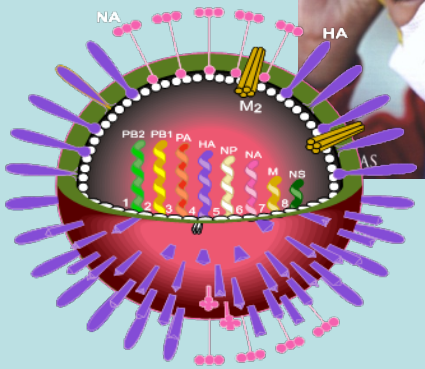
Learning from the

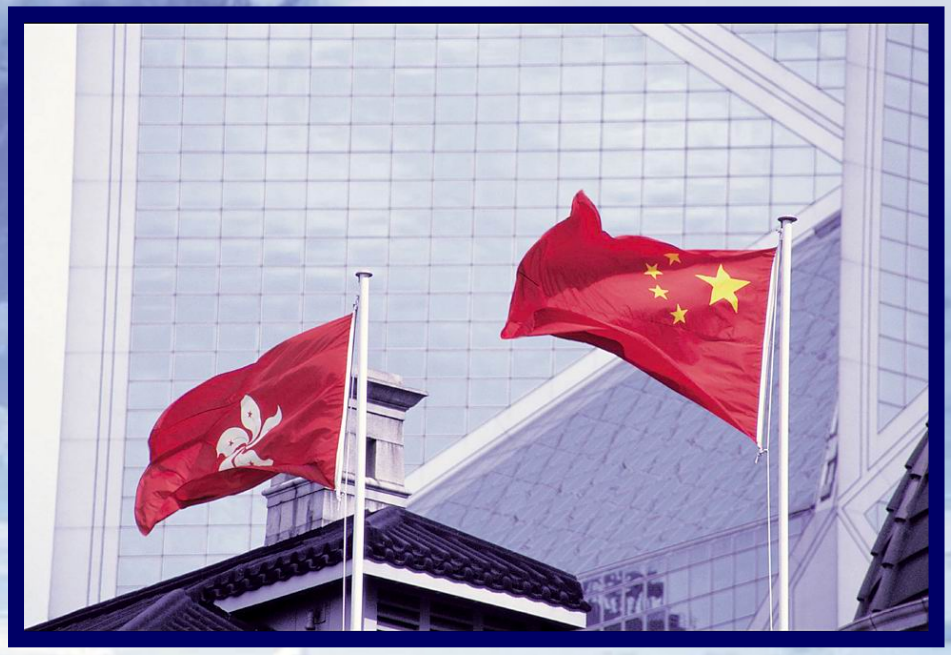
Avian and Swine Flu Pandemic

- clear lessons in Infection Control

for Influenza management



Wing Hong Seto, CICO, Hong Kong

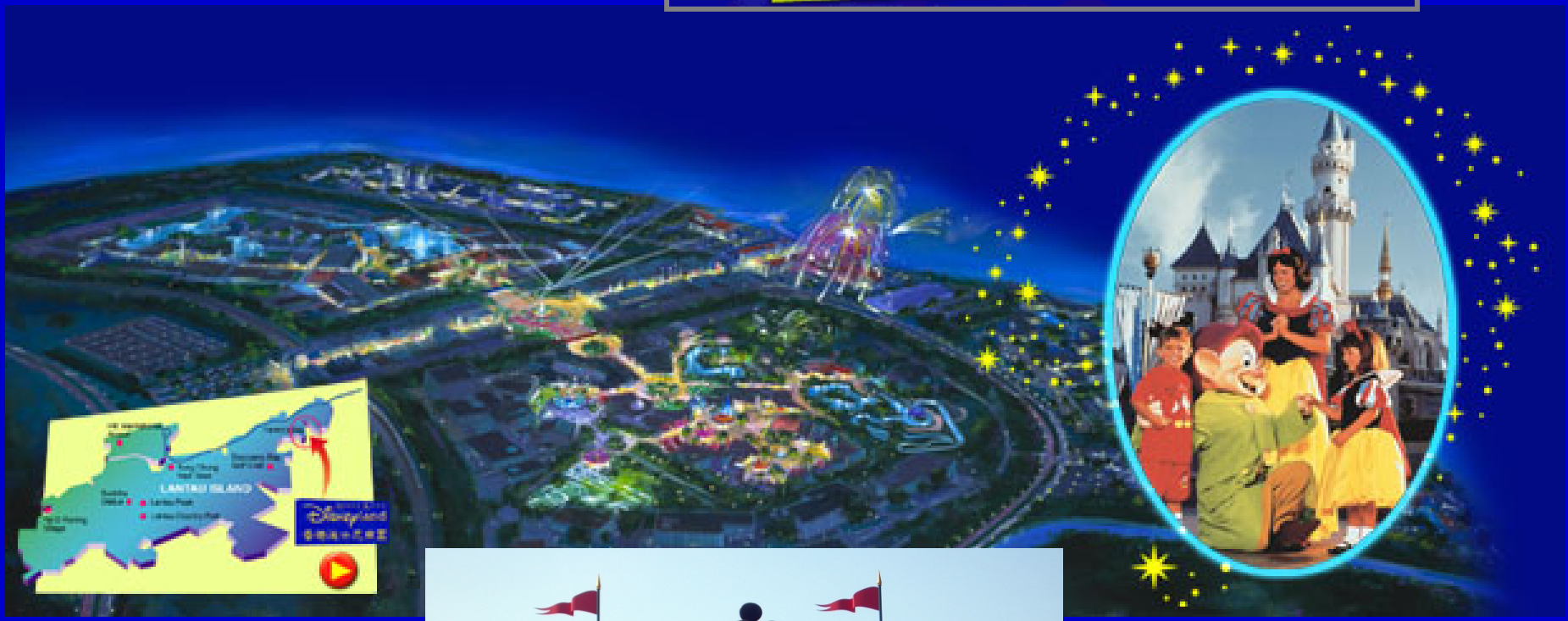


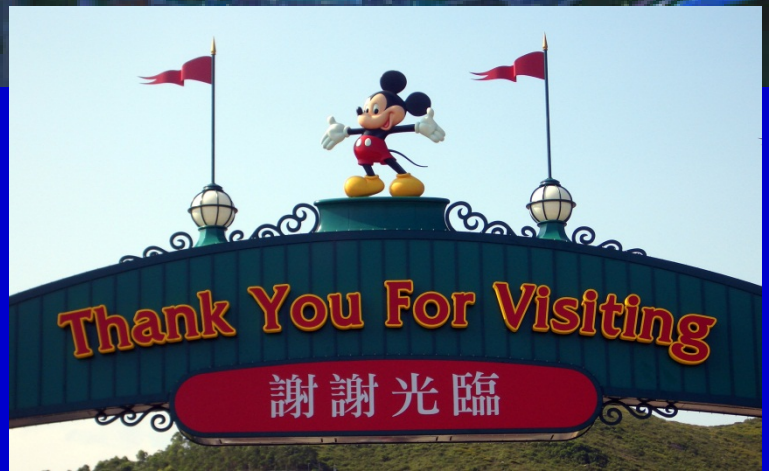
The Food is still Great..

The Queen's Birthday used to be a public holiday.

Now it is change to Buddha's Birthday…

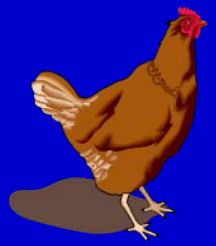
Welcome…



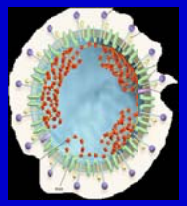


First Avian Flu case in Hong Kong, 2005

The Two Great Challenges for Hong Kong



		Cases	Death (%)
1. H5N1 Avian Flu Outbreak	1997	18	6 (33)
2. The SARS Outbreak	2003	1755	302 (17)

