

How to control a pandemic in this globalization era — the H1N1 2009 experience

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Public Health Emergency of International Concern (PHEIC):

**'an extraordinary event which ...
constitutes a public health risk
to other States through the
international spread of disease
and (which) require a
coordinated international response'**

- IHR (2005)



The influenza A (H1N1) 2009 experience

- Initial travel related Public Health (PH) measures
 - Panic reactions: politicians, media
 - Entry measures
 - Exit measures, other >>> **Conclusions**
- PH measures for international mass events: **hajj**
- PH / **individual** measures in times of pandemic
 - General hygiene
 - Vaccination
 - Antivirals

WHO recommendations

- “WHO is not recommending travel restrictions related to the outbreak of ... influenza A(H1N1)...“

Influenza A(H1N1) - update 31

Individuals who **are ill should delay travel plans** and returning travelers **who fall ill should seek appropriate medical care**. These recommendations are prudent measures which can limit the spread of many communicable diseases, including influenza.

www.who.int/csr/don/2009_05_17/en/index.html



Panic reaction by politician: Suspend flights

- Europe urged to stop flights, April 29
- *„We will ask our European colleagues to consider the suspension of flights going to Mexico,“ French health minister Roselyne Bachelot said Wednesday after talks in Paris with President Nicolas Sarkozy.*
- But the European Commission cannot impose an EU-wide ban, an official said.



What if travelers use other hubs?!



Panic reaction by politician + media: Close borders



- **April 28, 2009** The Pan American Health Organization / World Health Organization (PAHO/WHO) advises countries **not to restrict regular travel or to close borders.**

http://new.paho.org/hq/index.php?option=com_content&task=view&id=1286&Itemid=569

- **May 3, 2009** “If this is so important, why haven’t we closed the border?” Fox News

The **non-coordinated** response: What travel advisories have been issued?

GPHIN, 6 May 2009 — Examples

- No travel restriction
 - Postpone non-essential travel — all
 - To Mexico
 - To Mexico, US, Canada
 - To countries with confirmed case
 - To Portugal
 - To Britain, Spain and US
 - To **China**
 - Ban non-stop flights to Mexico
 - Scan all PAX from Mexico, US
 - Self-quarantine 10 days after travel
 - Closure of borders
- WHO, UN (unless scientific basis)
- India, Malta, New Zealand**
Canada, **Indonesia, Israel, USA**
Malaysia
Australia, Belize, Bosnia, Kuwait
Chinese Taipeh (Taiwan)
Uganda
Mexico
Argentina, China, Cuba, Peru
Chile, France, some **Pacific Islands**
WHO in the **Philippines**
neighbours of Ukraine (Nov 2009)

Inbound measures — in flight

- Doctor on board: Lufthansa LH 499 MEX-FRA only
- Cabin crew invited to observe and report
- **Captain must notify ATC about sick passengers:**
 - ICAO, Aircraft general declaration — Annex 9, Appendix 1: “...signs and symptoms for suspected communicable diseases, updated” (www.icao.int/icao/en/med/guidelines.htm)
 - Fever (temperature $\geq 38^{\circ}\text{C}/100^{\circ}\text{F}$) PLUS ≥ 1 of following
 - Appearing obviously unwell
 - Persistent coughing
 - Impaired breathing (etc.)
- ICAO State letter AN 5/22-07/55; 20 Jul 07
- **‘Global harmonization is the goal’ Dr. Evans**
- See also IHR, Article 28, 5



Health professionals on arrival

- Visual screen in cabin / while deplaning

BUT: how to diagnose influenza in 10 seconds

- Other screens

- Temperature

BUT: many H1N1 patients afebrile!

Passenger afebrile in incubation period

- Physical examination

BUT: what to examine: throat, chest, other?

- To reply to questions: OK

Health professionals on arrival

- Visual screen in cabin / while deplaning
- Other screens
 - Temperature
 - Physical examination



H5N1 Exercise Zurich Airport, 7/8 April 2009



Temperature check devices

- Mainly introduced on **Asian** airports
- Demonstrated to be ineffective in SARS:
35 million screened,
0 cases detected (!)

