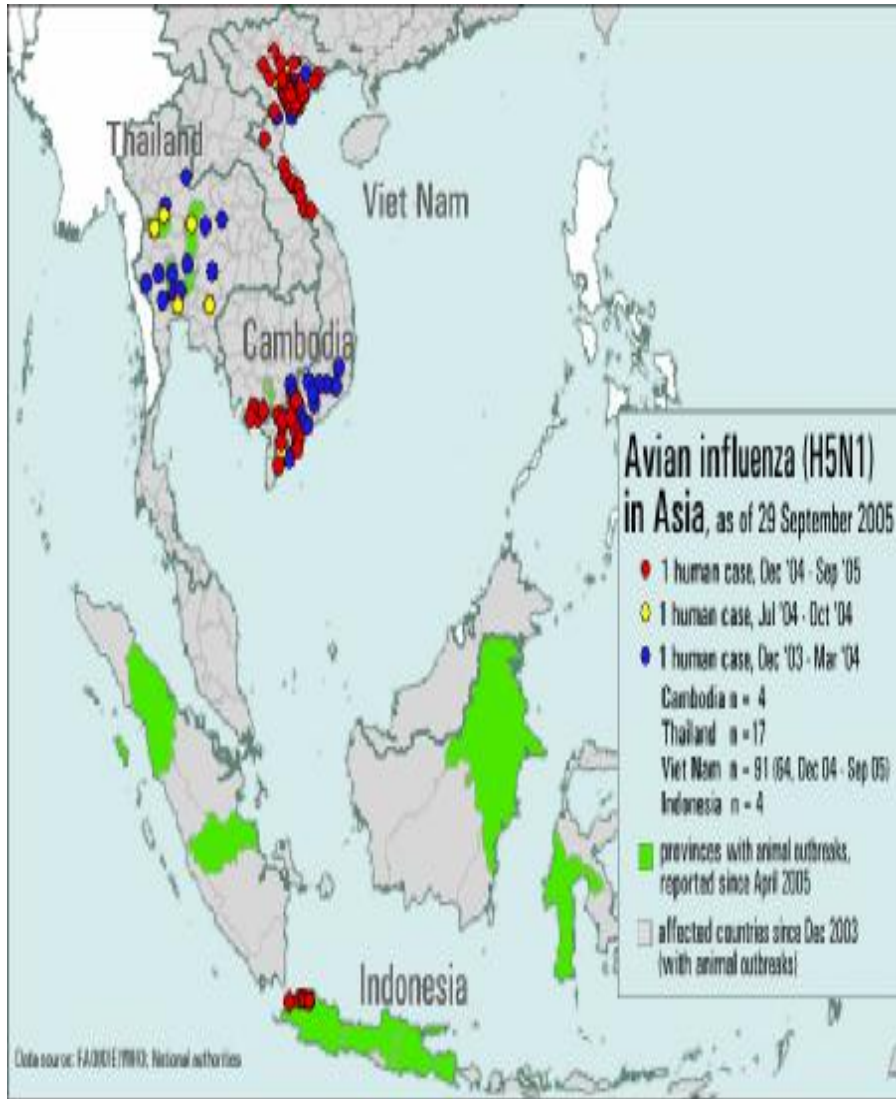
- H3N2


(Karl G Nicholson, et al Lancet 2003; 362: 1733-45)



The current outbreak of H5N1





 Disclaimer: The presentation of material on the maps contained herein does not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or areas or its authorities or its frontiers or boundaries.

1. Human cases of H5N1 avian influenza since Dec 2003 (as of 25 Jan 2006)

Country	Cases / Deaths
Vietnam	93 / 42
Thailand	22 / 14
Cambodia	4 / 4
Indonesia	19 / 14
China	10 / 7
Turkey	4/2
Total	152 / 83

2. Cluster of cases in same family

- Vietnam
- Thailand
- Cambodia
- Indonesia

Clusters of H5N1 human cases

Ha Nam, VTN

- 12y Daughter, Onset: 25/Dec 03
- 30y Mother, Onset: 01/Jan 04
- Mother took care of her daughter
- 1st reported cases Dec 03

Quang Binh, VTN

- 13y Sister died on 9/Mar 05
- ?y Aunt, Onset?(05)
- 5y Brother Admit on 15/Mar, Onset?
- There were dead poultry around their residence recently.

Sukhothai, THA

- 6y Son, Onset: unknown (04)
- ?y Mother, Onset: same day as above
- Mother slaughtered 2 ill chickens in house 4 days before onset

Kamphaeng Phet, THA

- 11y Daughter Onset 2/Sep 04
- 26y Mother Onset 11/Sep 04
- 32y Aunt Onset 16/Sep/04
- Daughter and Aunt live in the same household
- Mother took care of the sick Daughter
- NEJM publication 27 Jan 2005

Kampot, CAM

- 25y Sister Onset: 26/Jan 05
- 14y Brother Onset: 20/Jan 05
- 25y sister didn't have a contact with sick brother except cleaning body for funeral

Dong Thap, VTN

- 35y Mother Onset 14/Jan 05
- 13y Daughter Onset 20/Jan 05
- They slaughtered an infected duck for meal

Nam Dinh, VTN

- 7y Sister, Onset: ?
- 5y Brother, Onset: 29/Dec 03

Hai Phong, VTN

- 35y Father, 33y Mother, 13y Daughter, 10y Daughter, 4mo Daughter
- They all: Admitted 22/Mar 2005, onset?
- They kept poultry and mass deaths began in Mar 2005

Thai Binh, VTN

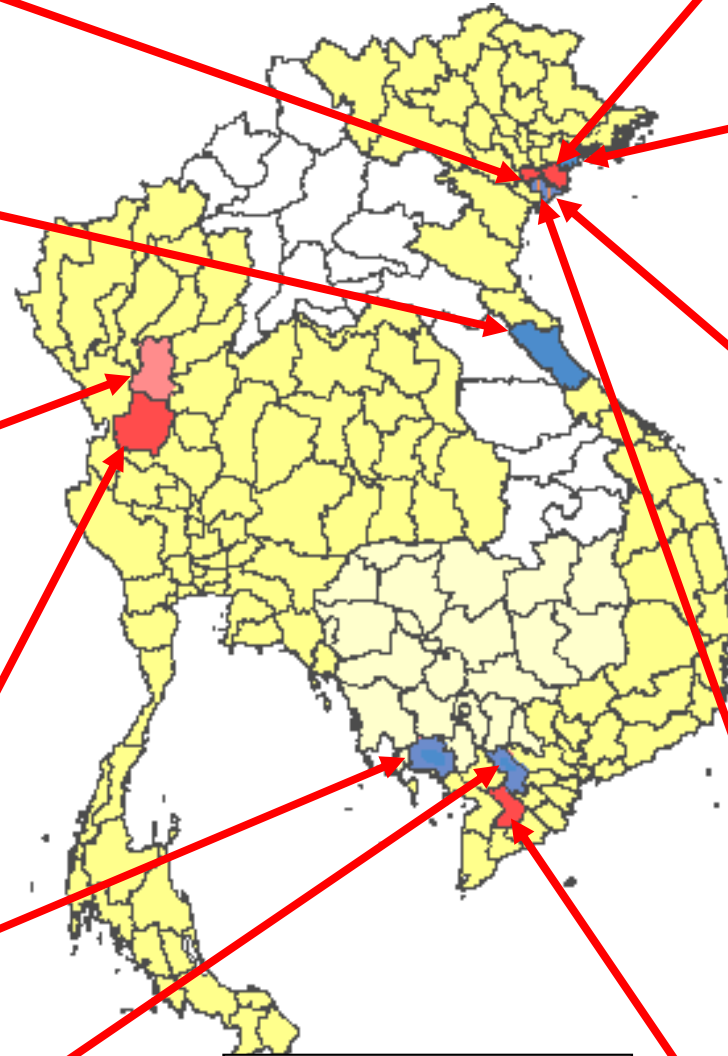
- 31y Brother, Onset: 03/Jan 04
- 30y Sister, Onset: 10/Jan 04
- 23y Sister, Onset: 10/Jan 04
- Duck exposure for brother
- Two sisters took care of sick brother