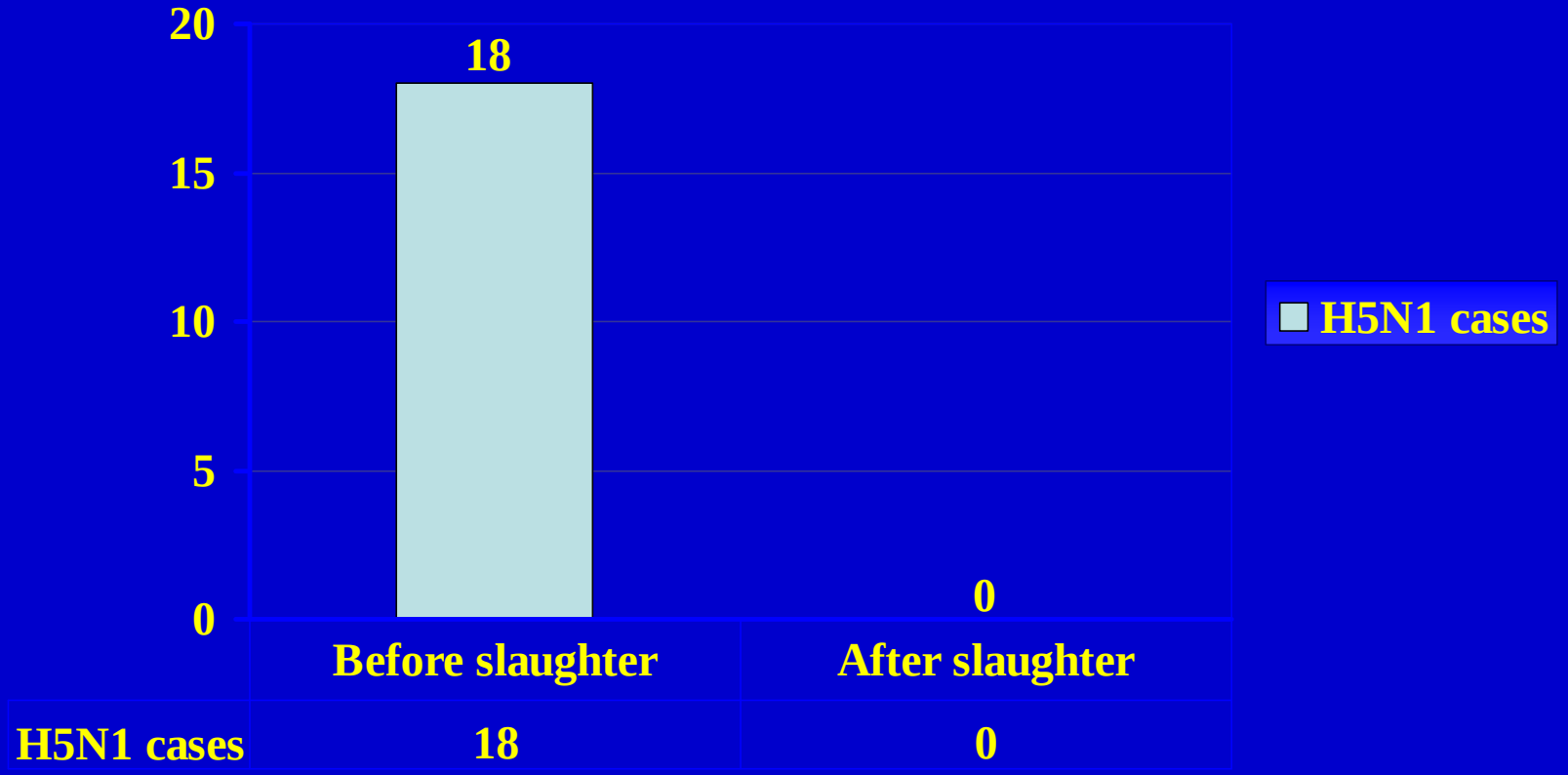


"They killed everything ----

and

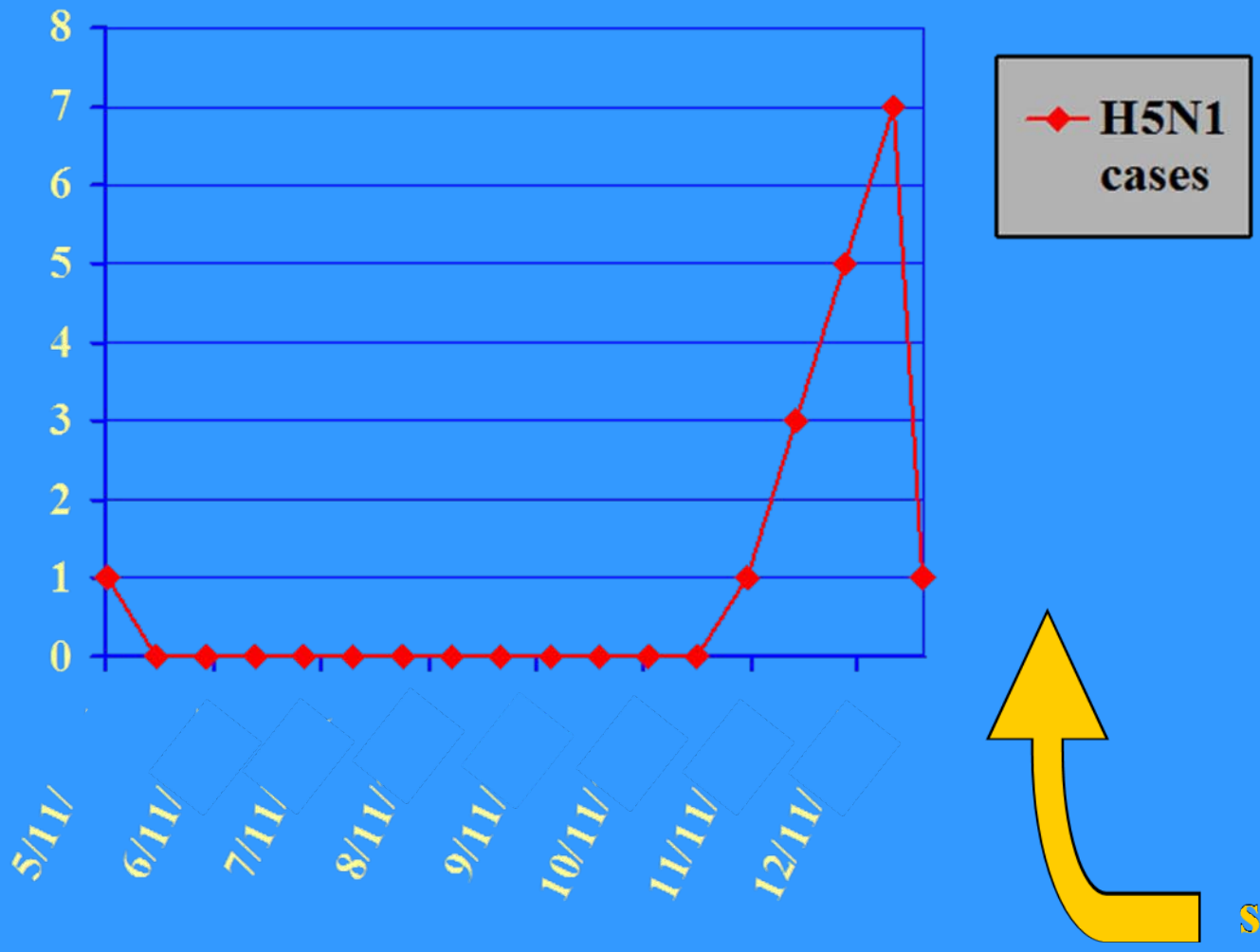
probably saved the world"

H5N1 Cases Before and After Poultry Slaughter



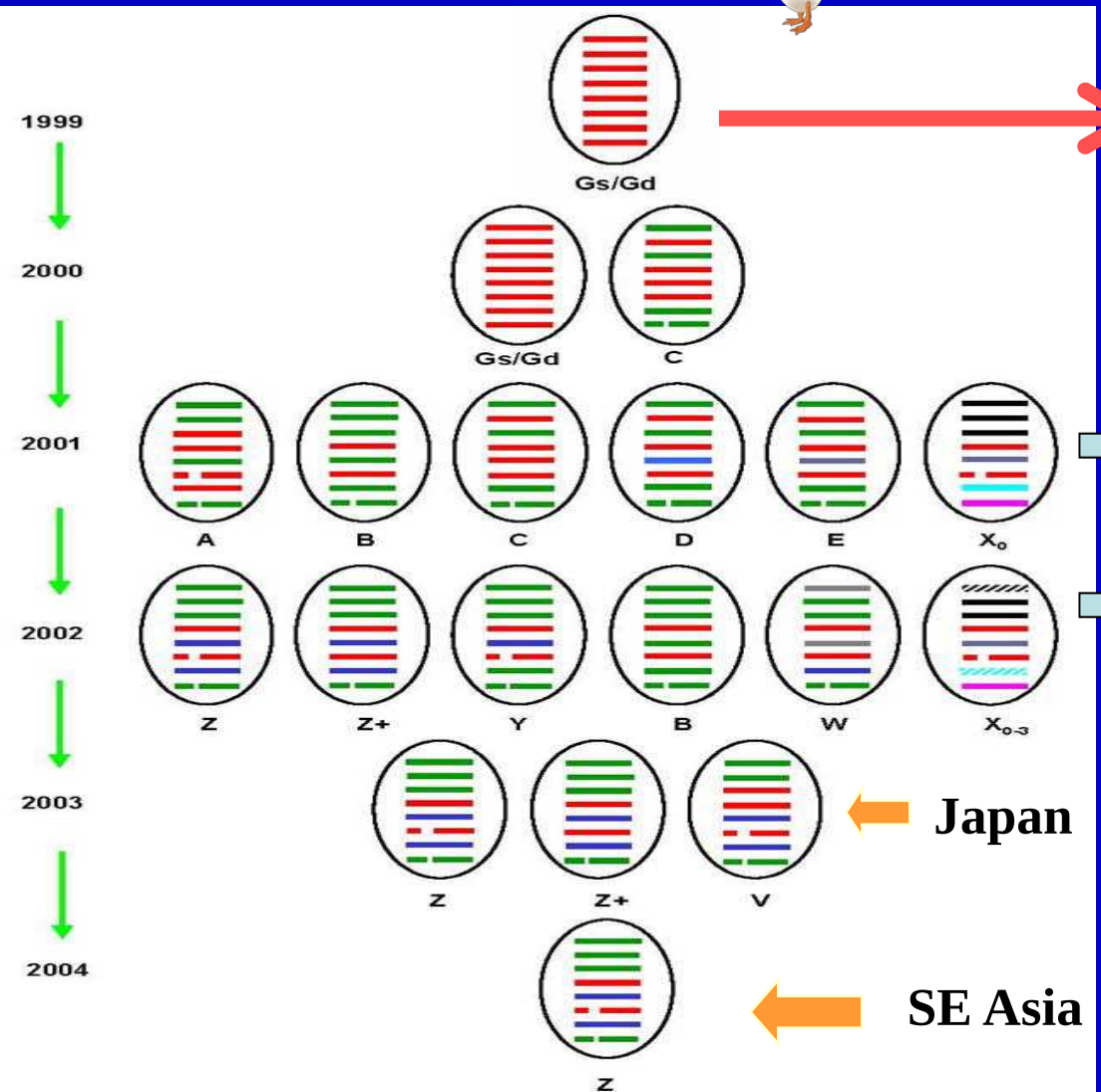
Culling was after the last case

H5N1 Epidemic Curve



Aggressive culling did not eliminate H5N1 in Hong Kong

1997 H5N1 Gs/GD/96-like

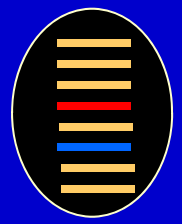


H9N2 G1-like

H6N1 W312-like

Quail

Teal



Not detected after 1997

H5N1/97

H5N1 in 2001 –HK Market

2002 – HK market and farm

Japan

SE Asia

2003 onwards vaccination program
No more Avian Flu

Guan et al PNAS 1999, 2002,2004

Pre-slaughter isolation of influenza viruses from poultry at HK markets

(23-29 December 1997)

Type of poultry	No. of samples	% isolation with H5
Duck	**329**	**2.4 (0.25)[a]**
Goose	**159**	**2.5 (0.07)**
Chicken	**343**	**19.5 (0.0)**
Miscellaneous[b]	**490**	**0.0**
Environment	**30**	**0.0**

[a] Figures in parentheses are percentages in 1975-80 surveillance

[b] Pigeon, quail, Chinese francolin, pheasant, fish-eye & caged birds.

No more human cases due to massive market clean up??

Infection control for Avian Flu is relatively easy…..

because transmissibility is low

Cohort Studies on Staff Exposures

	Exposed	Non-exposed	p
A	5/96	1/201	0.02
B	3/82	1/39	0.7
C	0/39	0/69	
Total:	8/217	2/309	0.01
No poultry exposure	3/96	1/119	0.23

"confirm that transmission …person to person or poultry to person, was uncommon"

Bridges, Katz, Seto et al JID 2000:181:344

Inefficient spread of Avianflu

Nature of exposures of staff with possibility of infection

Total staff contacts (Dec/Jan) - 965 reported – only 5 infected – 0.5%

1 Intern - History taking - coughed on by patient.
Venupuncture 2x

3 ICU doctors - 2 taken history & intubated patients.
1 was coughed on.
1 close eye examination.

1 Pediatrician - Close-up eye examination.
Touch eye with ungloved hands.

*** All exposures without protective apparels**

Spread of Avian Flu:

Not Airborne spread

But by droplets

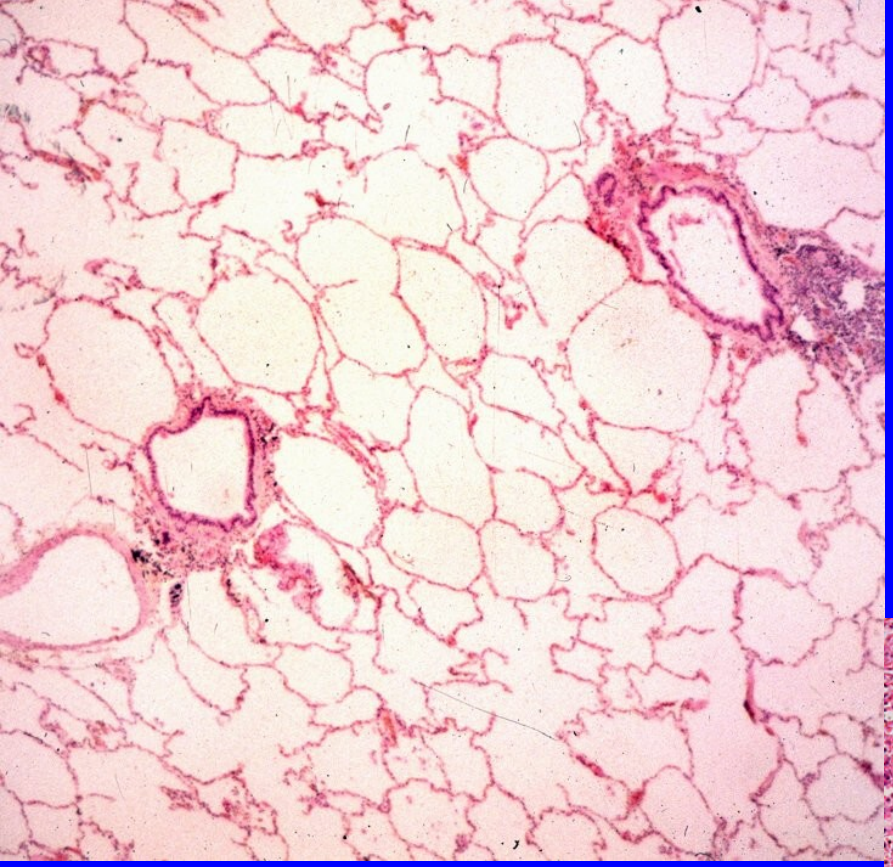
Bacteria That Cause Airborne Nosocomial Infections

- Group A Streptococcus
- Staph. aureus
- Neisseria meningitidis
- Bordetella pertusis
- MTB
- Acinetobacter
- Legionellae
- Clostridia
- Pseudomonas
- Nocardia