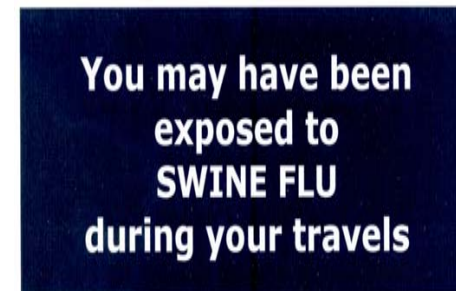
Bell DM, EID 2004;10:1900-6

Bangkok Airport, 27 Apr 09



Information leaflets

- Transmitted to each PAX vs. self-serve
- Information on
 - A(H1N1) / „new influenza“
 - Typical symptoms are...
 - What to do if symptoms
 - occurred during flight
 - occur within 7 days



IMPORTANT!

Do you feel like you have a fever now AND have a cough or sore throat?

If YES, please tell a customs or public health officer or immediately seek medical care and show them this card.

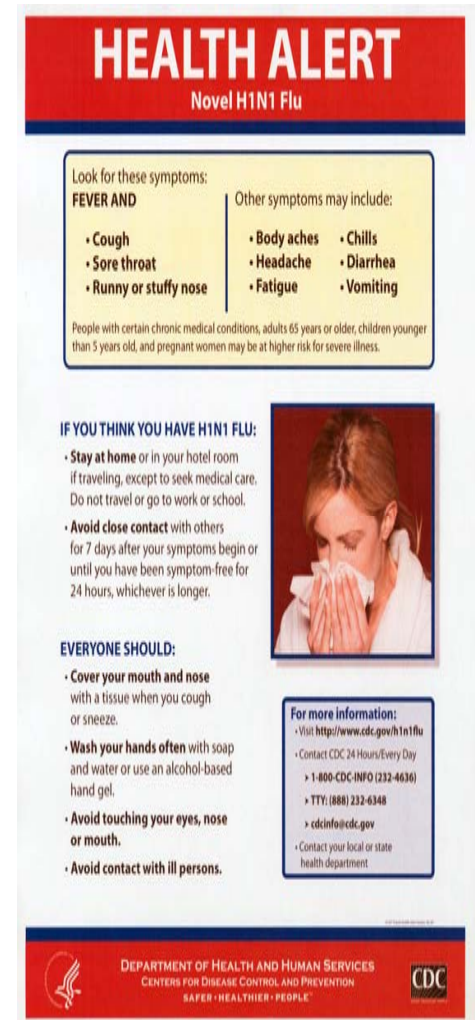
Save this card for 7 days and look for symptoms on the next page!

Today's date: _____

Keep this card until: _____



Swine Flu Travel Health Alert Notice
04-09
SAFER • HEALTHIER • PEOPLE™



Questionnaire / Contact cards

- To be completed by PAX
- Contains information on
 - Flight, including seat number
 - Person, including phone, e-mail
 - Travel partners
 - Symptoms
- Only in some countries: Exposure
- <http://www.who.int/csr/ihr/PLC.pdf>

PUBLIC HEALTH PASSENGER LOCATOR CARD

Public Health Passenger Locator Card to be completed when public health authorities suspect the presence of a communicable disease. The information you provide will assist the public health authorities to manage the public health event by enabling them to trace passengers who may have been exposed to communicable disease. The information is intended to be held by the public health authorities in accordance with applicable law and to be used only for public health purposes.

Flight Information			
1. Airline and Flight Number		2. Date of arrival	
Airline	Flight Number	DD MM YYYY	3. Seat Number where you actually sat on the aircraft

Personal Information			
4. Name			
Family Name		Given Name(s)	
Your Current Home Address (including country)			
Street Name and Number		City	State/Province
Country		ZIP/Postal Code	
Your Contact (Phone Number (Residential or Business or Mobile))			
Country code	Area Code	Phone Number	E-mail address
Passport or Travel Document Number		Issuing Country/Organization	

Contact Information			
5. Address and phone number where you can be contacted during your stay or, if visiting many places, your cell phone and initial address			
Street Name and Number		City	State/Province
Country		ZIP/Postal Code	Telephone Number (including country code) or mobile phone number