Thai Binh, VTN 3 clusters

- 46y Brother, Onset: 5/Jan 05
- 42y Brother, Onset: 10/Jan 05
(took care of the older brother in ICU)
- 36y Brother, asymptomatic
- They ate duck blood pudding
- 21y Brother, Onset: 14/Feb 05
- 14y Sister, Onset: 21/Feb 05
- 26y M Nurse, Onset: 24/Feb 05
(took care of the 21y brother)
- 21y M and 14y F were related to slaughtering or eating poultry
- 26y M visited a village where poultry cases were present
- 69y Husband, Onset: 19/Feb 05
- 61y Wife, Positive for H5N1: 9/Mar 05
- One media reported 61y F slaughtered They but other reported she didn't

Hau Giang, VTN

- 19y Brother, Onset: 27/Jul 04
- 25y Sister Onset: 05/Aug 04
- The sister took care of the sick brother
- Apparent contact with ducklings



Dec 03-Oct 04



Dec 04-Mar 05

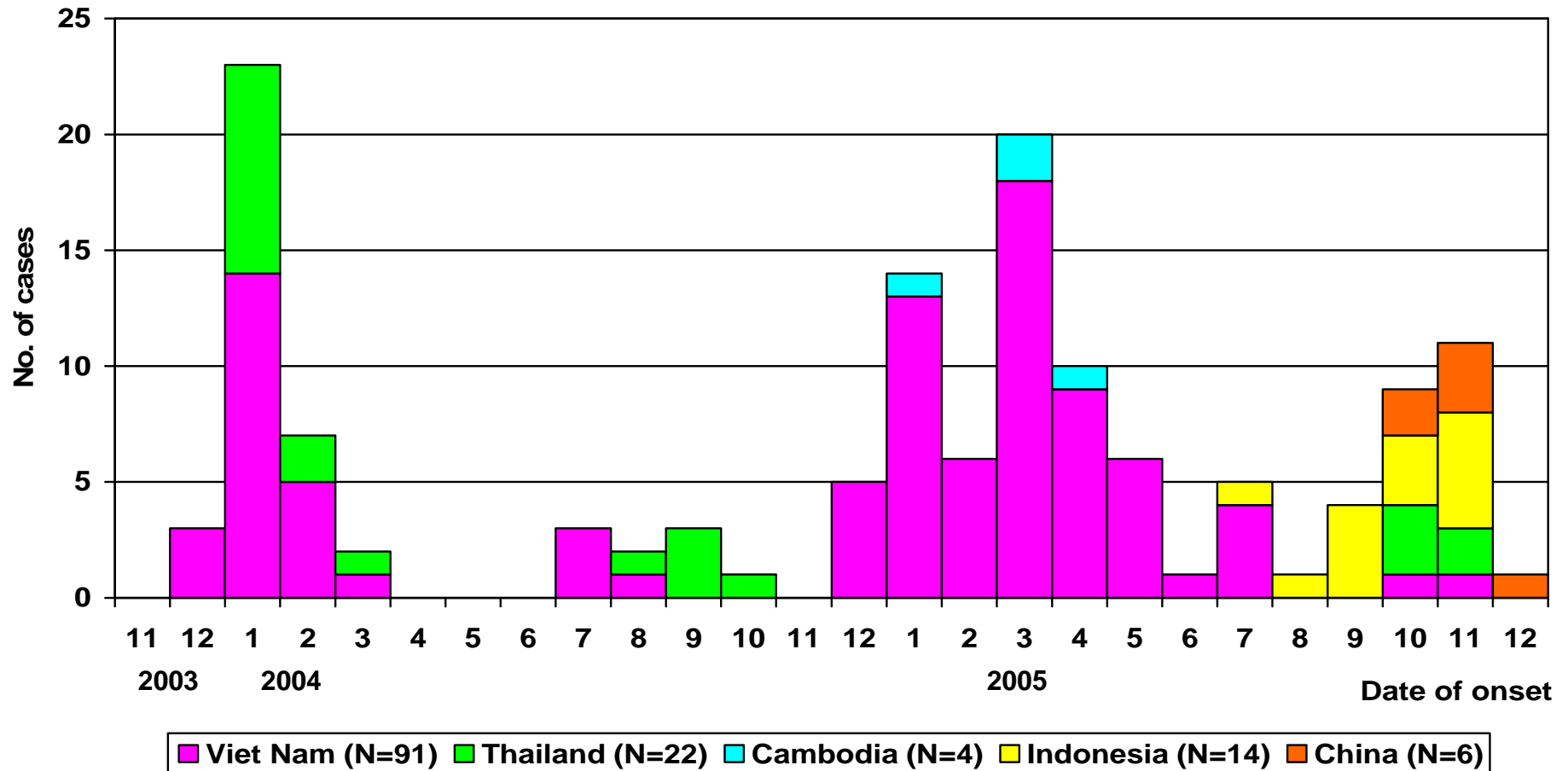
Underlined: confirmed case

World
Communicable Dis

ase

Human Avian Influenza A/H5N1 Cases by Onset Date and Country

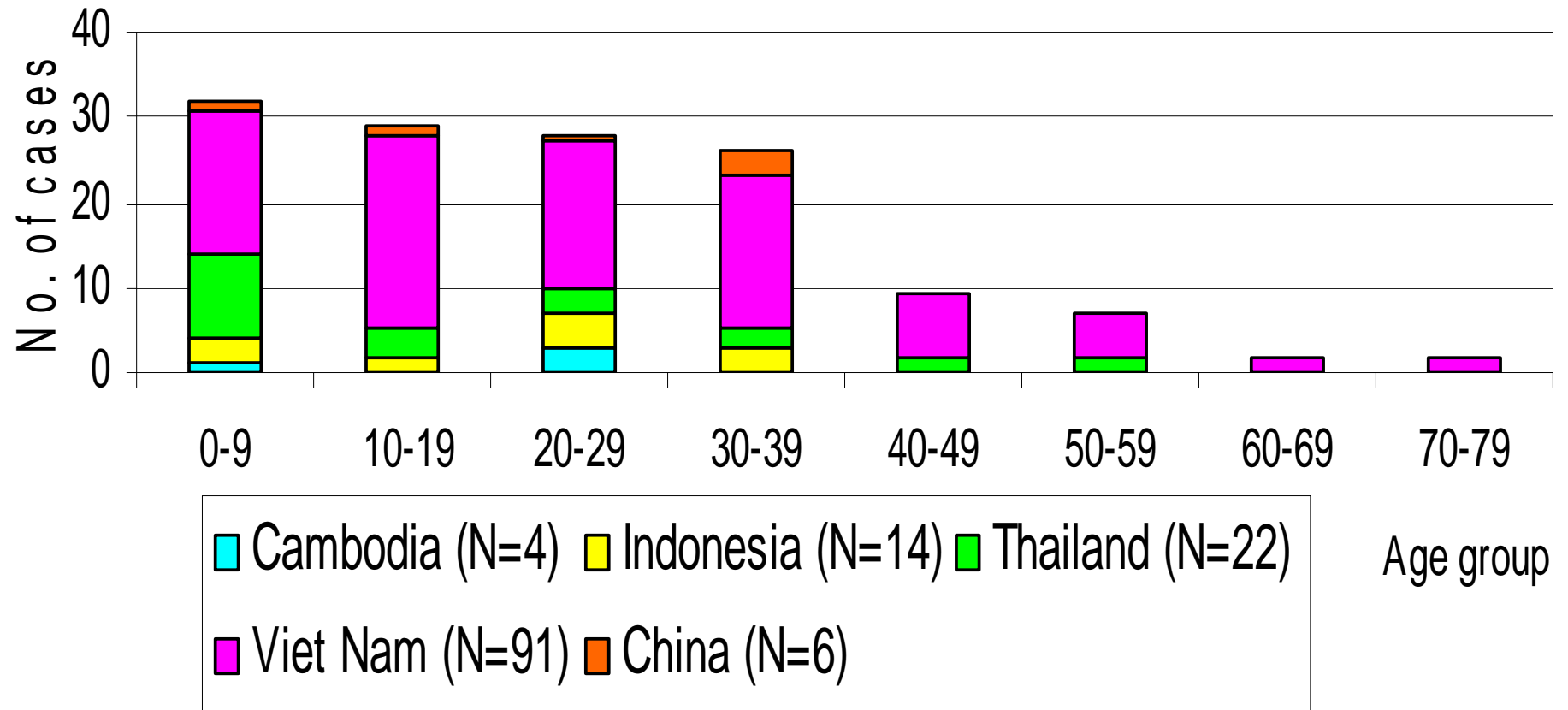
(16 December 2005)