Viruses Implicated in Airborne Nosocomial Infections

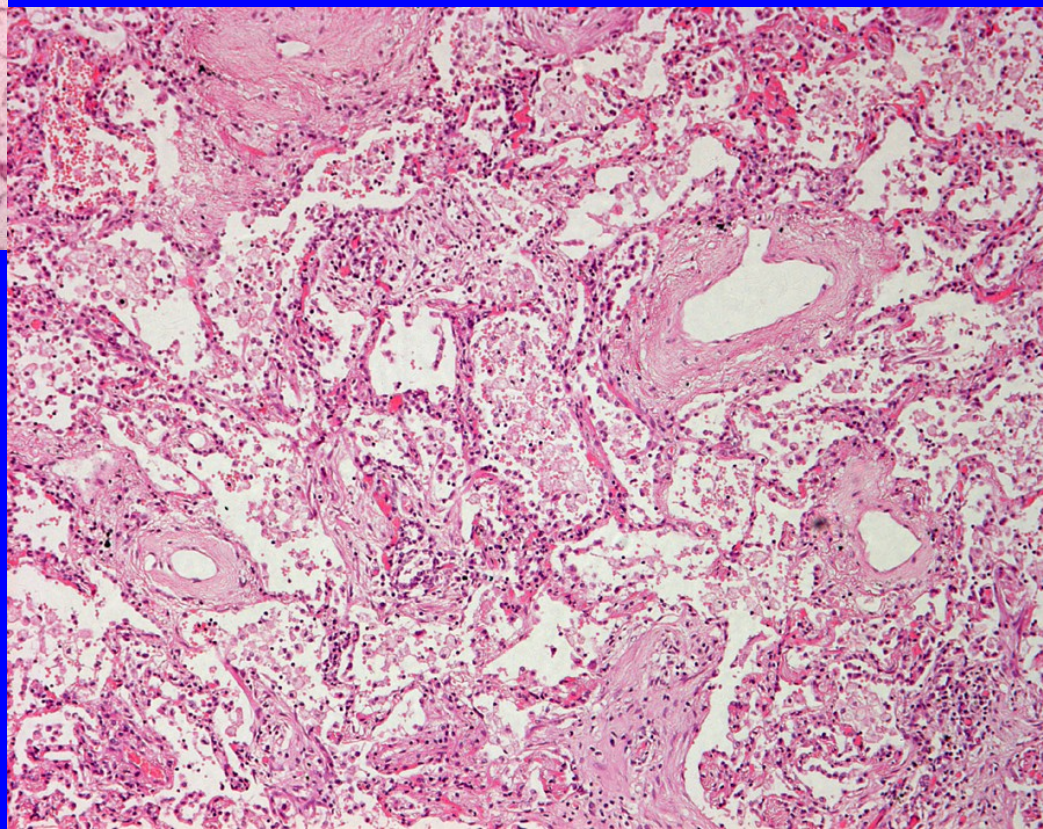
- Rinoviruses
- Influenza and
- Parainfluenza viruses
- Respiratory Syncytial Virus
- Adenovirus
- Varicella Zoster Virus
- Measles
- Rubella
- Smallpox
- Certain enteroviruses

Adapted from Schaal, 1985



Normal alveolar

Pneumonia



Courtesy: Dr Gavin Chan, Department of Pathology

Queen Mary Hospital


aerosol

WHO systemic review - 2008

Table 1. The scope and definitions of three transmission models

Mode of transmission	Definition	Examples of the agents
Airborne	Transmission of disease caused by dissemination of droplet nuclei that remain infectious when suspended in air over long distance (> 1m) and time. Airborne transmission can be further categorized into obligate or preferential airborne transmission. •***Obligate airborne*** *transmission* refers to pathogens that are transmitted only by deposition of droplet nuclei under natural conditions. •*Preferential airborne transmission* refers to pathogens that can initiate infection by multiple routes, but are predominantly transmitted by droplet nuclei.	pulmonary tuberculosis measles chickenpox

Opportunistic airborne	Transmission of droplet nuclei at short range during special circumstances, such as the performance of aerosol-generating procedures associated with pathogen transmission.	SARS CoV Influenza
Droplet	Droplets are generated from an infected (source) person primarily during coughing, sneezing, and talking. Transmission occurs when these droplets containing microorganisms are propelled a short distance (usually ≤ 1m) through the air and deposited on the conjunctivae, mouth, nasal, throat or pharynx mucosa of another person.	Adenovirus Respiratory Syncytial Virus Influenza SARS CoV

Recent classification for airborne transmission

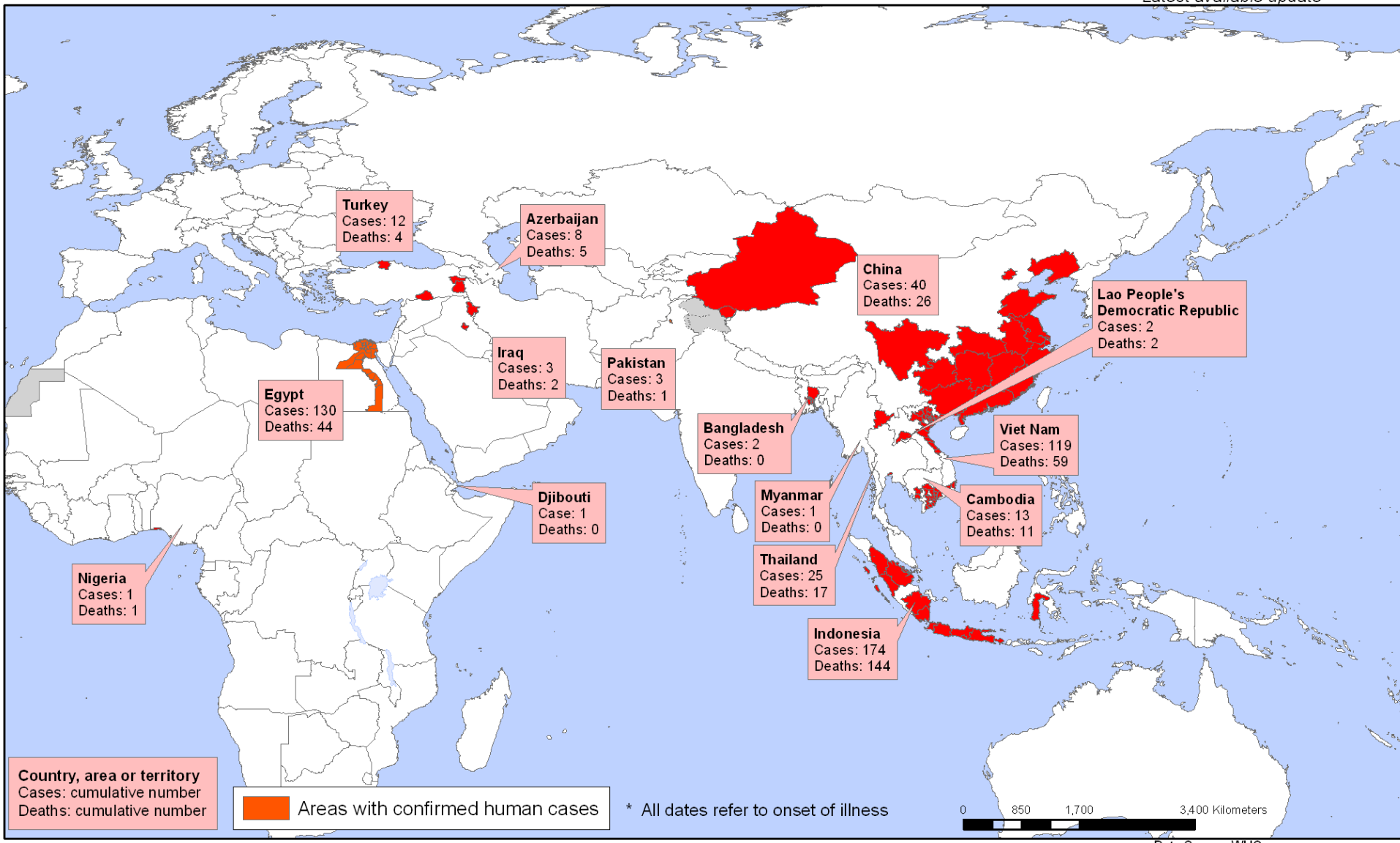
Obligate airborne: initiate solely through aerosols: TB

Preferential airborne: initiate through multiple routes but predominately by aerosols: Chicken pox and measles

Opportunistic airborne: typically through other routes but by aerosols in favorable conditions (as high-risk procedures such as intubation): Influenza and SARS

Areas with confirmed human cases of H5N1 avian influenza since 2003 *

Status as of 16 March 2011
Latest available update



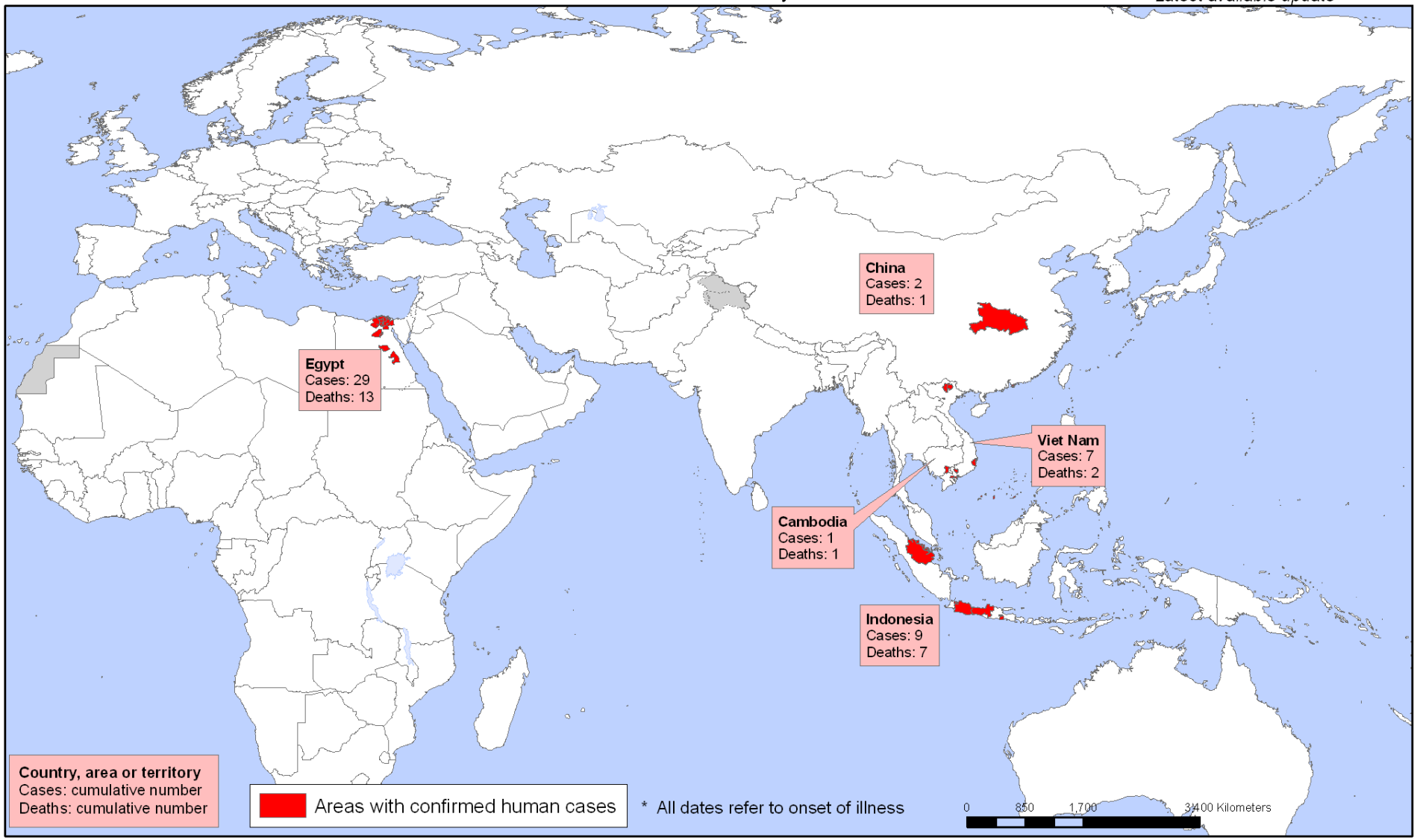
World Health Organization

Data Source: WHO
Map Production: Public Health Information and Geographic Information System (GIS)
World Health Organization

Total cases = 534 in nine years

Areas with confirmed human cases of H5N1 avian influenza since 1 January 2010 *

Status as of 31 December 2010
Latest available update



World Health Organization

Data Source: WHO
Map Production: Public Health Information and Geographic Information System (GIS)
World Health Organization

2010 = 48 cases for the year

Will the Avian flu pandemic ever come?