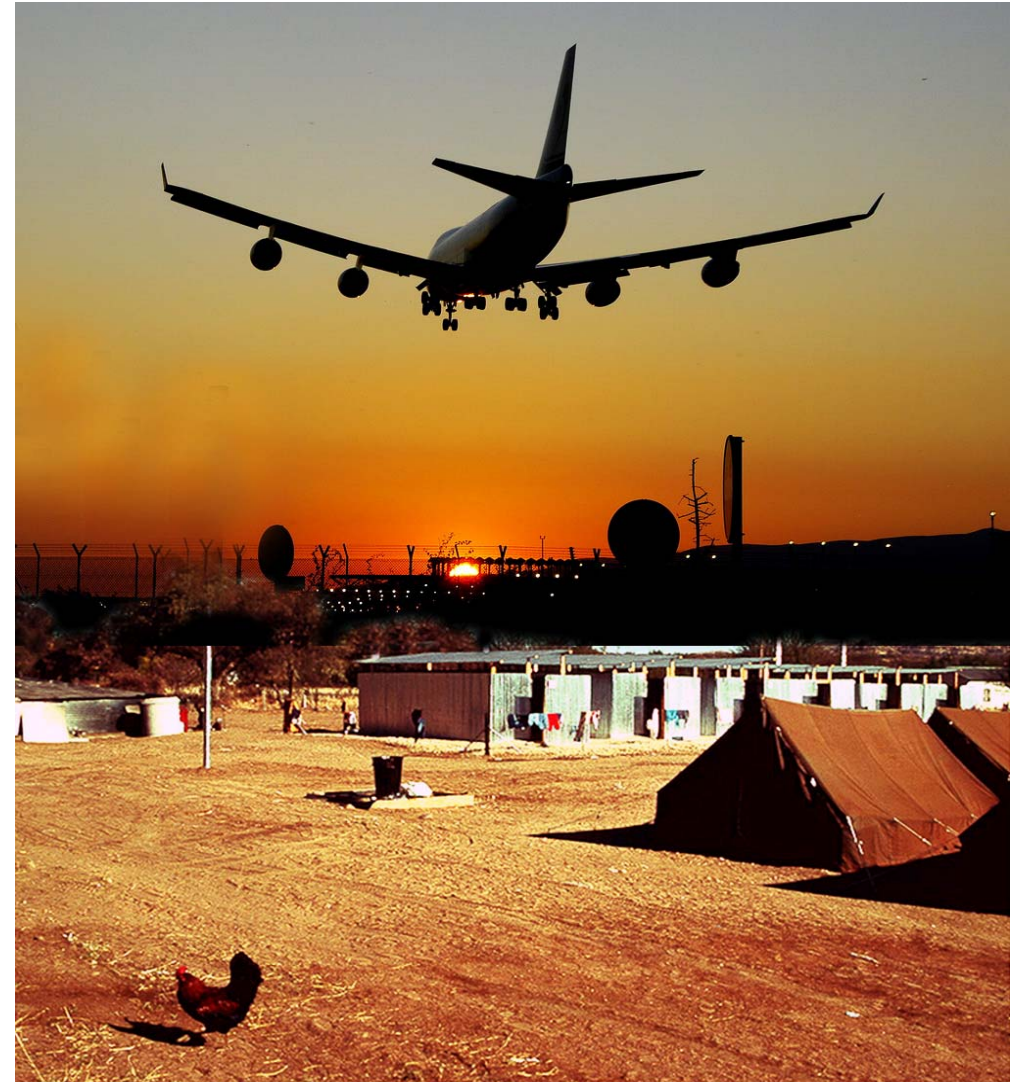
6. Contact Information for the person who will best know where you are for the next 30 days, in case of emergency or to provide critical health information to you. Please provide the name of a close personal contact or a work contact. This must NOT be you.			
a. Name			
Family Name		Given Name(s)	
b. Telephone Number			
Country code	Area Code	Phone Number	E-mail address
c. Address			
Street Name and Number		City	State/Province
Country		ZIP/Postal Code	

7. Are you traveling with anyone else? YES/NO Circle appropriate response If so, who? (name of individual(s) or Group)

GOAL: advice on medication, self-isolation, ...

Quarantine

Within / next to
the **airport** —
recommended by media



Quarantine

- In hotels: HKG

Health workers transit materials to Metropark Hotel where a guest was confirmed to be the first case of H1N1 in the Wanchai district.



Hotel residents wait for release from quarantine at the Metropark Hotel where they were held for a week in Hong Kong Friday, May 8, 2009.

Exit screening — Mexico only

- Health questionnaire
- Visual check
- Temperature check
- Spitting test (?!)



We are facing a new strain of flu virus which constitutes a possible outbreak.



We ask you to please answer this survey which will help you find out if you are sick.