- As of 16 December, total of 139 cases were reported officially to WHO
- 137 cases with available data for date of onset were included

Human Avian Influenza A/H5N1 Cases by Age Group and Country

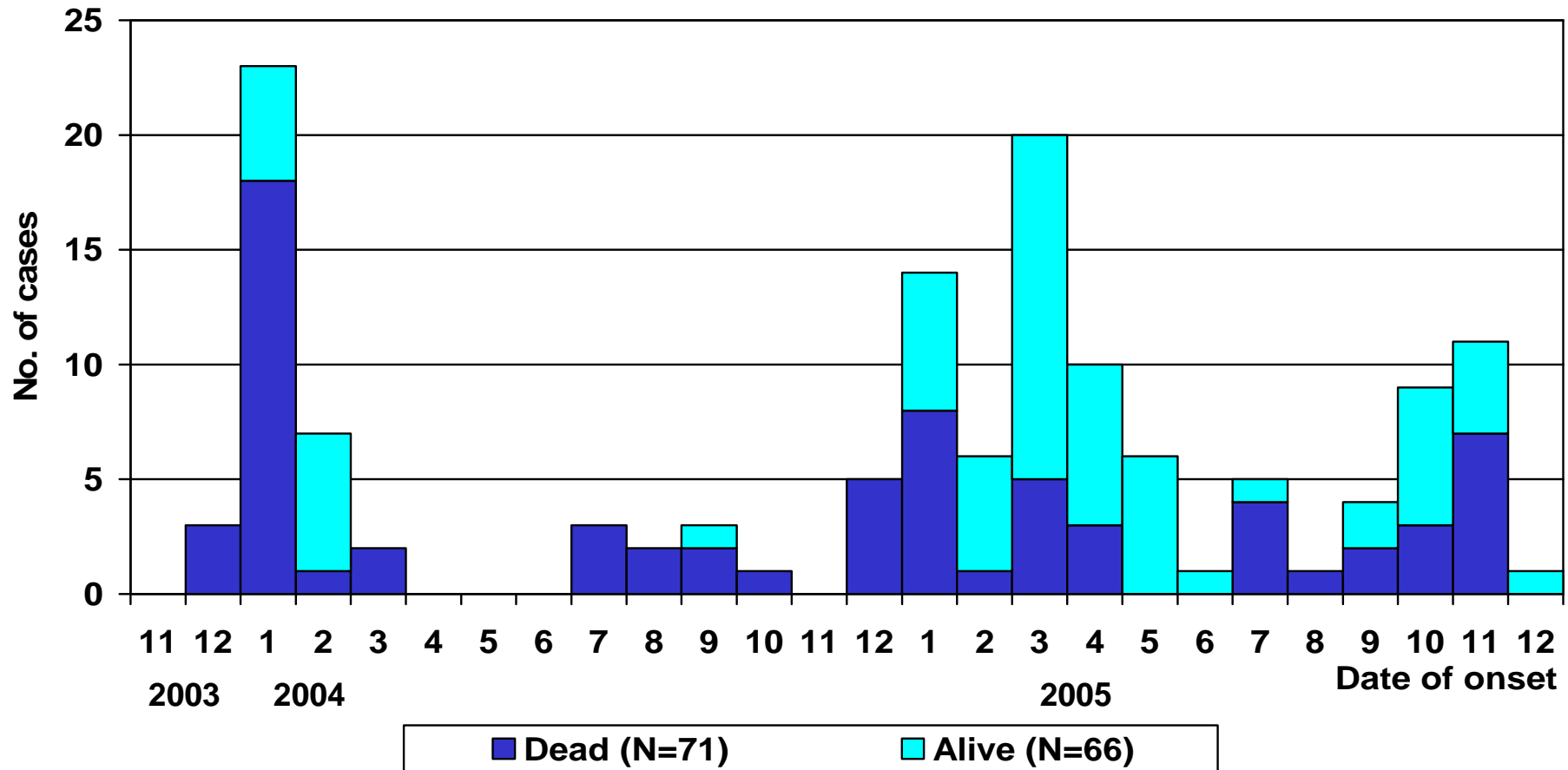
(as of December 16, 2005)



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Human Avian Influenza A/H5N1 Cases by Outcome and Date of Symptoms Onset

