



Managing the matrix of influenza infections in line with the “One Health” vision

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Italy

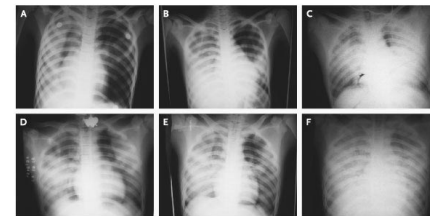
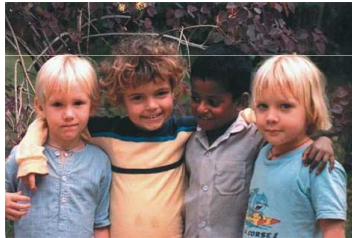


Do we think that influenza pademics are something we should worry about?



What do we know about the origin and emergence of pandemic influenza?





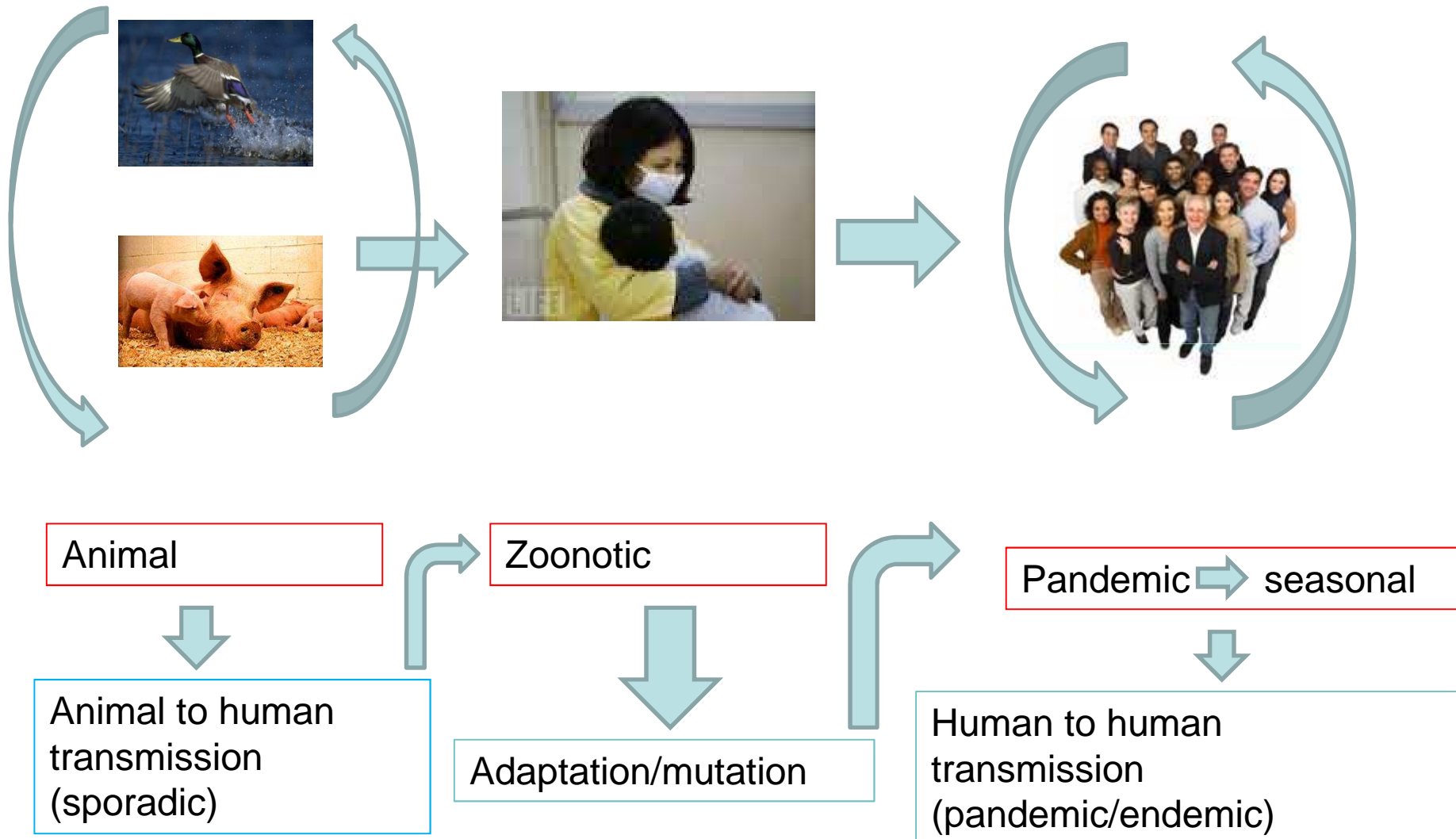
Influenza pandemics in last 100 years



- Spanish flu 1918-1819 – entirely of avian origin 20-40 million deaths (H1N1)
- “Asian flu” 1957, avian and swine origin (H2N2)
- “Hong Kong” 1968 – human and avian (H3N2)
- “H1N1 pdm 2009” – swine, human and avian (H1N1)

Always contained a novel “animal” component

Emergence of pandemic influenza



Animal Health implications



Highly Pathogenic Avian Influenza, Italy 2000

Technology, Management & Market

Awaiting the Next Big One

The 20th century's flu pandemics

YEAR	COMMON NAME	POSSIBLE SOURCE	DEATHS
1918	Spanish flu/H1N1	Pig or bird host of mutated H1N1 virus	40 million
1957	Asian flu/H2N2	Mixed infection of animal virus, human H1N1, and avian H2N2 strain in Asia	2 million
1968	Hong Kong flu/H3N2	Mixed infection of animal virus, human H2N2, and avian H3N2	2 million



Soldiers suffering from the 1918 flu pandemic at an emergency hospital at Fort Riley in Kansas.