NAME

AGE

GENDER M F

Do you have the following symptoms:

	YES	NO
Fever higher than 39° C	<input type="checkbox"/>	<input type="checkbox"/>
Cough	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Headache	<input type="checkbox"/>	<input type="checkbox"/>
Limb pain	<input type="checkbox"/>	<input type="checkbox"/>
Joint pain	<input type="checkbox"/>	<input type="checkbox"/>
Eye redness	<input type="checkbox"/>	<input type="checkbox"/>
Nasal flux	<input type="checkbox"/>	<input type="checkbox"/>

If you have all of these symptoms we recommend you to postpone your trip and visit a doctor.

Examination and tests on arrival

PART V — PUBLIC HEALTH MEASURES

Article 31 Health measures relating to entry of travellers

1. Invasive medical examination, ... shall not be required as a condition of entry of any traveller to the territory of a State Party

„invasive“ means the **puncture / incision of the skin** or insertion of an instrument or foreign material into the body or the examination of a body cavity. For the purposes of these Regulations, **medical examination of the ear, nose and mouth, temperature assessment using an ear, oral or cutaneous thermometer, or thermal imaging**; medical inspection; auscultation; ... external collection of ... saliva samples; ... shall be considered to be **non-invasive**;

Swabs? Time until results are available?



Occupational health problems

● Staff

- Handwashing
- Cough etiquette
- Stay home if sick
- Masks
- WHO: guidance 3 May

at airports

OK
OK
OK
surgical if <1 m

cabin crews

OK
OK
OK
surgical if ill PAX
US: N95 (untrained)

● Passengers

With symptoms

isolate in room

separate 6 ft (?)

Conclusions on initial measures taken

- In **contrast** to WHO recommendations
- **No international coordination (Future NET)**
- National decisions driven by
 - Fear, emotion, media, politicians
 - Lack of Public Health concept
 - Many procedures **useless „alibi measures“**
- Useful **in initial phase** (evidence?):
E.g. Exit screening, report by crew, information, contact tracing

How to control a pandemic?

- Influenza A (H1N1) 2009 **containment at source impossible** in April as
 - already 2 or more continents with cases
 - asymptomatic contagious initial phase
- Adapted response: **WHO Phase 5:**
„implementation of the planned mitigation measures“ — *should be evidence based!*

<http://www.who.int/csr/disease/influenza/PIPGuidance09.pdf>, Khan K et al. NEJM 2009

What could authorities contribute?

- Who is in charge? WHO? IATA? States!
- Avoid confusion / contradiction
 - Between States
 - Within a single State
- Improve **coordination** at least within region
 - All hubs same procedures (roads / railways / ports?)
 - Identical occupational health recommendations, e.g. masks
- Strategy: pragmatism vs. (idealistic) purism
 - Consider feasibility
 - Avoid to be driven by purely political arguments, or the media.

Pandemic H1N1 and the 2009 hajj

- Usually 2.5 million pilgrims from 160 countries
- KSA / WHO consultation to mitigate effects of pandemic
 - During hajj **end of November 2009**
 - By returning pilgrims
 - Particularly to resource-poor countries



Recommendations for 2009 hajj

- High risk groups **voluntarily refrain** from hajj
 - Pregnant women, chronic disease
 - Age <12y or >65y (25% senior pilgrims!)
- Thermal screening > isolation if ILI
- Non-pharmaceutical options
 - Washing required before 5 prayers (soap)
 - Hand sanitizers **with alcohol permitted**
 - **Cough etiquette**, but no face masks

Pharmaceutical recommendations for hajj 2009

- Monovalent pandemic H1N1 vaccine
 - not available in all countries \geq 2 weeks pre-departure
 - proof of vaccination required from countries with supplies in time to receive a hajj visa
- Antivirals
 - no routine chemoprophylaxis recommended
 - treatment a.s.a.p. for
 - all hospitalized persons
 - outpatients in high-risk groups

Ebrahim SH et al. *Science* 2009;326:938-40

Khan K et al. *J Travel Med* 2010;17 (in press)



Hajj 2009 — what happened?

- Pilgrims 1.6 million
- Vaccination rates
 - Seasonal influenza 40%
 - H1N1 influenza 10%
- H1N1 infections
 - confirmed cases 73
 - **deaths** **5**

Travel health recommendations in an influenza pandemic (1)

- WHO: no travel restrictions
- Travel health professional: follow national guidelines for in- & outbound customers
- Surveillance networks: limited function now, except
 - H1N1 2009 mutations
 - Antiviral resistance
- „Experts“: be ready to answer questions
 - To health authorities: national, regional
 - To media (base on evidence, basic PH rules)

Travel health recommendations in an influenza pandemic (2)