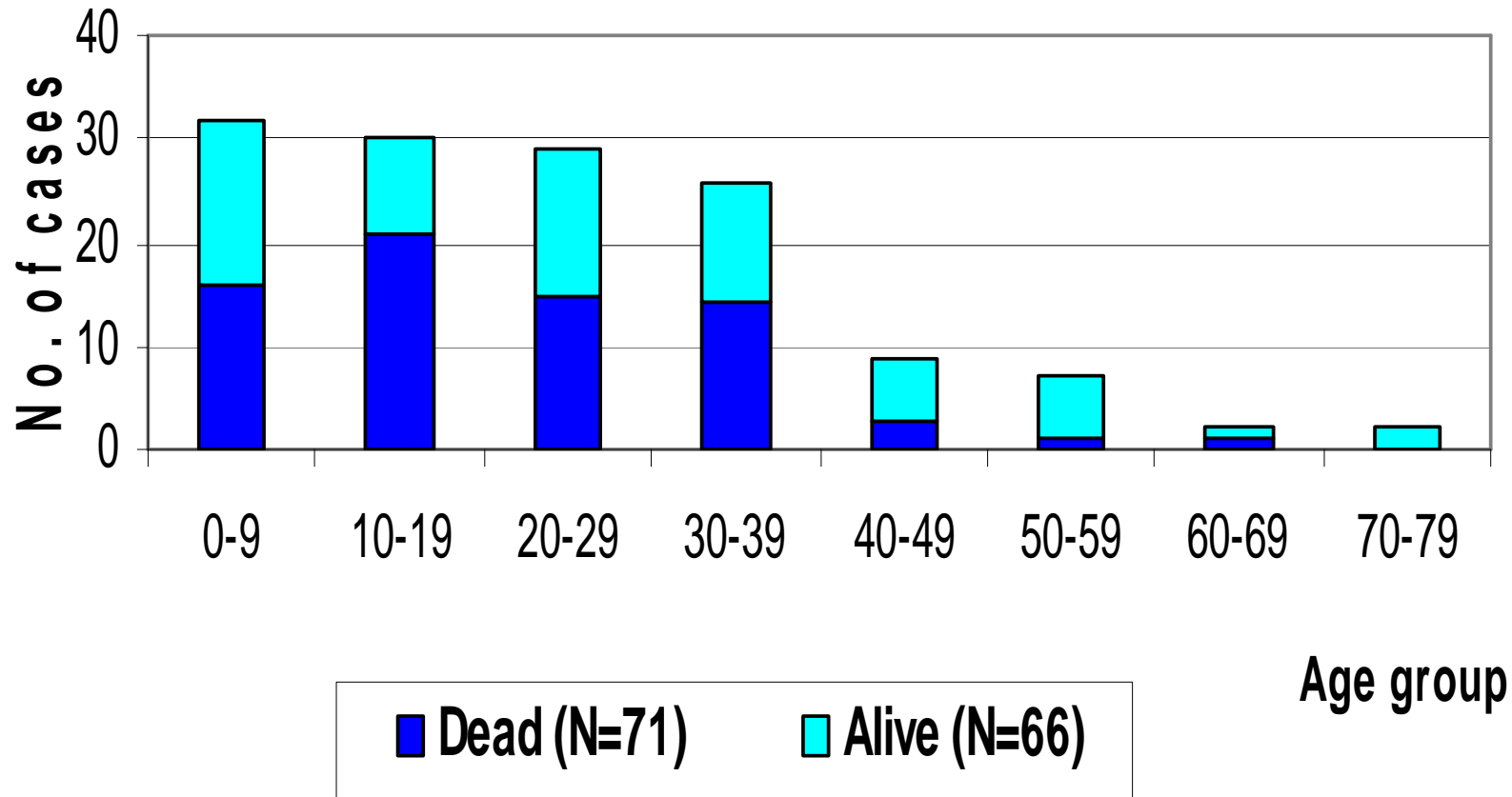
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Human Avian Influenza A/H5N1 Cases by Outcome and Age Group

(16 December 2005)



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Why are we so concerned?

- **Number of affected countries with avian influenza increasing**
- **Number of avian and human cases increasing**
- **Majority of human population has no immunity**
- **High case fatality rate**
- **Human influenza viruses are circulating**

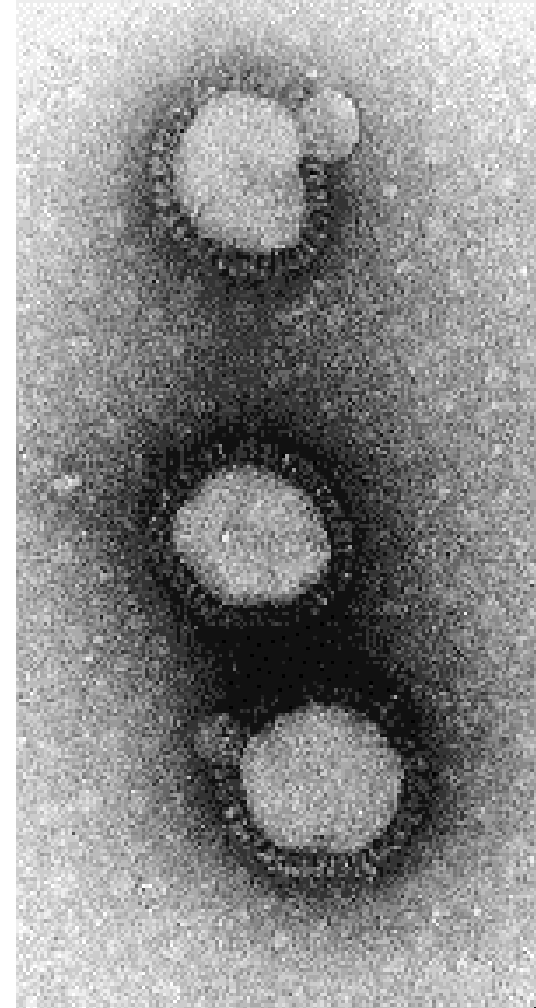


Increasing risk of human to human transmission (pandemic)



What is an influenza pandemic?

- A global epidemic of influenza resulting from a combination of
 - the emergence of an influenza A virus with a subtype different from strains circulating among humans in recent years
 - a high proportion of susceptible people in the community
 - high person-to-person transmissibility of the new virus, with accompanying human disease



Influenza pandemics 20th century



Credit: US National Museum of Health and Medicine

1918: “Spanish Flu”

20-40 million deaths

A(H1N1)

1957: “Asian Flu”

1-4 million deaths

A(H2N2)

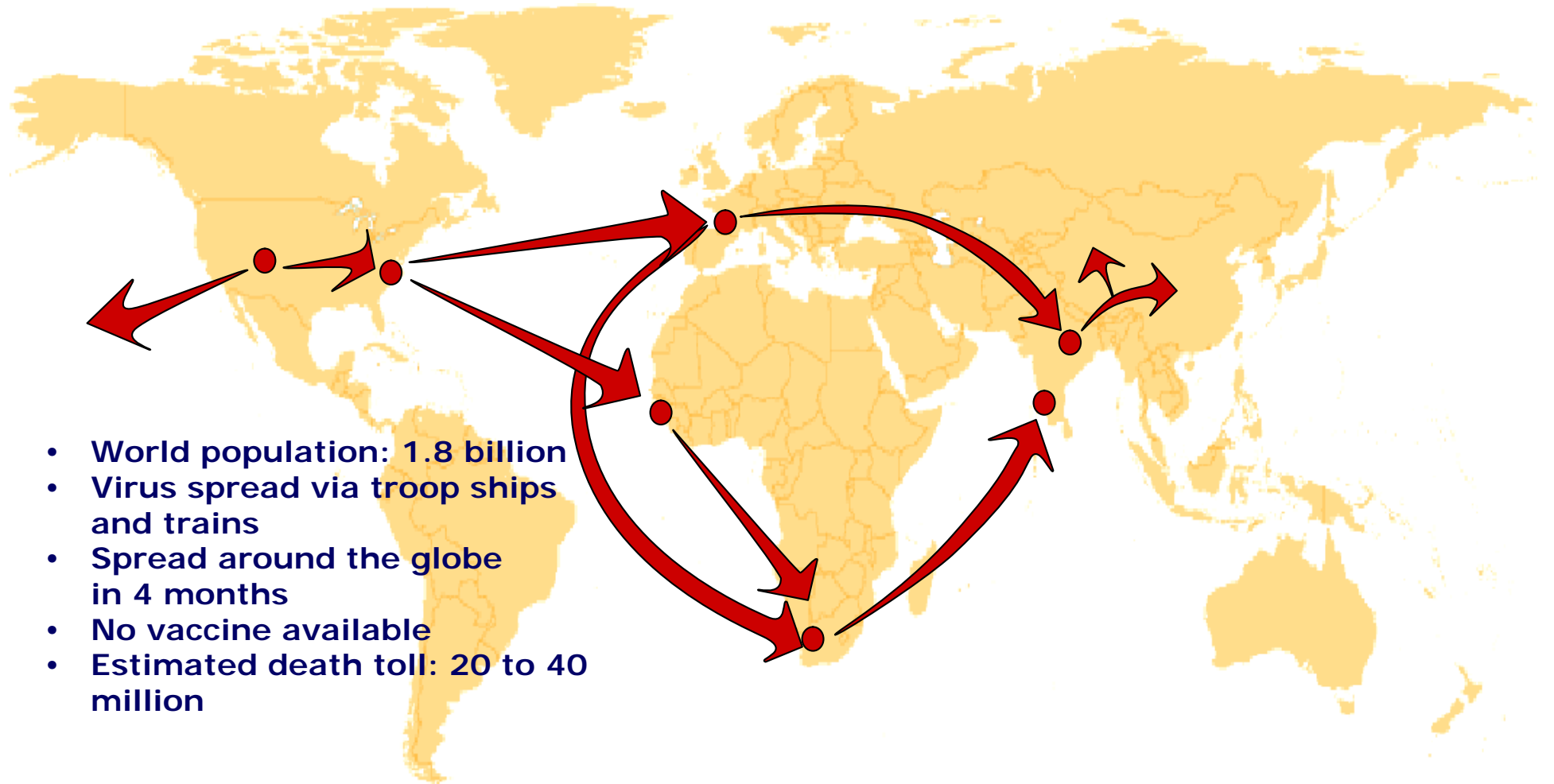
1968: “Hong Kong Flu”