Table 7. Serological Evidence for Human Exposure to Avian Influenza Viruses in the Hypothetical Influenza Epicenter and Occurence of these Viruses in Domestic Ducks There

HA Subtype	Percent Seropositivity of Human Sera From: Pearl River Delta (n = 400)*	Jiangsu Province (n = 300)	Taichung Taiwan (n = 150)	Urban Hong Kong (n = 100)	Percent Isolation Rate From Domestic Ducks
H1	NT	19	NT	NT	<1
H2	NT	58	NT	NT	1
H3	47	46	48	45	25
H4	11	4	10	2	29
H5	2	7	2	0	4
H6	12	1	13	1	22
H7	5	38	4	0	<1
H8	4	3	5	2	0†
H9	3	6	4	0	3
H10	6	17	4	1	12
H11	15	15	4	0	2
H12	3	2	4	1	<1
H13	3	1	1	2	0

Studies done in 1975-80

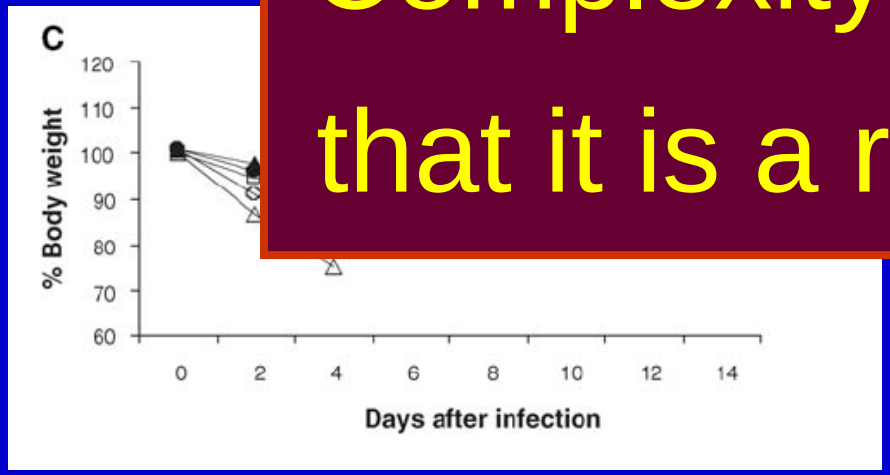
KS Shortridge Seminars in Resp Infect, Vol 7: 1: 1992: 11-25

Characterization of the Reconstructed 1918 Spanish Influenza Pandemic Virus

Terrence M. Tumpey,[1]* Christopher F. Basler,[2] Patricia V. Aguilar,[2] Hui Zeng,[1] Alicia Solórzano,[2] David E. Swayne,[4] Nancy J. Cox,[1] Jacqueline M. Katz,[1] Jeffery K. Taubenberger,[3] Peter Palese,[2] Adolfo García-Sastre[2]

Virus
N. Cal/99
Tx/91
Tx/91 HA:1918
1918 HA/NA:Tx/91
1918 HA/NA/M/NP/NS:Tx/91
1918 (1)
1918 (2)
ta/35/76

Complexity indicates that it is a rare event

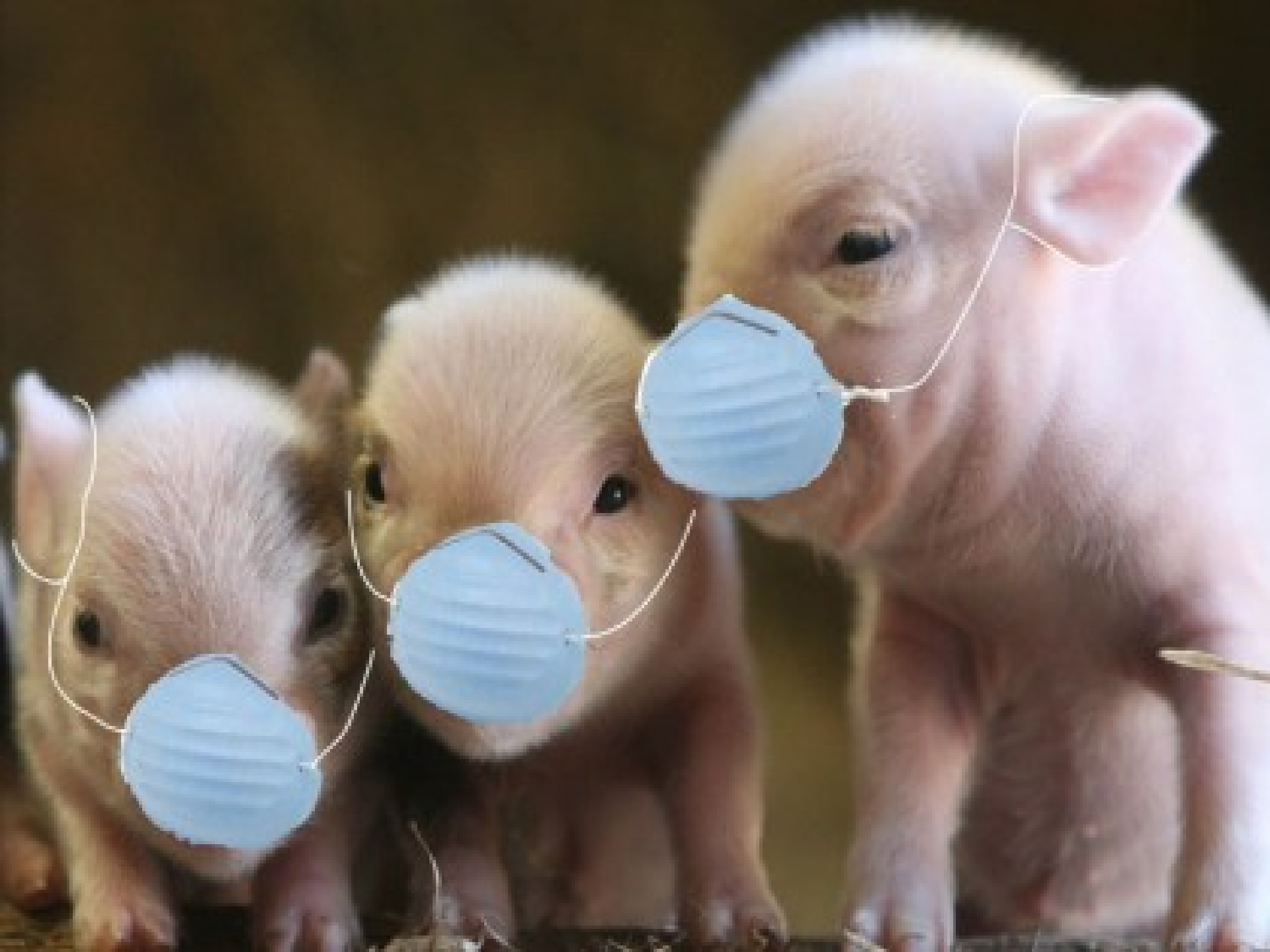


…e 1918 virus
…t viruses
expressing 1918 genes….all eight genes makes an exceptionally virulent viruses”

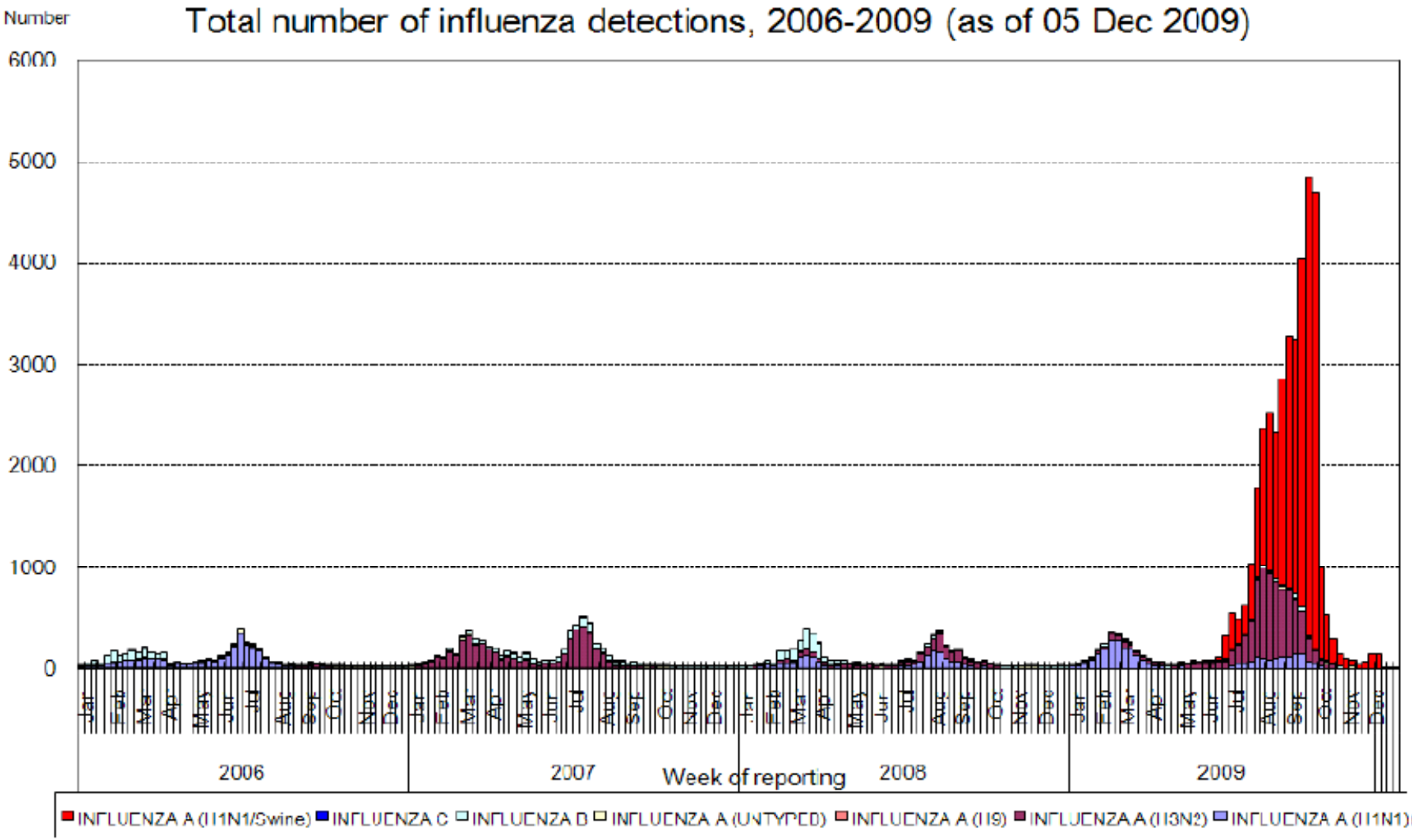
The pandemic strain requires very complex mutation