One WHO Expert on SARS Finds Flu More Frightening

Doctor Deems World Unprepared for Long-Awaited Pandemic That Could Cause Tens of Millions of Deaths

By GAUTAM NAIK

AS AN EXPERT ON SARS, Klaus Stöhr works 16-hour days, sometimes as virtually the same clothes as the day before, and often juggling three phone calls at once. But his chief worry isn't SARS, it's the flu.

Not any old flu, but a long-awaited influenza pandemic that could spark a massive world-wide crisis in public health. This sort of virus could circulate in less than six months, long before a vaccine is ready. Though antiviral drugs exist, not a single country has stockpiled them in anticipation of an outbreak. And there are glaring cracks in the flu pandemic surveillance systems of many countries.

"We're not prepared," says Dr. Stöhr, the scientist who heads the World Health Organization's influenza program and is also leading the agency's fight against severe acute respiratory syndrome. Compared with the devastation of a flu pandemic, he adds, "SARS will be something to smile about."

Influenza is one of the oldest and most common diseases known to man. But a flu pandemic would be a lot harder than the flu bug that sickens millions of people around the world and kills tens of thousands of them each year. Annual flu outbreaks occur when the structure of the virus undergoes small changes, permitting it to evade the immunity that people have acquired from previous infections or from vaccinations. But sometimes the surface proteins of a flu virus change substantially, and nobody has immunity against such a bug. If it also acquires the ability to spread from person to person, the stage is set for a lethal pandemic.

The damage can be catastrophic. The Spanish flu pandemic of 1918 killed more than 40 million people, while those of 1957 and 1968 together killed some four million. By comparison, SARS is a lot less infectious, and it has caused fewer than 700 reported deaths so far.

Global jet travel and urban overcrowding increase the risk. The WHO projects that in developed countries alone the next pandemic could cause as many as 2.3 million hospitalizations and 650,000 deaths in less than two years. The toll in developing countries could be worse. Countries that belong to the WHO have recognized the danger only recently, passing a resolution underlining the need to improve flu surveillance and response.

Influenza pandemics have occurred historically at 20-year intervals. Since the last one occurred in 1968, the conclusion is hard to avoid: We're due. "It's not a matter of if, but when, this will happen," says Stöhr. "We're not ready. We're not ready. We're not ready."

Dr. Stöhr, who trained as a veterinarian in the former East Germany and later became an expert in diseases that jump from animals to people. He joined the WHO in 1992, and two years ago, he was named head of the WHO influenza program and was asked to revamp it.

The program then was poorly regarded. Focusing on vaccine development and reacting slowly to global outbreaks, it largely responded to flu as if it were only a problem for developed countries. Dr. Stöhr discovered that he faced an uphill task when he tried to get appointments with some scientists, flu-vaccine makers and governments, and was turned down.

But thanks to his strong scientific credentials and indefatigable manner, Dr. Stöhr was able to persuade potential partners to let the WHO take a bigger role in coordinating the fight against the disease.

WHO's flu-monitoring network today consists of 112 labs in 87 countries. One of its jobs is to determine the composition of each year's flu vaccine, so work can be done early on vaccines. Another is to look for the Big One. Dr. Stöhr's phrase for the expected flu pandemic.

Since 1978, there have been some half-dozen outbreaks of flu deemed to be unusual, and possibly marking the start of a pandemic. Authorities learned the word in 1997, when an avian-flu virus, known as H5N1, apparently spread from chickens to people in Hong Kong, killing six, and causing a health emergency. That year, when Dr. Stöhr went to Hong Kong to advise health authorities, he was forced to stay in an out-of-the-way hotel to avoid dozens of news-hungry journalists.

On the WHO's recommendation, authorities in Hong Kong and southern China destroyed more than a million chickens, preventing the further spread of H5N1 to people.

The string of unusual infections in recent years, including avian flu and SARS, suggests Stöhr: "These are signals from Mother Nature. If we don't prepare for the pandemic now, complacency will be paid for in human lives."

Journal Link: WSJ.com subscribers can use an interactive graphic tracing the path of the infected people who fueled the SARS outbreak, in the Online Journal at WSJ.com/SARS.

Le Monde

www.lemonde.fr

40^e ANNÉE - N° 1818 - 120 € - FRANCE METROPOLITAINE

MARDI 3 FÉVRIER 2004

FONDATEUR: HUBERT BLOCH

Juppé fait face à son la droite critique le

Sous le coup de jugement rendu par le tribunal correctionnel de Nanterre, le ministre de l'Intérieur, Jean-Pierre Juppé, a été condamné à 18 mois de prison avec sursis, et à 18 mois de prison avec sursis, et à 18 mois de prison avec sursis, et à 18 mois de prison avec sursis.