1-4 million deaths

A(H3N2)

FLU PANDEMIC, 1918:

How the virus spread via ships and trains



- World population: 1.8 billion
- Virus spread via troop ships and trains
- Spread around the globe in 4 months
- No vaccine available
- Estimated death toll: 20 to 40 million

Approximate beginning of the epidemic, 1918



before sept. 14	between sept. 14 - 21	between sept. 21 - 28	between sept. 28 - oct. 5	after oct. 5
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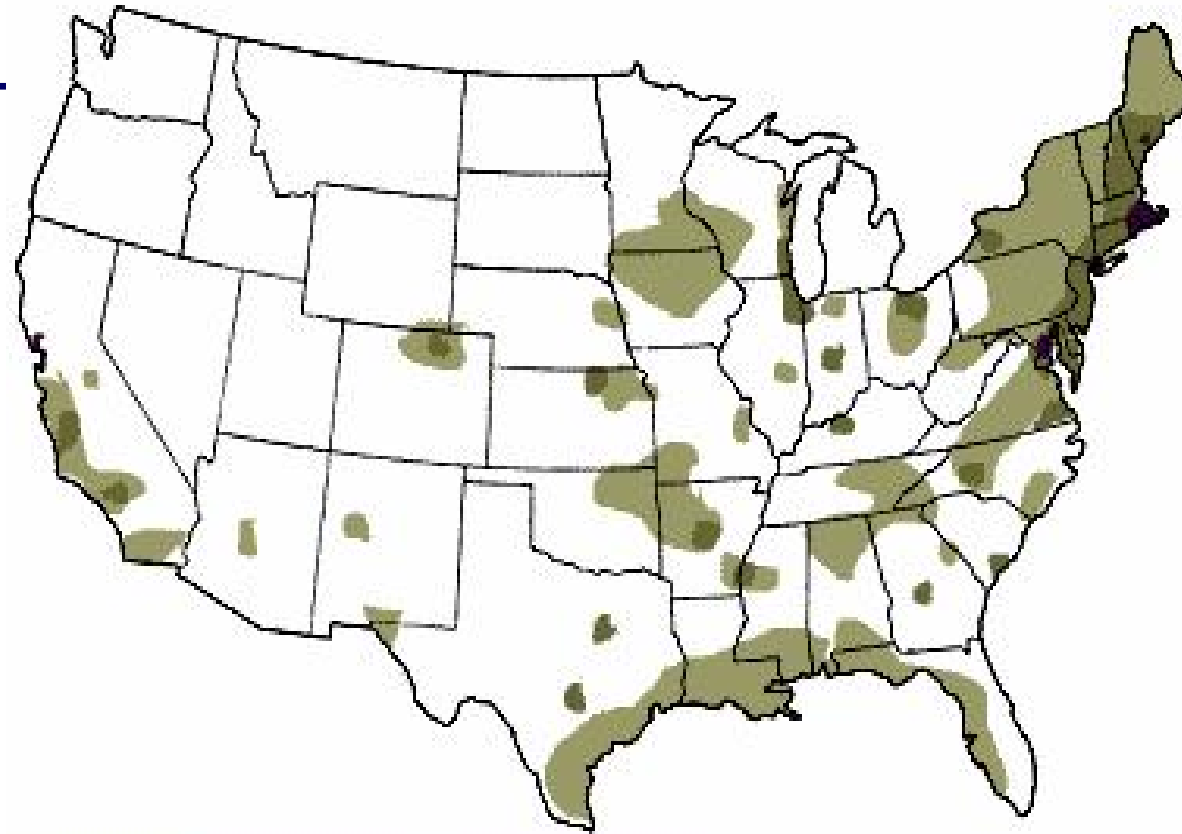
Source: *America's Forgotten Pandemic - The Influenza of 1918 - 1989*

Approximate beginning of the epidemic, 1918



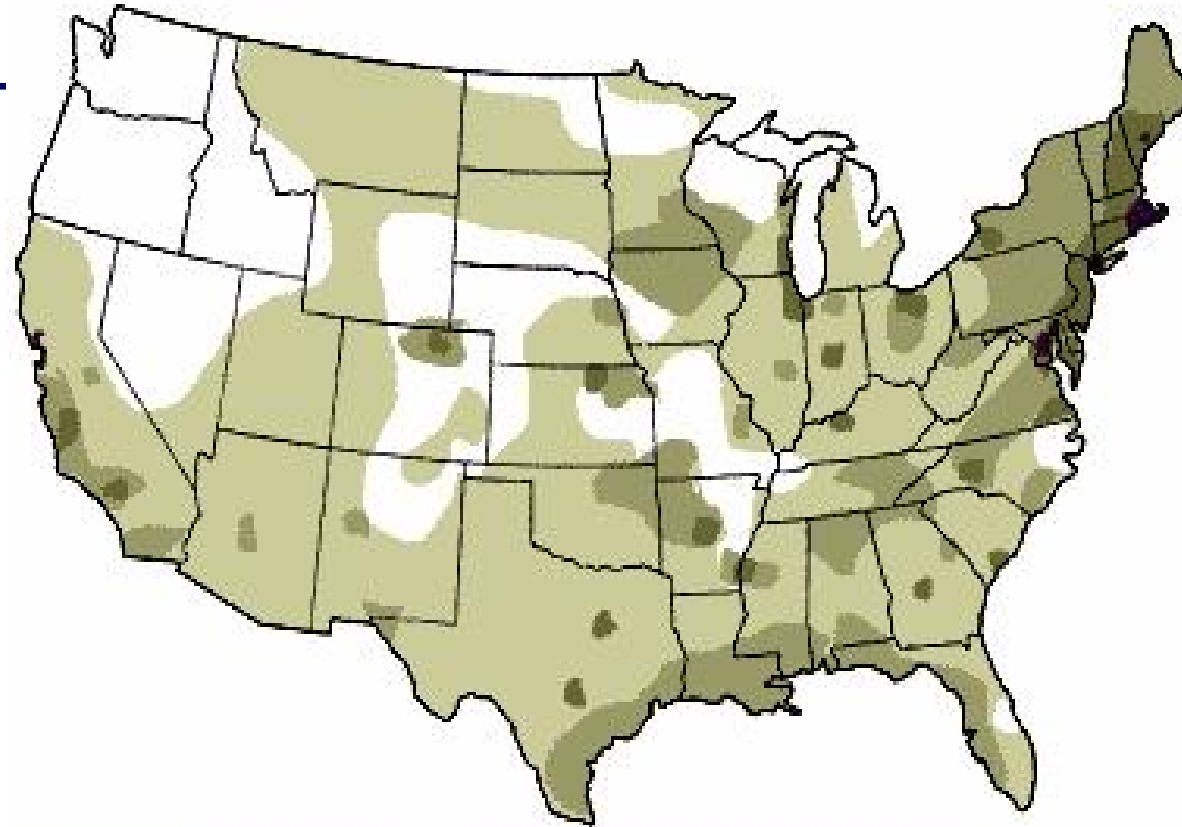
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Approximate beginning of the epidemic, 1918