H1N1 – Swine Flu

Then the panic

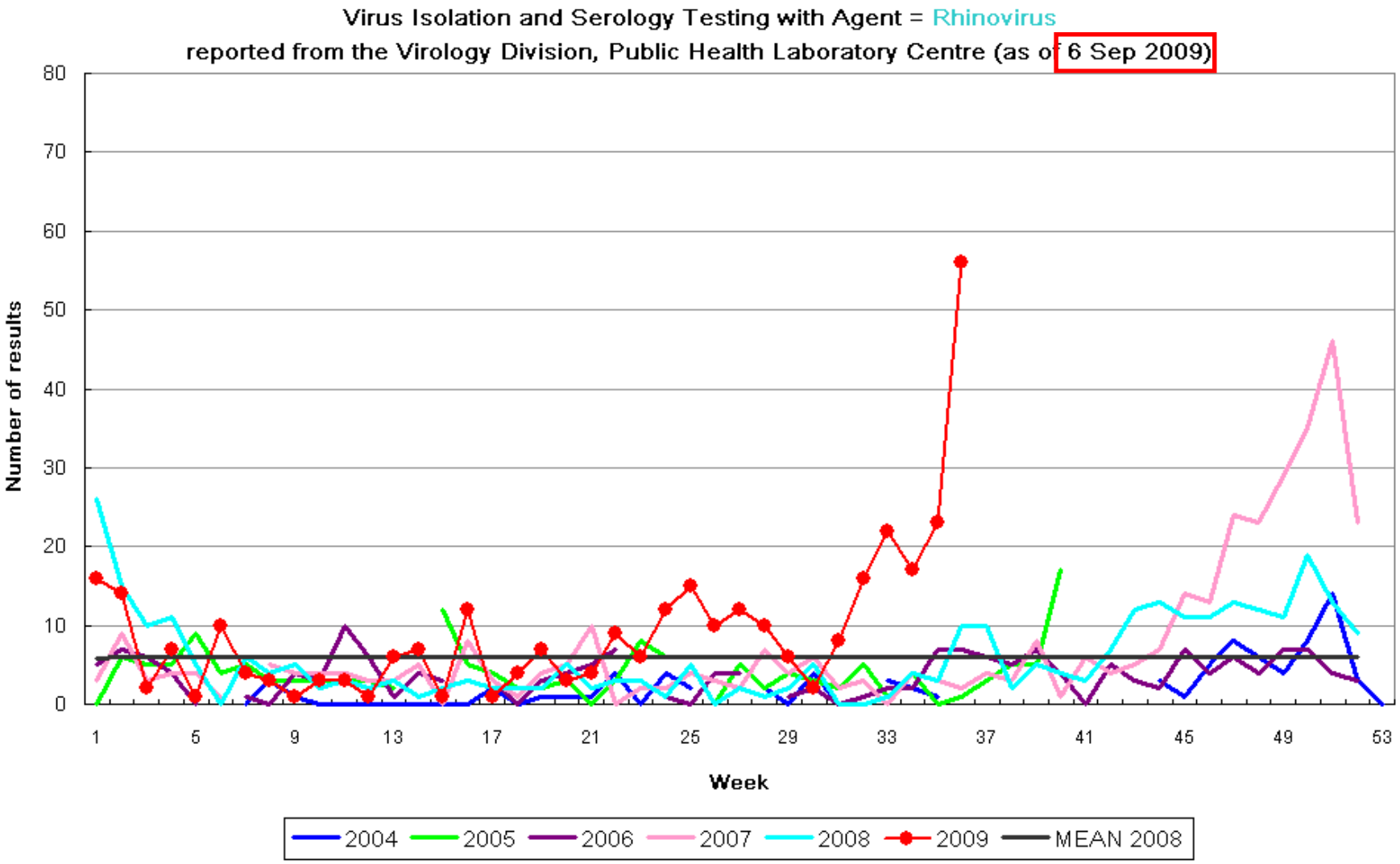


Total Number of Influenza Detections



Prepared by ICB/IDCTC

PHLC Data of Rhinovirus



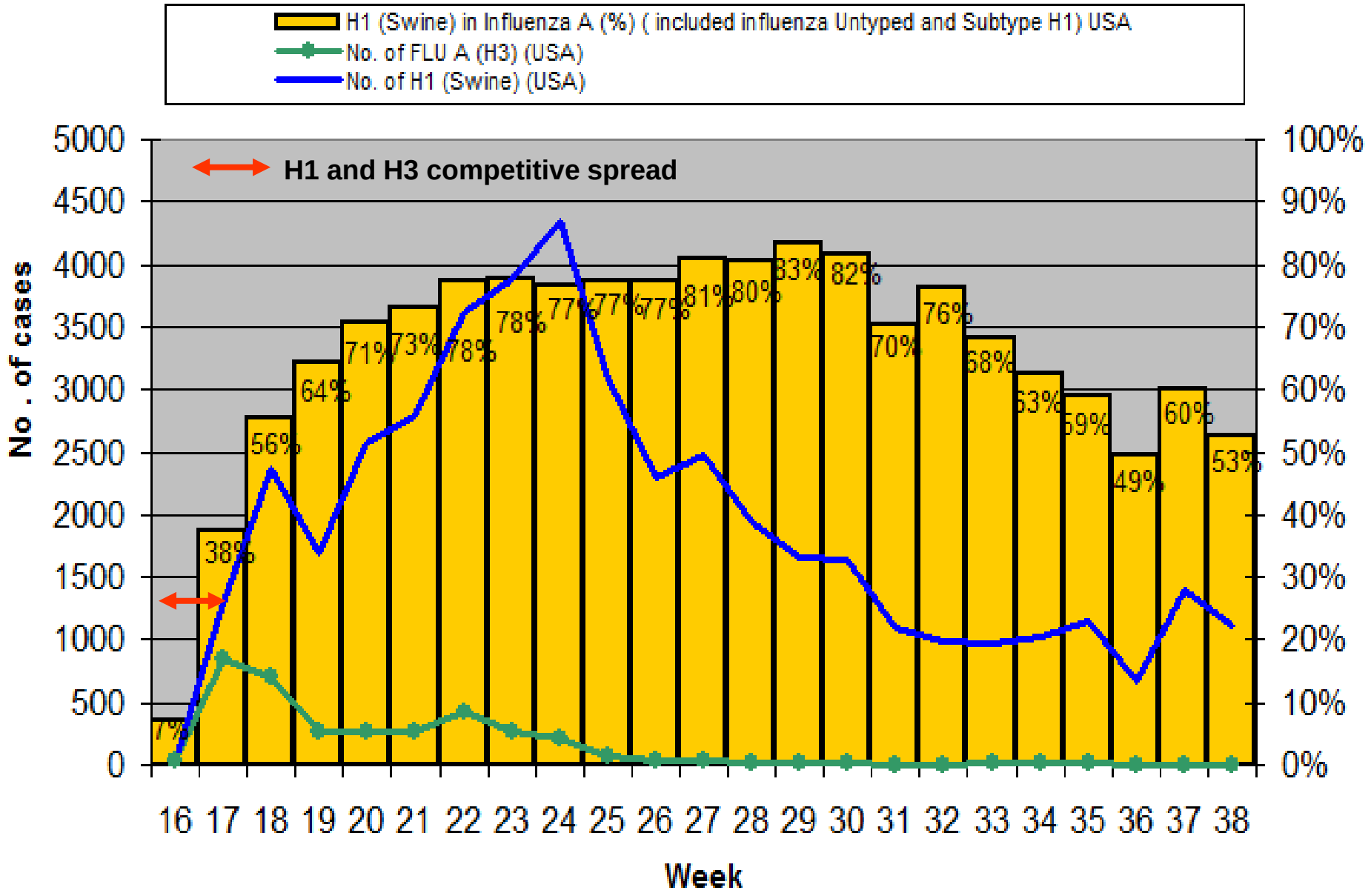
Prepared by ICB/IDCTC

All ILI cases tested and reported up till

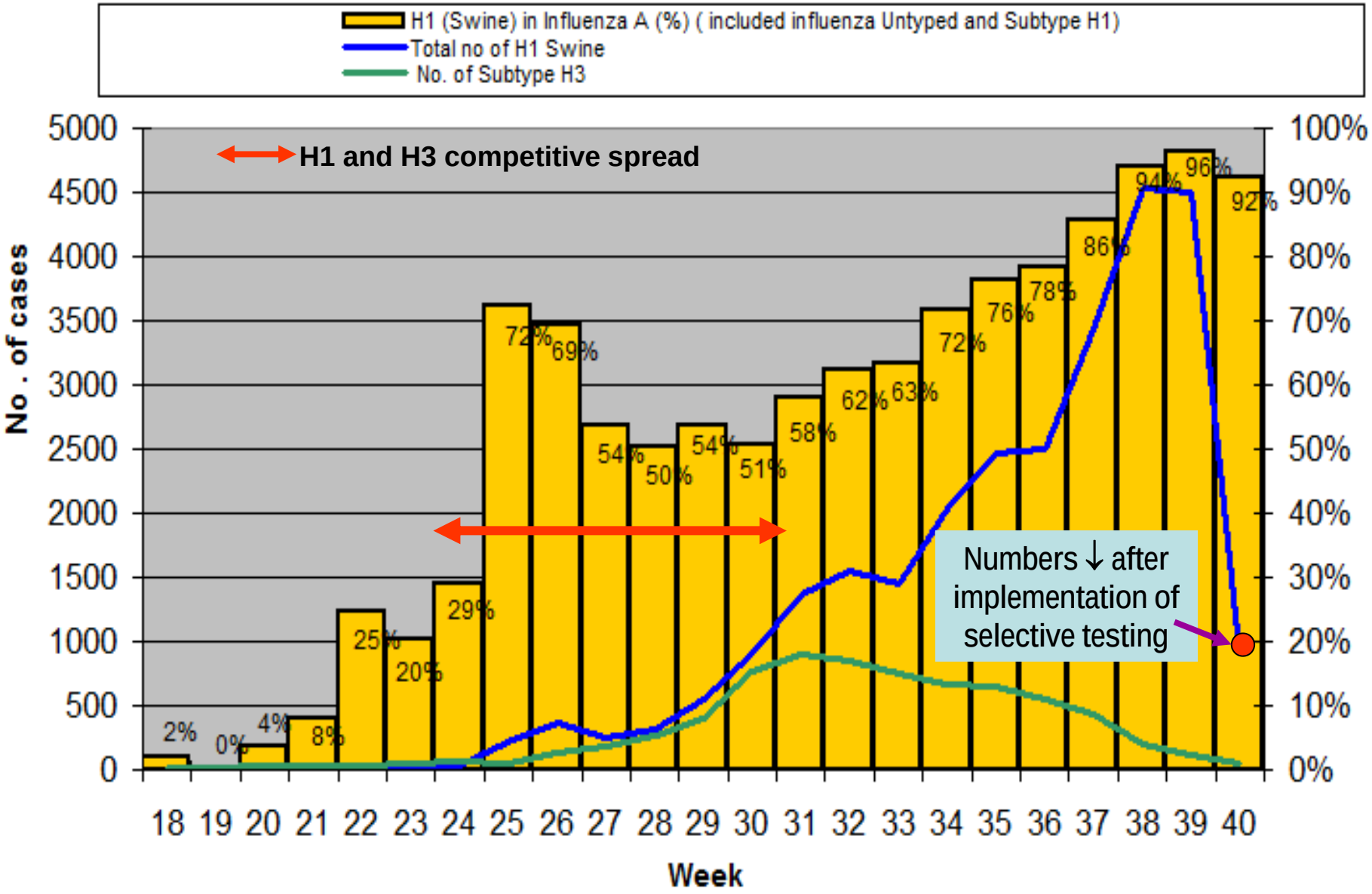
September 2009

Prepared by ICB/IDCTC

Weekly data of H1 (Swine) & H3 in USA



Weekly data of H1 (Swine) & H3 in HK



Total cases for HSI and H3N2 (7/7/2009 to 28/9/2009)

	Total cases (T)	Death	SC Cases (n)	Mean age	M/F
HSI:	26,026	26(0.01%)	108 (0.4%)	42*	1.4
H3N2:	5,616	10(0.02%)	29 (0.4%)	67*	3.8

*statistical differences are noted for age
SC: Serious and critical cases – hospitalized.

"Pandemic and seasonal influenza infections were substantially similar in terms of patients' symptoms, risk factors, and proportion hospitalized."

Carcione et al: EID,16(9),1388

Critical / Serious patients : HSI and H3N2 in Hong Kong (7/7/2009 to 28/9/2009)

Medical conditions	HSI				H3N2			
	ICU Admission		Total n(%) (N=108)	Total n(%) (n= 26017)	ICU Admission		Total n (%) N=29	Total n (%) n=6605
	YES	NO			YES	NO		
Any one condition	50 (46.3%)	25 (23.2%)	75 (69.4%)	**75(0.28%)**	12 (41.4%)	7 (24.1%)	19 (65.5%)	**19 (0.29%)**
Asthma	9 (8.3%)	5 (4.6%)	14 (13%)	**14(0.1%)**	0	1 (3.5%)	1 (3.5%)	**1(<0.01%)**
Chronic Obstructive pulmonary disease	8 (7.4%)	5 (4.6%)	13 (12%)	**13(0.1%)**	4 (13.8%)	2 (6.9%)	6 (20.7%)	**6(<0.1%)**
Diabetes	13 (12%)	5 (4.6%)	18 (16.7%)	**18(<0.1%)**	6 (20.7%)	1 (3.5%)	7 (24.1%)	**7(0.1%)**
Immunosuppression	4 (3.7%)	3 (2.8%)	7 (6.5%)	**7(<0.1%)**	0	2 (6.9%)	2 (6.9%)	**2(<0.1%)**
Chronic Cardiovascular disease	25 (23.2%)	11 (10.2%)	36 (33.3%)	**36(0.1%)**	8 (27.6%)	5 (17.2%)	13 (44.8%)	**13(0.2%)**
Chronic Renal disease	2 (1.9%)	2 (1.9%)	4 (3.7%)	**4(<0.1%)**	1 (3.5%)	0	1 (3.5%)	**1(<0.01%)**
Neurocognitive disorder	0	3 (2.8%)	3 (2.8%)	**3(<0.1%)**	0	0	0	**0**
Neuromuscular disorder	2 (1.9%)	3 (2.8%)	5 (4.6%)	**5(<0.1%)**	1 (3.5%)	0	1 (3.5%)	**1(<0.01%)**
Pregnancy	1 (0.9%)	0	1 (0.9%)	**1(<0.1%)**	0	0	0	
Seizure disorder	4 (3.7%)	1 (0.9%)	5 (4.6%)	**5(<0.1%)**	1 (3.5%)	0	1 (3.5%)	**1(<0.01%)**