Non-pharmaceutical measures

- Individuals who **are ill should delay travel plans**
- Travelers who **fall (severely) ill should seek appropriate medical care**
- Social distancing: **where feasible**
- Worldwide propagated hygiene measures



Wash hands thoroughly with soap frequently



Cover coughs and sneezes



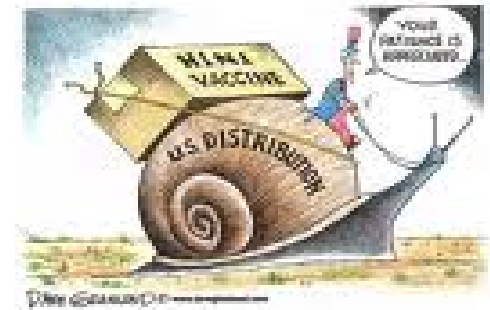
Wear a mask if symptomatic



Don't spit!

Travel health recommendations in an influenza pandemic (3)

Monovalent H1N1 vaccines



- Available vaccines

- Adjuvanted (MF59, AS03, etc) vs. Non-adjuvanted (USA)
- Split / subunit vs. Whole-cell
- Intramuscular (inactivated) vs. Intranasal (live)
- Produced on chicken-egg vs. on cell-culture

- Indicated from 6 months, including pregnancy

- Experience to date

- > 100 million, over 50,000 in pregnant women
- > 50 million with MF59 (oil-in-water, for > 10 years)

Travel health recommendations in an influenza pandemic (4)

Indication of H1N1 vaccines

- Often as per **national recommendations**
- In travelers particularly recommend / consider
 - **High risk groups and their travel companions:**
 - Age: very low, senior travelers from 50y (USA), 60/65y
 - Co-morbidity: particularly cardiopulmonary, immunological
 - Medical tourists
 - **High risk settings:**
 - Captive setting: Cruise ship, camp, sports mass gathering, tour group, crews
 - Occupational: medical, multiple contacts, incl. hotel staff
 - **All who request maximum protection**
- **Contraindications: none**, except history of massive reaction

Marti F et al. Expert Rev Vaccines 2008;7:679-87



Travel health recommendations in an influenza pandemic (5)

The future seasonal vaccines

Recommended composition of influenza virus vaccines for use in the 2010 southern hemisphere influenza season:

It is recommended that vaccines for use in the 2010 influenza season (southern hemisphere winter) contain the following:

- an **A/California/7/2009 (H1N1)**-like virus;
- an **A/Perth/16/2009 (H3N2)**-like virus;
- a **B/Brisbane/60/2008**-like virus.

<http://www.who.int/csr/disease/influenza/recommendations2010south/en/index.html>

Composition of influenza virus vaccines for use in the 2009-2010 northern hemisphere:

- an **A/Brisbane/59/2007 (H1N1)**-like virus;
- an **A/Brisbane/10/2007 (H3N2)**-like virus;
- a **B/Brisbane/60/2008**-like virus.

Travel health recommendations in an influenza pandemic (5)