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Approximate beginning of the epidemic, 1918



before
sept. 14

between
sept. 14 - 21

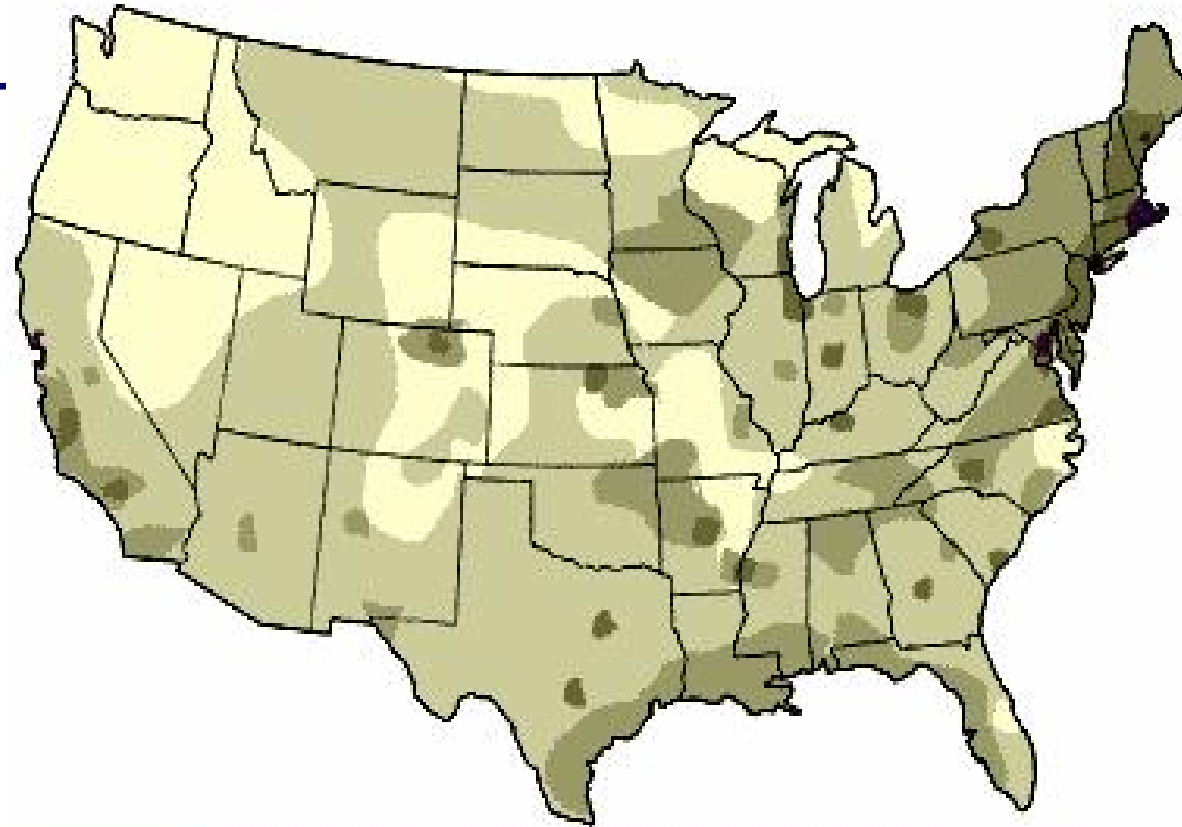
between
sept. 21 - 28

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after
oct. 5

Source: America's Forgotten Pandemic - The Influenza of 1918 - 1989

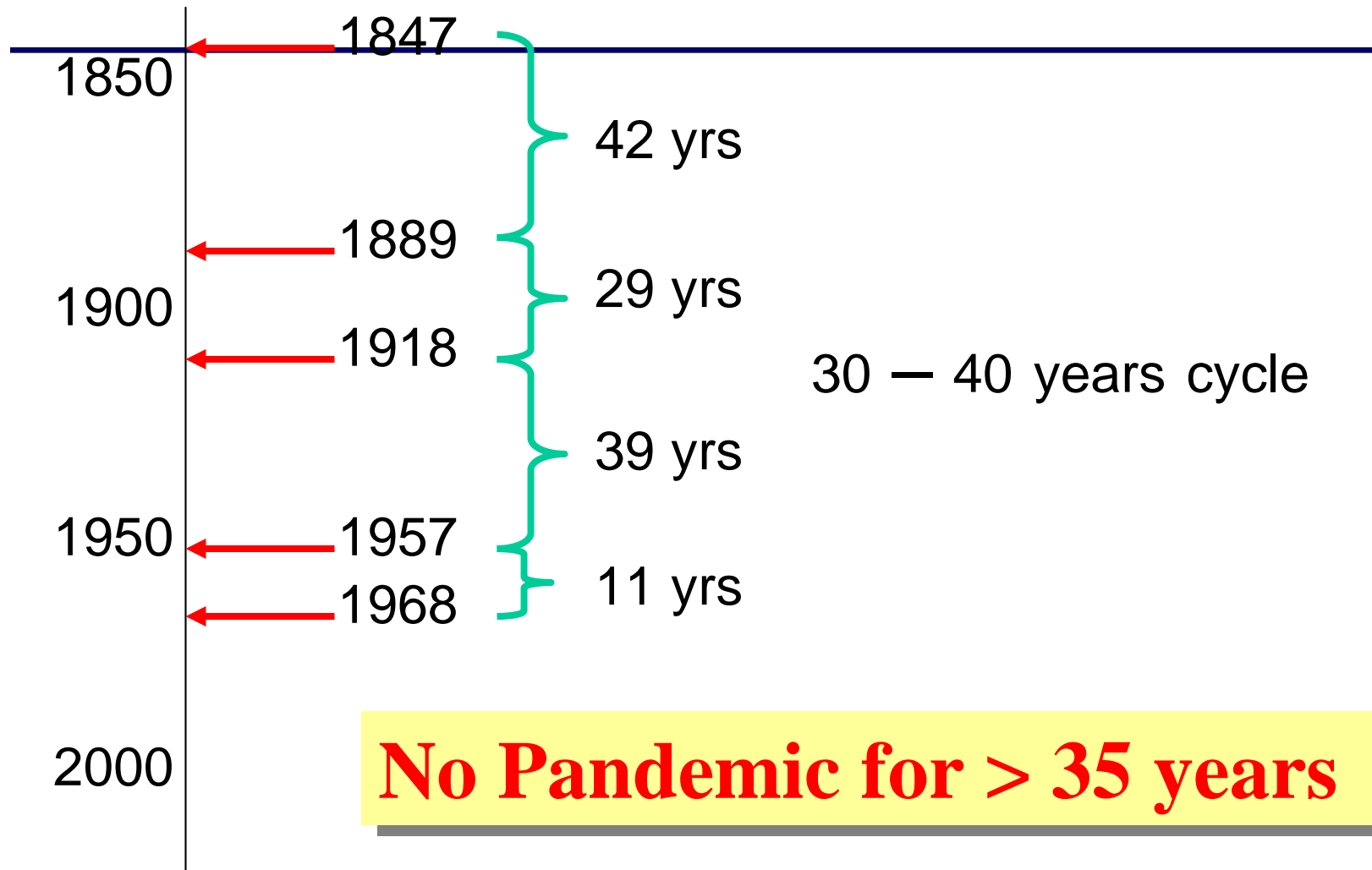
Approximate beginning of the epidemic, 1918