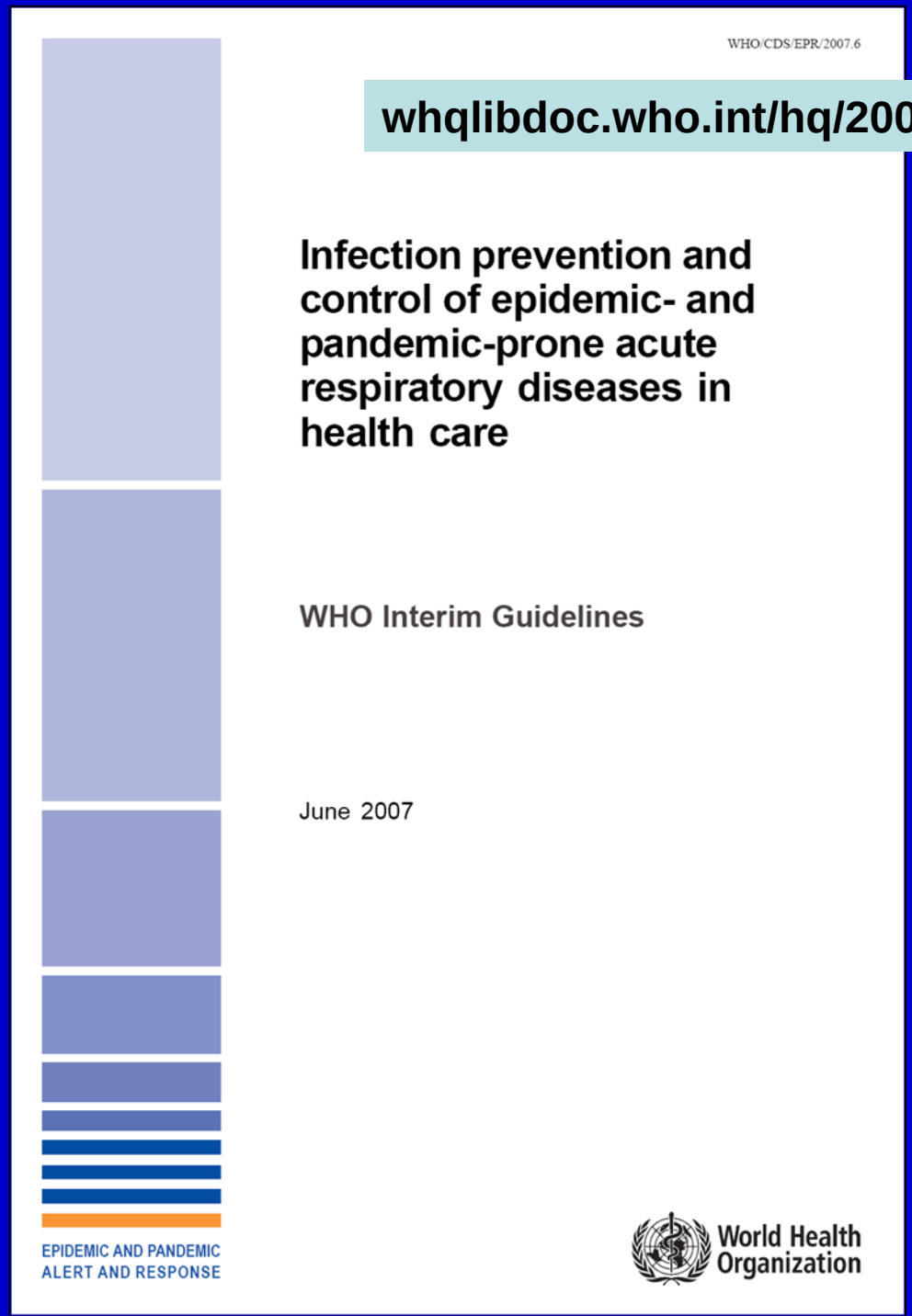
*≧2 Medical condition in HSI patient: 35 (32.4%) , ≧2 Medical condition in H3N2 patient: 8

Comparative epidemiology of pandemic and seasonal influenza A in households – (Cowling et al - in press NEJM) by secondary attack rate

Determination Of Influenza	Contacts of 45 pandemic cases 130 contacts	Contacts of 55 seasonal cases 137 contacts
RT- PCR	0.08	0.09
ILIs	0.06	0.04

Key concepts for Influenza Prevention (1)

What isolation precautions is needed for Influenza?

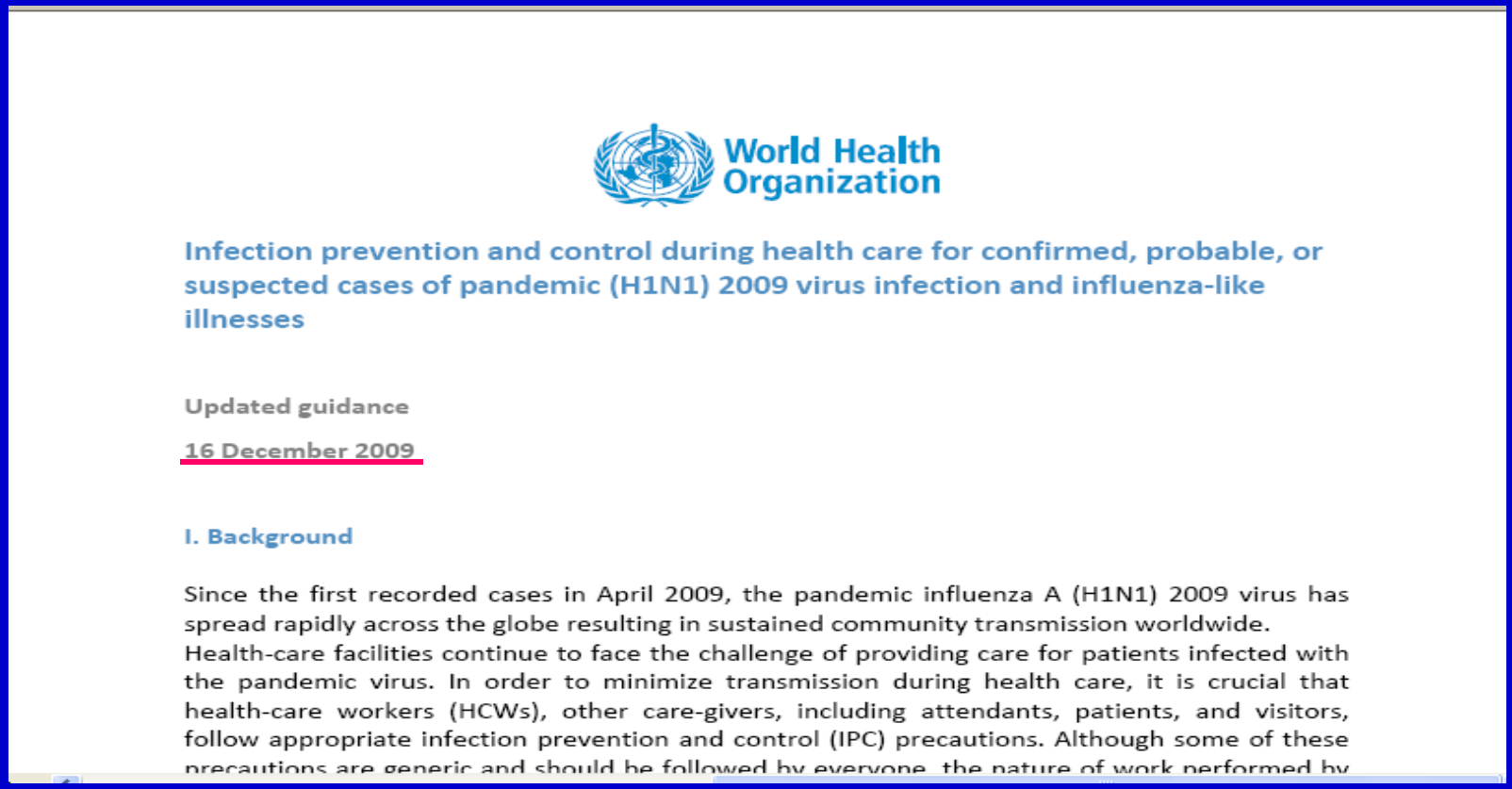


whqlibdoc.who.int/hq/2007/WHO_CDS_EPR_2007.6_eng.pdf

Table 1. Infection control precautions for HCWs and caregivers providing care for patients with ARDs according to a sample of pathogens

Precaution		No pathogen identified, no risk factor for ARD of potential concern (e.g. influenza-like illness without risk factor for ARD of potential concern)	Pathogen					
			Bacterial ARD[a]	Parainfluenza RSV & adenovirus	Influenza virus with sustained human-to-human transmission (e.g. seasonal influenza, pandemic influenza)	New influenza virus with no sustained human-to-human transmission (e.g. avian influenza)	SARS	Novel organisms causing ARD[b]
Hand hygiene[c]		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Gloves		Risk assessment[d]	Risk assessment[d]	Yes	Risk assessment[d]	Yes	Yes	Yes
Gown[e]		Risk assessment[d]	Risk assessment[d]	Yes	Risk assessment[d]	Yes	Yes	Yes
Eye protection		Risk assessment[f]	Risk assessment[f]	Risk assessment[f]	Risk assessment[f]	Yes	Yes	Yes
Medical mask on HCWs and caregivers		Yes	Risk assessment[f]	Yes	Yes	Yes[g]	Yes[h]	Not routinely[b]
Particulate respirator on HCWs and caregivers	for room entry	No	No	No	No	Not routinely[g]	Not routinely[h]	Yes
	within 1m of patient	No	No	No	No	Not routinely[g]	Not routinely[h]	Yes
	for aerosol-generating procedures[i]	Yes	Not routinely[i]	Not routinely[i]	Yes	Yes	Yes	Yes
Medical mask on patient when outside isolation areas[k]		Yes	Yes	Yes[l]	Yes	Yes	Yes	Yes
Single room		Yes, if available[m]	No	Yes, if available[m]	Yes, if available[m]	Yes	Yes	Not routinely[b]
Airborne Precaution room[n]		No	No	No	No	Not routinely[o]	Not routinely[o]	Yes
Summary of infection control precautions for routine patient care, excluding aerosol-generating procedures[i]		Standard plus Droplet Precautions	Standard Precautions	Standard plus Droplet plus Contact Precautions	Standard plus Droplet Precautions	Standard plus Droplet plus Contact Precautions	Standard plus Droplet plus Contact Precautions	Standard plus Airborne plus Contact Precautions

http://www.who.int/csr/resources/publications/cp150_2009_1612_ipc_interim_guidance_h1n1.pdf



World Health Organization

Infection prevention and control during health care for confirmed, probable, or suspected cases of pandemic (H1N1) 2009 virus infection and influenza-like illnesses

Updated guidance

16 December 2009

I. Background

Since the first recorded cases in April 2009, the pandemic influenza A (H1N1) 2009 virus has spread rapidly across the globe resulting in sustained community transmission worldwide. Health-care facilities continue to face the challenge of providing care for patients infected with the pandemic virus. In order to minimize transmission during health care, it is crucial that health-care workers (HCWs), other care-givers, including attendants, patients, and visitors, follow appropriate infection prevention and control (IPC) precautions. Although some of these precautions are generic and should be followed by everyone, the nature of work performed by

This guidance replaces guidance documents issued on 29th April and 25th June 2009 and remains **valid until 30th June 2010,**

1.1. When working in direct contact with patients, Standard[6] and Droplet Precautions[7] should always be applied.

Key concepts for Influenza Prevention (2)

Respiratory protection is needed for aerosol generating procedures.

Intubation and related procedures

Cardiopulmonary resuscitation

Bronchoscopy

Surgery and autopsy

ARD, pp43

The USA position

CDC and SHEA recommendations

"At the start of the 2009 outbreak, there was uncertainty regarding the transmission dynamics of the novel H1N1 virus. While seasonal influenza is spread by large respiratory droplets, a concern at the onset of any potential influenza pandemic is whether the pathogen will have a different dynamics or methods of spread."

13th May – CDC recommends N95 to be used in all situations

SHEA recommendations (10th June 2009)

Mode of transmission

"available data and clinical experiences suggest that H1N1 transmission occurs like seasonal influenza via droplets spread".

"SHEA endorses implementing the same practices recommended to prevent the transmission of seasonal influenza for the novel H1N1".