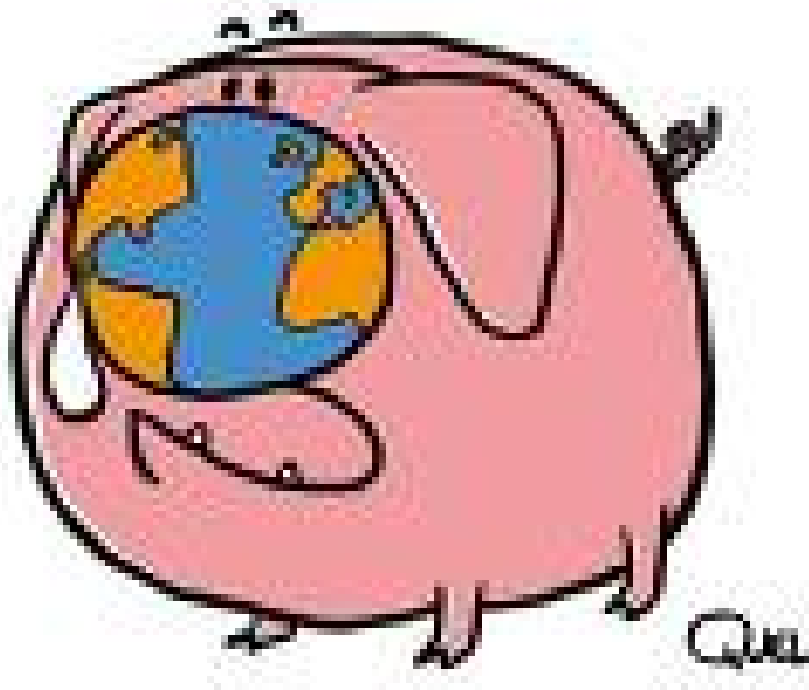
Antivirals

- Often as per national recommendations
- Stand-by emergency treatment (travel kit) consider
 - High risk groups and their travel companions:
 - Unvaccinated
 - Co-morbidity: particularly cardiopulmonary, immunological
 - High risk settings:
 - Captive setting (?)
 - Occupational: medical, multiple contacts
- Prophylaxis: unvaccinated short term with multiple contacts (VIP)

Marti F et al. Expert Rev Vaccines 2008;7:679-87



Thank you!



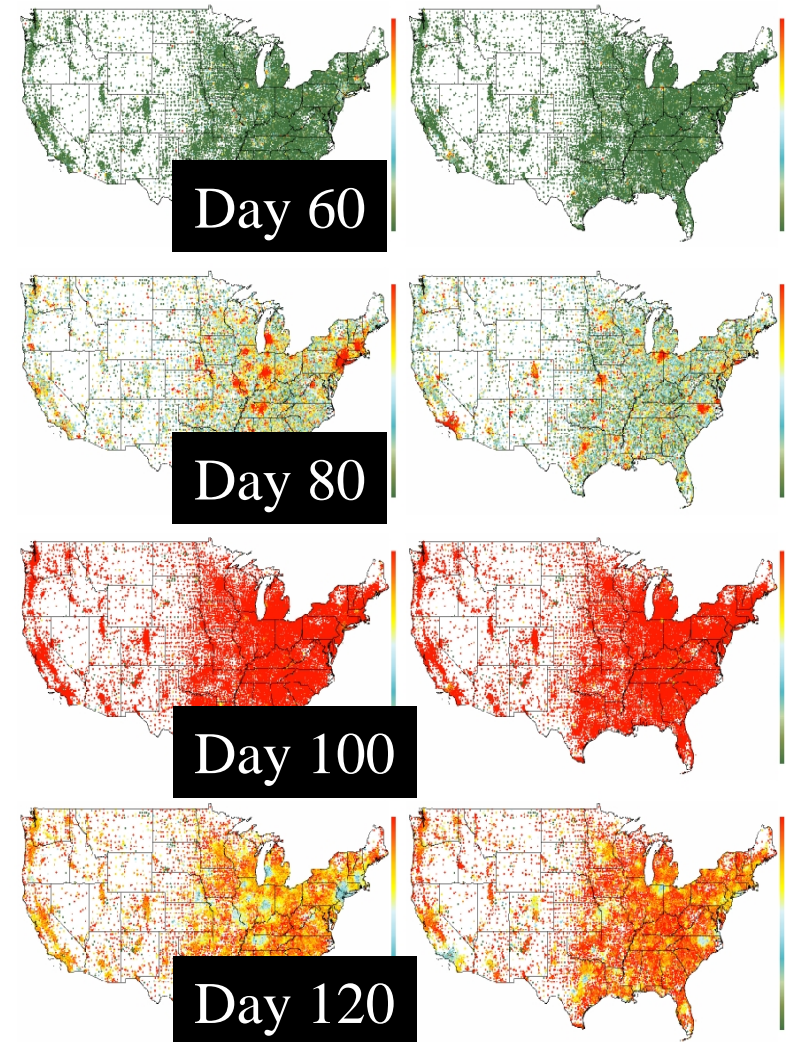
Conflict of Interest Declaration — Robert Steffen

RS has 2006 to 2009 accepted fee for education or advice from

- **Baxter**
- **Berna Biotech/Crucell**
- **GlaxoSmithKline**
- **Novartis Vaccines & Diagnostics**
- **Roche**
- **Sanofi Pasteur MSD**
- **SBL Vaccin**
- **World Health Organization.**

Travel restrictions and spread of pandemic influenza

- In a highly mobile population rapid imposition of 90% reduction in domestic travel would slow the virus spread by only a few days to weeks, and would not reduce the eventual number ill
- Travel restrictions at borders are unlikely to delay spread by more than 2-3 weeks unless more than 99% effective



Ferguson NM et al. Nature. 2006;442:448-52

Germann TC et al. Proc Nat Acad Sci USA 2006;103:5935-40

Hollingsworth TD et al. Nat Med 2006;12:497-9