Source: *America's Forgotten Pandemic - The Influenza of 1918 - 1989*



Past Influenza Pandemics



SARS vs Pandemic Influenza

	SARS	Pandemic Influenza
Mode of Transmission	Droplet	Aerosol??
Infectivity	+	+++??
Infectious Period	Only late stage	Early stage
Place of Transmission	Mainly Hospital	Community

Containment is much more difficult for Pandemic Influenza



SARS vs Pandemic Influenza

	SARS	Pandemic Influenza
Number of Cases	8098	400-800 million
Number of Severe Cases	8098	1 – 2.3 million
Number of deaths	774	280,000-650,000

The impact is much bigger for Pandemic Influenza



Current WHO phase of pandemic alert

Inter-pandemic phase New virus in animals, no human cases	Low risk of human cases	1
	Higher risk of human cases	2
Pandemic alert New virus causes human cases	No or very limited human-to-human transmission	3
	Evidence of increased human-to-human transmission	4
	Evidence of significant human-to-human transmission	5
Pandemic	Efficient and sustained human-to-human transmission	6

November 2005; http://www.who.int/csr/disease/avian_influenza/phase/en/index.html

Estimated **health** impact of new influenza pandemic*

- **Disease and deaths****

- ∅ 1253 – 500 million falling ill
- ∅ 875 – 1610 requiring medical care
- ∅ 6.4 – 28.1 hospitalizations
- ∅ 2 – 7.4 million deaths



- **Countries in Asia-Pacific will be hardest hit**
- **These could happen during only a few weeks.**
- **There could be several waves before pandemic ceases.**

* Klaus Stohr, citing Meltzer et al 1999.

** *Estimated for an attack rate of 35%, and case fatality rate of 0.6% (1918 mortality was 2.2%).*

Other impacts of pandemic

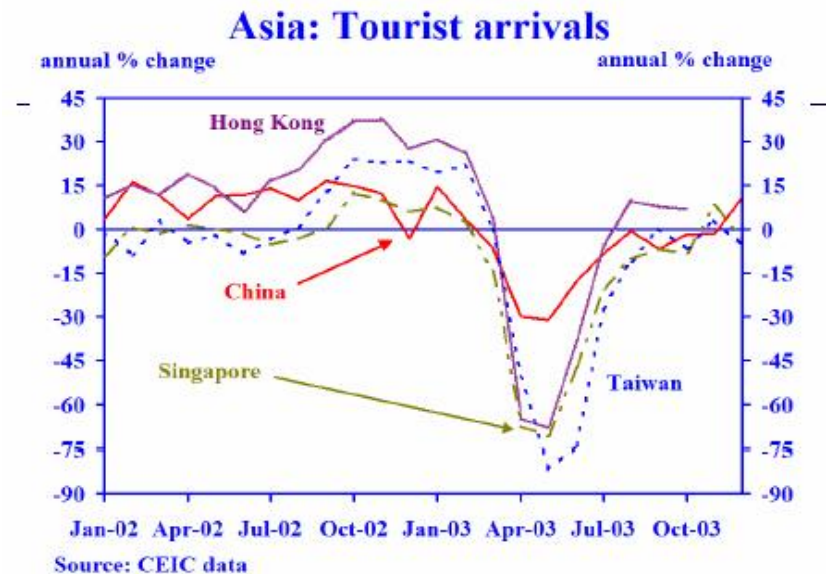
Economic:

- Drop in work force
- Drop in trade and travel
- Import of needed items

Social:

- Widespread panic
- Political instability
- Risk of social disruption

National security



Drops in tourist arrivals to Asian countries during 2003 SARS epidemics.

Source: Klaus Stohr/ WHO, Aug 2005

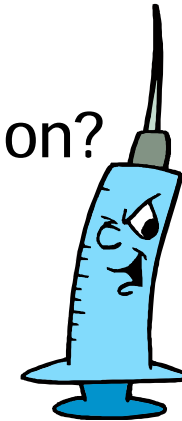
Public health tools for influenza pandemic response

- Antiviral drug

costly, limited supply, pre-emption?

- Pandemic vaccine

not immediately available



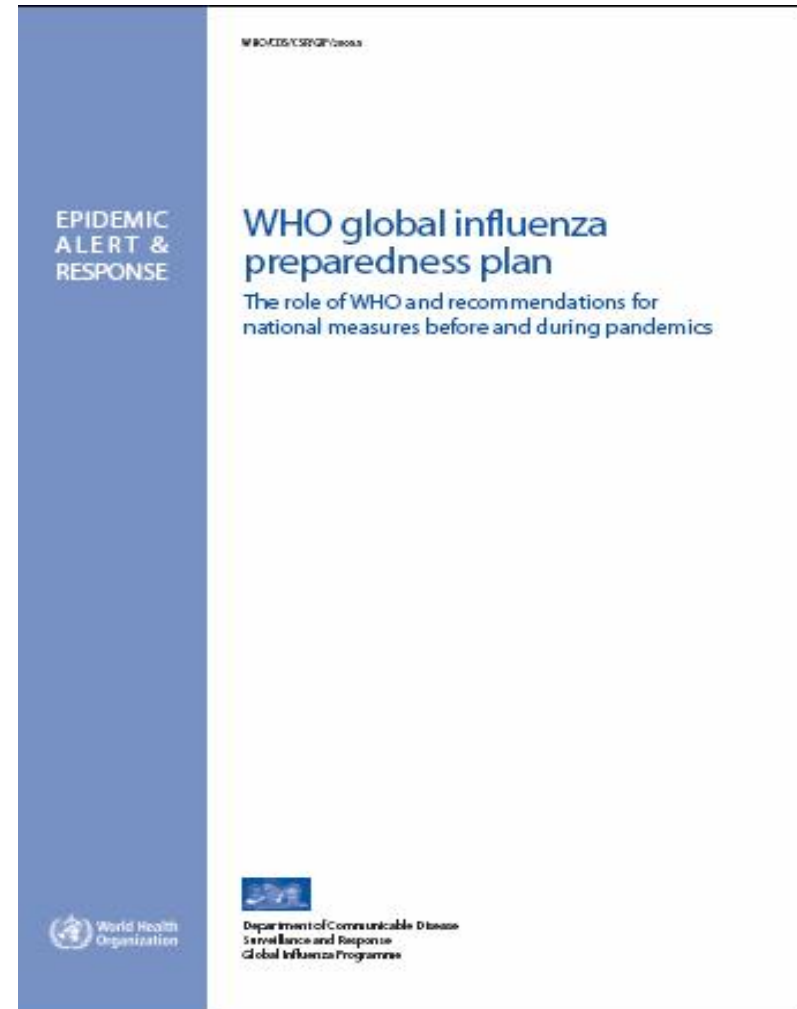
- Public health measures

- ∅ Risk communication
- ∅ Personal hygiene (mask, hand washing)
- ∅ Social distancing, travel restriction
- ∅ Isolation, Quarantine, etc.



Pandemic Preparedness

- **WHO Guidelines**
 - First version published in 1999
 - Revised version just published
- **Consultation on Recommended Measures Before and During Influenza Pandemics**
 - Revision on phases
 - Geneva, 13-15 December, 2004
- **Pandemic vaccine development**
- **Global stockpiles of antivirals**
 - Any role in preventing or mitigating pandemic?