Isolation Measures:

"Negative pressure rooms are not needed for the routine care of such patients." "The N95 is *not* recommended as part of standard precautions". This applies even for "preventing seasonal influenza transmission."

High risk aerosol-generating procedures:

Enhance respiratory protection including the N95 is recommended for such procedures. The procedures should include

"**open suctioning of airway secretions, resuscitation involving emergency incubation or cardiac pulmonary resuscitation and endotracheal intubation".**

However the following should ***not*** be included:

"collection of nasopharyngeal specimens, close suctioning of airway secretions and administration of nebulized medications".

WHO/SHEA	Medical Masks	Gloves	Gowns	Eye Protection	N95
Droplets all cases	Yes	-	-	-	-
Standard Precautions	Yes	Yes	Yes	Yes	-
Aerosol Generating		Yes	Yes	Yes	Yes
Resp swabs	Yes	Yes	Yes	Yes	-
Collecting blood	Yes	Yes	-	-	-

CDC (13th May)					
Standard & Contact	-	Yes	Yes	Yes	Yes
Enter Isolation room - all HCWs					Yes

23rd July 2009

(http://www.cdc.gov/ncidod/dhqp/hicpac_transcript-07-23.html).

Healthcare Infection Control Practices Advisory Committee (HICPAC)

"No studies to date have demonstrated human infection occurring from naturally aerosolized influenza or human infection occurring by inhalation of artificially aerosolized influenza in ambient rather then directed air."

"confirm the presence of airborne influenza virus in various clinic locations"

Blachere et al (CID 2009 48 (4):438)

Finally a recent study focused on air sampling in a busy hospital emergency room during influenza's seasonal activity ….. detected in the air fraction was in small particles 1 to 4 micrometers in size.

PCR detection, rather then viral culture and assessment of viability, was utilized in this study, so the significance of these findings needs further investigation.

CDC website

HICPIC advisory committee
23rd July to vote on the latest recommendation

(http://www.cdc.gov/ncidod/dhqp/hicpac_transcript-07-23.html).

“endorse the use of surgical masks for the routine care of patients with confirmed or suspected, novel influenza A (H1N1)”

“it is appropriate at this time to recommend the use of N95 or higher respiratory protection for procedures that are likely to generate small particle aerosols.” The procedures are then listed to include “bronchoscopy, intubation under controlled or emergent situations, cardiopulmonary resuscitation, open airway suctioning and airway induction.”

Comment on Blachere et al: PCR positive is not the same as culture positive

1st September 2009

Institute of Medicine

- HCWs (including non-hospital settings) in close contact with individuals with nH1N1 or ILIs should use fit-tested N95 respirators.
- Endorse current CDC guidelines.

Page 17 : "confirm the presence of airborne influenza virus in various clinic locations"

Blachere et al (CID 2009 48 (4):438)

Also based on the Macintyre study done in China

Claims N95 statistically significant more protective then controls.

but surgical masks had no efficacy for any outcome

But there is a study not considered by IOM showing that surgical masks is as effective as N95……

Surgical Mask vs N95 Respirator for Preventing Influenza Among Health Care Workers: A Randomized Trail.

Mark Loeb et al, JAMA,, 2009;302(17), October 1 online

A randomized controlled trail of 446 nurses in 8 tertiary care hospitals – Ontario

	Surgical masks	N95
n =	225	221
Influenza infected =	50 (23.6%)	48 (22.9%)

p = 0.086 (meet criteria for non-inferiority)

+ HICPAC

WHO/SHEA	Medical Masks	Gloves	Gowns	Eye Protection	N95
Droplets all cases	Yes	-	-	-	-
Standard Precautions	Yes	Yes	Yes	Yes	-
Aerosol Generating		Yes	Yes	Yes	Yes
Resp swabs	Yes	Yes	Yes	Yes	-
Collecting blood	Yes	Yes	-	-	-

CDC (13th May)					
Standard & Contact + IOM		Yes	Yes	Yes	Yes
Enter Isolation room - all HCWs					Yes

But Macintyre group retracted their study

abcNEWS Health
ABC News Swine Flu Coverage

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CDC Flu Mask Decision Based on Flawed Study, Authors Say

Authors Retract Study CDC Used to Decide on Surgical Masks to Prevent Flu

By MICHAEL SMITH
PHILADELPHIA, Nov. 1, 2009

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A worker inspects an N95 face mask in this file photo. Authors retracted findings of a study that found N95 respirators were better than surgical masks at preventing flu.
(Romeo Ranoco/Reuters)

After a re-analysis prompted by questions from reviewers, the findings were no longer significant, said Holly Seale of the University of New South Wales in Sydney, Australia.

The original study, presented earlier this year, formed the basis of several important policy decisions, including Centers for Disease Control and Prevention guidance on the use of masks in a health care setting.

The retraction -- near the end of a presentation at the annual meeting of the Infectious Diseases Society of America -- prompted a "rush to the microphones" by

ABC News Swine Flu Coverage New


Panic: H1N1 Vaccine Shortag Roil Public
Health Secretary Kathleen Sebelius urges Americans to patient.

- Panic: H1N1 Vaccine Shortages Roil Public
- Swine Flu Emergency: What Does It Mean?
- H1N1 Vaccine Delay Dogs Doctors, Patients

http://abcnews.go.com/Health/SwineFluNews/cdc-flu-mask-decision-based-flawed-study-authors/Story?id=8966585&page=1

November 5, 2009

President Barack Obama
The White House
1600 Pennsylvania Avenue, NW
Washington D.C. 20500

Dear President Obama:

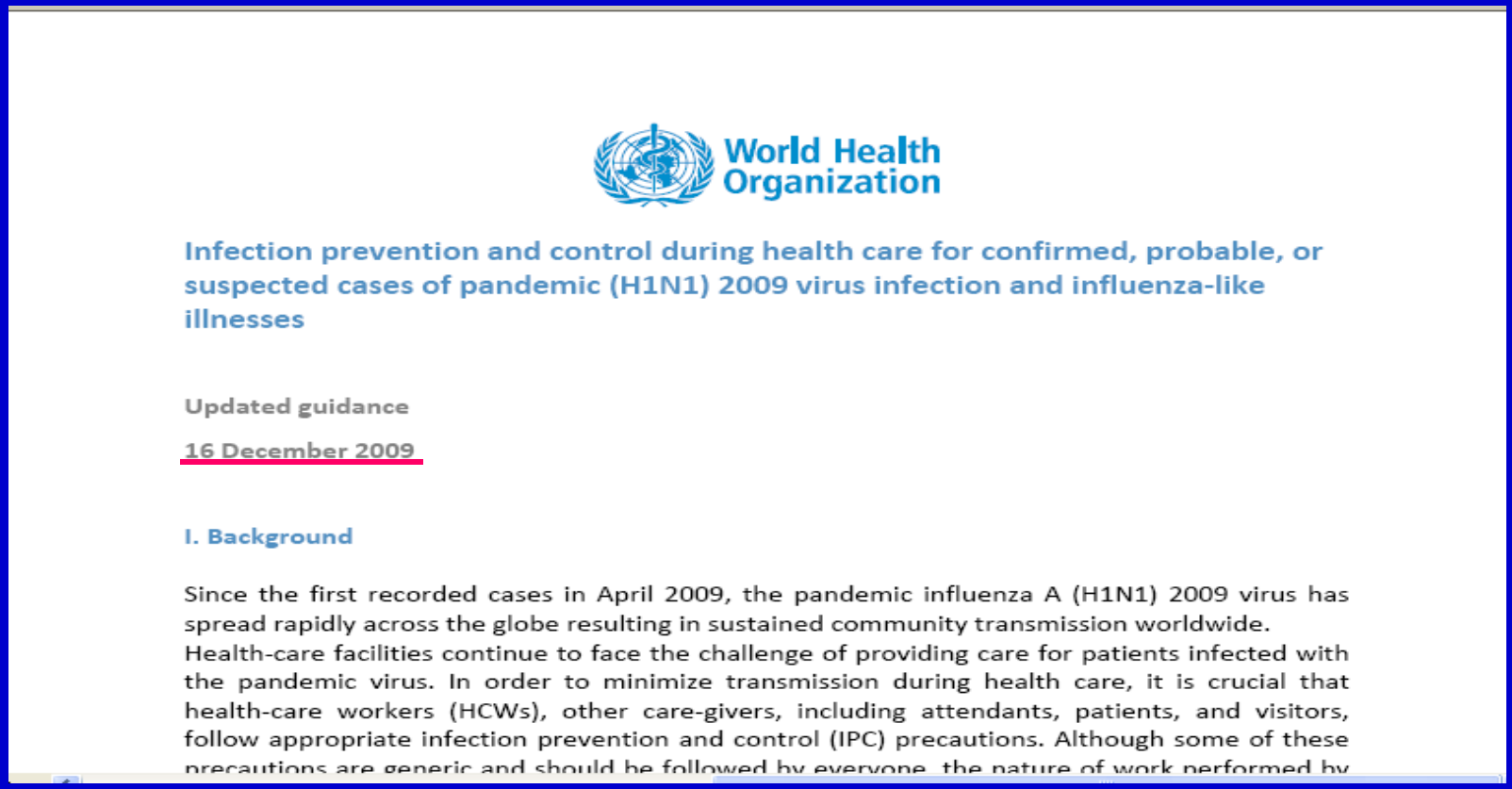
During this state of national emergency due to the 2009 H1N1 influenza pandemic, it is imperative that healthcare professionals and facilities receive clear, practical, and evidence-based federal guidance to ensure patient and healthcare worker safety. With this in mind, the Society for Healthcare Epidemiology of America (SHEA), Infectious Diseases Society of America (IDSA), and Association of Professionals in Infection Control and Epidemiology (APIC) write to express significant concern with the federal guidance, developed by your Administration in cooperation with several agencies and recently issued by the Centers for Disease Control and Prevention (CDC), and Occupational Safety and Health Administration (OSHA) requirements concerning the use of personal protective equipment (PPE) by healthcare workers in treating suspected or confirmed cases of H1N1 influenza.

CDC change in June 2010.

"In a change from previous pandemic H1N1 recommendations, the CDC advises that healthcare workers wear face masks [ie. the surgical masks] when entering the room of a patient who has confirmed or suspected flu. Earlier recommendations suggested that staff wear N-95 respirators during all contact with flu patients; however, the new guidance recommends N-95s or higher levels of protection during risky procedures such as aerosol-generating procedures."


EMPUJE
AP

http://www.who.int/csr/resources/publications/cp150_2009_1612_ipc_interim_guidance_h1n1.pdf



World Health Organization

Infection prevention and control during health care for confirmed, probable, or suspected cases of pandemic (H1N1) 2009 virus infection and influenza-like illnesses

Updated guidance

16 December 2009

I. Background

Since the first recorded cases in April 2009, the pandemic influenza A (H1N1) 2009 virus has spread rapidly across the globe resulting in sustained community transmission worldwide. Health-care facilities continue to face the challenge of providing care for patients infected with the pandemic virus. In order to minimize transmission during health care, it is crucial that health-care workers (HCWs), other care-givers, including attendants, patients, and visitors, follow appropriate infection prevention and control (IPC) precautions. Although some of these precautions are generic and should be followed by everyone, the nature of work performed by

This guidance replaces guidance documents issued on 29 April and 25 June 2009 and remains **valid until 30 June 2010,**

Key elements for IP in health-care settings

1. Health-care facility managerial activities
2. Basic IC recommendations for all health-care facilities
3. Respiratory hygiene/cough etiquette
4. Triage of febrile cases
5. Outpatient settings
6. Placement of patients with presumptive H1N1
7. Visitors and family members
8. Specimens transport
9. Pre-hospital care
10. Occupational Health
11. H1N1 vaccination
12. PPE when supplies are limited
13. Waste disposal
14. Dishes/eating utensils
15. Linen and laundry
16. Environmental cleaning
17. Patient care equipment
18. Patient discharge
19. Health facility engineering controls
20. Mortuary care
21. Health care in the community

Key concepts for Influenza Prevention (3)

Does good infection control practices work?