**Global
preparedness**

**Regional
preparedness**

**Regional
preparedness**

**Thailand's
preparedness**

**National
preparedness**

**National
preparedness**

**National
preparedness**

Thailand Strategies for **AI control (2005-2007)**



National Strategic Plan for
Avian Influenza Control and
Influenza Pandemic Preparedness
in Thailand, 2005-2007

The National Committee on Avian Influenza Control
The National Committee on Influenza Pandemic Preparedness

1. **Development of a disease free poultry management system**
2. **Disease surveillance and control during outbreaks**
3. **Knowledge generation and management**
4. **Capacity building of organizations and manpower**
5. **Create understanding and participation of the civil society and private sectors**
6. **Develop sustainable integrated management systems and mechanisms**

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Thailand Strategies for Influenza Pandemic Preparedness (2005-2007)



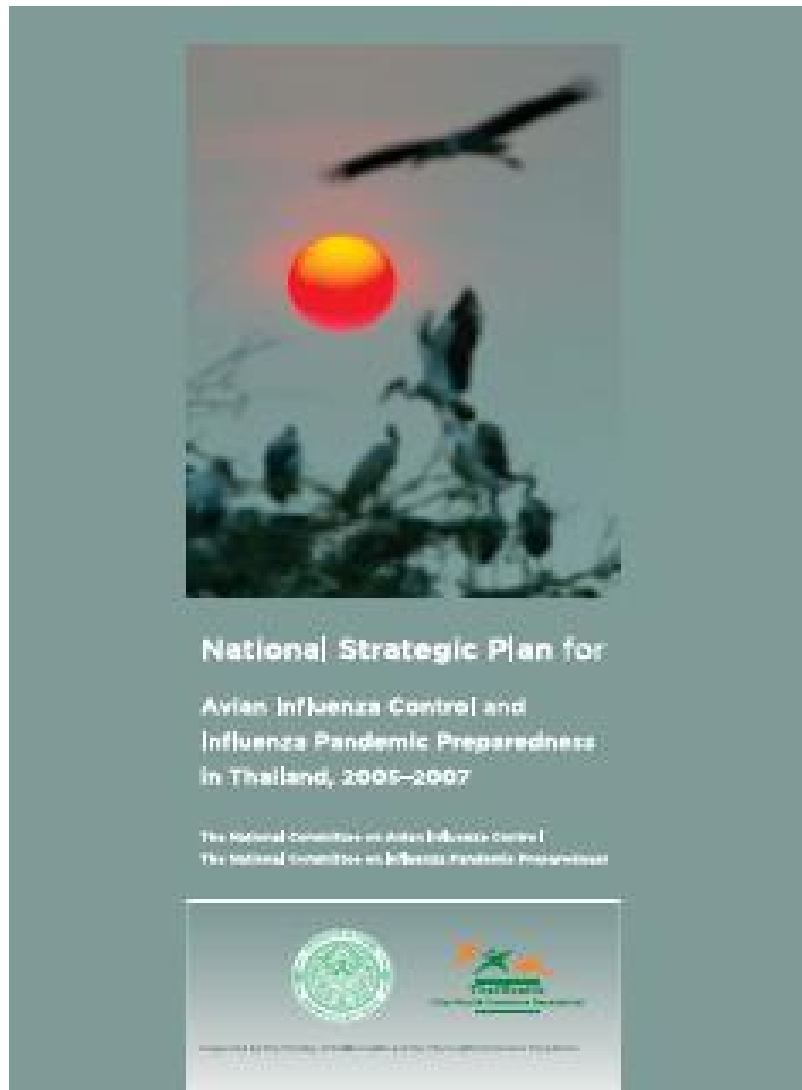
National Strategic Plan for
Avian Influenza Control and
Influenza Pandemic Preparedness
in Thailand, 2005-2007

The National Committee on Avian Influenza Control
The National Committee on Influenza Pandemic Preparedness

1. **Strengthen Influenza Surveillance System**
2. **Preparedness of essential medical supplies and equipment**
3. **Knowledge generation and management**
4. **Public Relations and Education**
5. **Development of Sustainable and Integrated Management Systems**

www.whothai.org

Roles and responsibilities of concerned agencies under Thailand's PPP



- **MOPH** – situation in humans, etc.
- **MOD** – support field hospitals and temp shelters, etc.
- **Dept of Disaster Prevention and Mitigation** – evacuation and temp shelters set up, drills, etc.
- **National Police Bureau** – peacekeeping during crisis, etc.
- **MOE** – health ed to students and action during crisis, etc.
- **DLD** – surveillance in domestic poultry, etc.
- **National Park** – surveillance in wild birds
- Etc..

Take Home Messages

1. **Influenza Pandemic will occur, we just don't know when and how severe**
2. **AI control and PPP are inter-related, they are consecutive chapters of the same story**
3. **We need to timely and effectively control AI in poultry and in human while increasing preparedness for Influenza pandemic**
4. **Multi-sectoral and international cooperation are key to success in both AI Control and PPP**



Where to get more information

WHO global influenza site:

www.who.int/csr/disease/influenza/pandemic/en/





Thank you

With special thanks to:

Dr. Rick Brown (WHO WPRO)

Dr. Supamit Chunsuttiwat (DDC/MOPH/THA)

World Health Organization



Other Recent Developments

- Resistance to oseltamivir...? (Chui, Hayden, Purdue)
- Family clustering of H5N1 (Olsen, Ungchusak, Aldis et al; Emerging Infectious Diseases 1 Nov 05)
- Review of human H5N1 infection (Hayden et al; NEJM 01 Sept 05)
- Spread of avian H5N1 westward (Kazakhstan, Russia, Turkey)
- “Resurrection” in the laboratory of 1918 pandemic virus!! (Tannenbunrg et al, Nature 5 Oct 05, Church et al, Trumpey et al, Science vol 310, 05)



RECREATING THE VIRUS



1
Flu victim frozen in Alaskan permafrost since 1918



2
Fragments of RNA are retrieved from samples of lung tissue, converted into DNA, and sequenced.

3

```
SCATTACGATGCTGGCCATT  
GAGGCCCATAGGTCGCTTA  
GAGGATGCGATAGGTCGCTTA  
GAGGATGCGATAGGTCGCTTA  
GAGGATGCGATAGGTCGCTTA  
GAGGATGCGATAGGTCGCTTA  
GAGGATGCGATAGGTCGCTTA  
GAGGATGCGATAGGTCGCTTA  
GAGGATGCGATAGGTCGCTTA  
GAGGATGCGATAGGTCGCTTA
```

The overlapping sequences are pieced together to give the full genome sequence. A DNA version is synthesized in the lab.



5
The virus is isolated from the cells and used to infect mice. They all die within 6 days.



4
The DNA is injected into human kidney cells, which produce tens of virus particles.

How severe would a pandemic be?

- Best case scenario for international agencies
 - Significant amount of illness, but mostly not severe and no deaths?
 - Hospitals still function?
 - Medical insurance provides cover (at increased premium)?
 - Sufficient tamiflu to provide treatment?
 - Food and basic supplies continue to be available at reasonable cost?
 - Airlines keep flying, staff can move freely
 - Communications not disrupted
 - No security issues



How severe would a pandemic be?

- Worst case scenario for international agencies
 - Severe illness in staff with some deaths?
 - Hospitals overwhelmed despite applying strict triage (WHO needs to operate clinic and provide direct care)?
 - Medical insurance not available except at prohibitive levels?
 - Severe pressure on use of tamiflu for treatment of cases and contacts and for prophylaxis of staff?
 - Severe disruption to food and water supplies?
 - Airlines not operational – essential travel only possible
 - Communications disrupted (telephones / internet)?
 - Security issues