Clinical vs nonclinical HCWs : 6.0% vs 4.3% $p<0.001$

n = 526 HCWs in Saudi Arabia

ICHE 2010;31 (10):1004

"Infection control personnel were overstretched throughout the study"

CDC reported 70 infected HCWs and majority (80%) are clinical

CID 2011:52 (Suppl 1)

"The total number of infected HCP is likely underreported"

Only 20% reported using mask during all encounters

Reporting of pH1N1 cases among HA staff

1. All staff infected to be notified to the government
   – pH1N1 is a notifiiable disease

2. Mandatory reporting within HA for all staff –

   mid June to end of August – all staff

Survey by ICN on all staff reported – demographic information
clinical presentation
nature of exposure

Testing is provided without charge at staff clinics

Testing done by RT – PCR and viral culture

A confirmed cases given 7 days leave

Data should be complete – mandatory reporting, granting 7 days leave, difficult to hide ILIs, follow up by CICO office

A study comparing clinical and non-clinical staff

under the condition of mandatory reporting

Seto et al: CID (in press)

Comparison of Non-clinical and Clinical Staff Infected by pH1N1

	Non-clinical	Clinical	Statistical significance (p)
Total number of staff (n)	18759	40511	
Number infected			
A. During mandatory reporting for all staff	119 (0.63%)	249 (0.62%)	0.82 RR: 0.98 (95% CI 0.78-1.2)
B. Data during the entire pandemic period	NA	1039 (2.6%)	
For Infected staff (n)	**119**	**1039**	
Demographic data			
M	36 (30.3%)	253 (24.4%)	0.19
F	83 (70%)	786 (75.6%)	
Mean age	38.6	37	0.45

HK – 3.6% for same age group

(Cowling et al – accepted CID)

Exposures to pH1N1 in the community

Contact history with confirmed case in community	Non-clinical (n=119)	Clinical (n=1039)	p
Family	16 (12.6%)	178 (17.1%)	0.74
Friend	8 (6.7%)	35 (3.4%)	0.11
Others - Public transportation	0	2 (0.2%)	-
No perceived community contact	96 (80.7%)	824 (79.3%)	0.82

Exposures to pH1N1 in the hospital

	Non-clinical	Clinical	p
Unprote confi healt			0.97
			0.6
Infectio due t			0.12

The greatest risk in the health care setting in Hong Kong is non-protected exposures to an unknown infected colleagues – but it should be the same all over the city

Serology study by Cowling et a
To be submitted

85% not vaccinated Feb – March 2010	Non-clinical	Clinical	p
Total cases (n)	147	439	
Positive serology titre ≥ 1:40 (Viral microneutralization)	20 (14%)	54 (12%)	0.79

"There was no statistically significant difference between HCWs and community population in March 2010 in the proportion with antibody titer ≥1:40"

"Healthcare workers in hospitals do not have a higher risk of influenza then non healthcare workers" - Berlin 07/07 (Williams et al BMC ID 2020)

Hand Hygiene compliance – **Feb 2010**

Jobs Category	Total no		% compliance
	Complied	Observed	
Nurse	13579	19056	71.3%
Doctor	2322	4378	53.0%
HCA & supporting	6248	9127	68.5%
Others	2328	3399	68.5%
Total	24477	35690	68.8%*

* Range : 30-96% by hospitals

"Infection control guidelines for the pandemic were issued very early on 29 April 2009 stipulating droplet precautions as recommended by the World Health Organization. Educational sessions conducted organization-wide have more than 39,000 staff in attendance."

Seto et al, CID (in press)

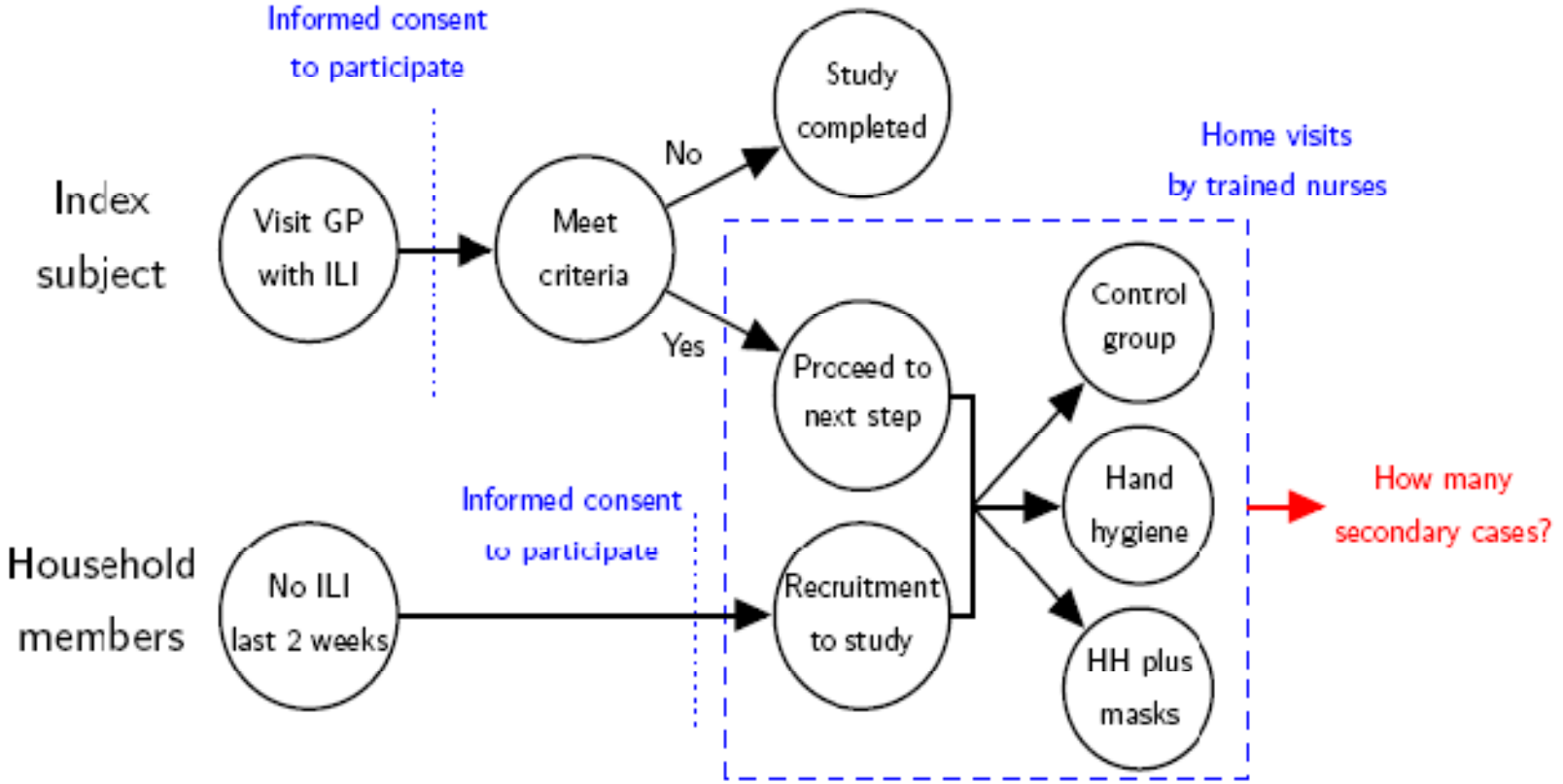
The routine use of PPE when on duty

Routine PPE when on duty	Non-clinical	Clinical
Surgical mask	70 (59%)	999 (96.2%)
N95	0	1 (0.1%)
Face shield	1 (0.8%)	30 (2.9%)
Eye shield	0	3 (0.3%)
Gloves	1 (0.8%)	1 (0.1%)
Gown	0	2 (0.2%)

Preventing Influenza in the community

Can Hand Hygiene make a difference?

HK NPI study design



Index cases are recruited from outpatient clinics. Households are followed-up for 7 (10 in pilot study) days with symptom diaries including 3-4 home visits to collect nose and throat swabs from all household members.

- *58% reduction of transmission w HH*
- *Hands play a role in flu transmission*

Key results of NPI study, 2008

Table: Secondary attack ratios in the contacts of 154 analyzed households where the intervention was applied within 36 hours of symptom onset in the index case.

	Secondary attack ratio (95% CI)*						p-value†
	Control *(n=183)*		Hand hygiene *(n=130)*		Mask+HH *(n=149)*		
RT-PCR-confirmed influenza	0.12	(0.08, 0.18)	0.05	(0.02, 0.11)	0.04	(0.01, 0.09)	0.04
Clinical influenza(1)	0.22	(0.17, 0.29)	0.11	(0.06, 0.17)	0.18	(0.12, 0.25)	0.03
Clinical influenza(2)	0.07	(0.03, 0.11)	0.04	(0.01, 0.09)	0.07	(0.04, 0.13)	0.52

* By the exact binomial method.

† By Pearson chi-square test adjusted for within-household correlation.

(1) is at least 2 of fever$\geq$37.8°C, cough, headache, sore throat, aches or pains in muscles or joints.

(2) is fever$\geq$37.8°C plus cough or sore throat.

Cowling et al, Annuals of Internal Medicine – 2009 Vol.151 No.7 p.437-446

Table 3. **Secondary Attack Ratios of RT-PCR–Confirmed Influenza Virus Infection and Clinical Influenza**

Interval Between Symptom Onset and Intervention	Determination of Influenza*	Control Group (n = 279)		Hand Hygiene Group (n = 257)		Facemask Plus Hand Hygiene (n = 258)		*P* Value†
		Cases, *n*	SAR (95% CI), %‡	Cases, *n*	SAR (95% CI), %‡	Cases, *n*	SAR (95% CI), %‡	
Any	RT-PCR confirmed	28	10 (6–14)	14	5 (3–9)	18	7 (4–11)	0.22
	Clinical definition 1	53	19 (14–24)	42	16 (12–21)	55	21 (16–27)	0.40
	Clinical definition 2	14	5 (2–8)	9	4 (2–6)	18	7 (4–11)	0.28
≤36 h§	RT-PCR confirmed	22	12 (7–18)	7	5 (1–11)	6	4 (1–7)	0.040
	Clinical definition 1	42	23 (16–30)	14	11 (5–17)	27	18 (12–24)	0.032
	Clinical definition 2	12	7 (3–11)	5	4 (1–7)	11	7 (3–12)	0.52

RT-PCR = reverse-transcription polymerase chain reaction; SAR = secondary attack ratio.

* "Clinical definition 1" is at least 2 of the following: temperature ≥37.8 °C, cough, headache, sore throat, and myalgia. "Clinical definition 2" is temperature ≥37.8 °C, plus cough or sore throat.

† For difference among the 3 groups by the Pearson chi-square test, adjusted for within-household correlations of 0.12 for the RT-PCR–confirmed secondary attack ratios and 0.04 and 0.07 for the clinical influenza secondary attack ratios.

‡ The secondary attack ratio at the individual level was defined as the proportion of household contacts of an index case that subsequently became infected with influenza. The CIs were calculated by using a cluster bootstrap method (20), not accounting for within-household correlation, and the resulting intervals may therefore slightly underestimate the uncertainty about the secondary attack ratios.

§ Based on 183 patients in the control group, 130 in the hand hygiene group, and 149 in the facemask plus hand hygiene group.

Ann Intern Med. 2009;151:* * * FILL THIS IN * * *. www.annals.org
For author affiliations, see end of text.
ClinicalTrials.gov registration number: NCT00425893.
This article was published at www.annals.org on 4 August 2009.

Appendix Table 2. **Secondary Attack Ratios for RT-PCR–Confirmed and Clinical Influenza When the Intervention Was Applied Within 48 Hours of Symptom Onset in the Index Patient***

Interval Between Symptom Onset and Intervention	Determination of Influenza†	Secondary Attack Ratio (95% CI), %‡			*P* Value§
		Control Group (*n* = 214)	Hand Hygiene Group (*n* = 167)	Facemask Plus Hand Hygiene Group (*n* = 171)	
≤48 h	RT-PCR confirmed	11 (6–16)	6 (2–10)	4 (2–7)	0.077
	Clinical definition 1	20 (14–26)	13 (7–18)	19 (13–25)	0.182
	Clinical definition 2	6 (2–10)	3 (1–6)	8 (4–12)	0.24

RT-PCR = reverse-transcription polymerase chain reaction.

* Based on 552 household contacts in 184 analyzed households.

† "Clinical definition 1" is at least 2 of the following: temperature ≥37.8 °C, cough, headache, sore throat, and myalgia. "Clinical definition 2" is temperature ≥37.8 °C, plus cough or sore throat.

‡ The CIs were calculated by using a cluster bootstrap method (20), not accounting for within-household correlation, and the resulting intervals may therefore slightly underestimate the uncertainty about the secondary attack ratios.

§ For the difference among the 3 groups by the Pearson chi-square test, adjusted for within-household correlation.

The Key -
always be alert

Put on protective gear when needed

Thank you

Sent to cluster for distribution to ICT of hospitals for their use
Before the end of Jan 2010