Grippe aviaire : l'épidémie devient extrêmement dangereuse

Les experts de l'Organisation mondiale de la Santé (OMS) ont déclaré que la grippe aviaire est devenue une véritable pandémie mondiale. Les experts de l'OMS ont déclaré que la grippe aviaire est devenue une véritable pandémie mondiale.



Documento riservato della Casa Bianca pubblicato dal «New York Times»

Virus, rapporto segreto Usa: milioni di morti, ospedali in tilt

L'influenza aviaria in Europa: duemila tacchini colpiti in Turchia

SPERALE GLADIATORI

NATIONAL GEOGRAPHIC

ITALIA



Aviaria, pericolo per l'umanità? Influenza killer

THAILANDIA, ELEFANTI IN CITTA

IL TRIONFO DELL'AMERICA NEL MONDO

GERMANY: THE GENERATION OF '88 ROWS OUT

TIME

AVIAN FLU

DEATH THREAT

SPECIAL REPORT: Inside the global race to avert a pandemic



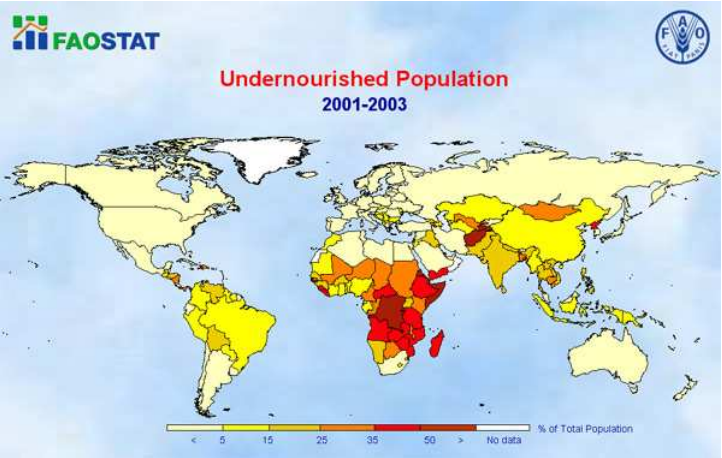
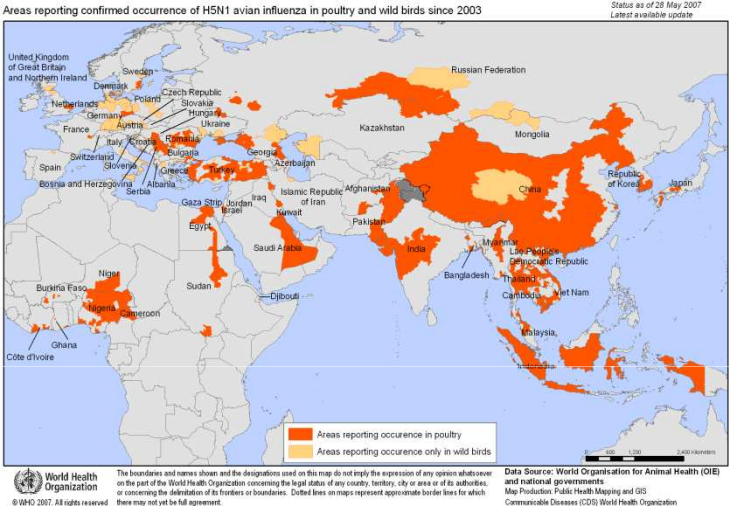
Gli esperti europei di influenza riuniti a Malta. Il nostro Paese deve aumentare le scorte di antivirali, pronto il piano di emergenza

«Il virus dei polli colpirà 16 milioni di italiani»

Crovati: epidemia inevitabile. Le previsioni: 150 mila vittime. Un commissario in ogni Asl

H5N1- where are we?

- H5N1 is still endemic in at least 5 countries
- The virus is able to infect approximately 50 avian species and 10 mammalian species, including human beings
- It causes a 50% fatality rate in infected individuals, but has not acquired human-to-human transmissibility
- Human beings are immunologically naive to the virus
- H5N1 is causing food security issues in developing countries



H5N1 is the first HPAI virus

- Which has persisted for over 13 years
- For which extensive vaccination has been applied
- Has spread to three continents
- Has infected an unpredictable number of animal species, including humans
- Is evolving into lineages and sublineages
- Has been mentioned by most political leaders of the world



Legacy of H5N1

- Investments in capacity building
- Increase of number of veterinary/human laboratories performing influenza surveillance
- Establishment of reliable contacts worldwide to provide information on local aspects
- Expansion of areas of research
- Availability of an unprecedented number of isolates containing valuable genetic information
- And above all has provided an opportunity

Contributing to One World, One Health*

A Strategic Framework for Reducing Risks of
Infectious Diseases at the
Animal–Human–Ecosystems Interface

14 October 2008

Consultation Document

Produced by:



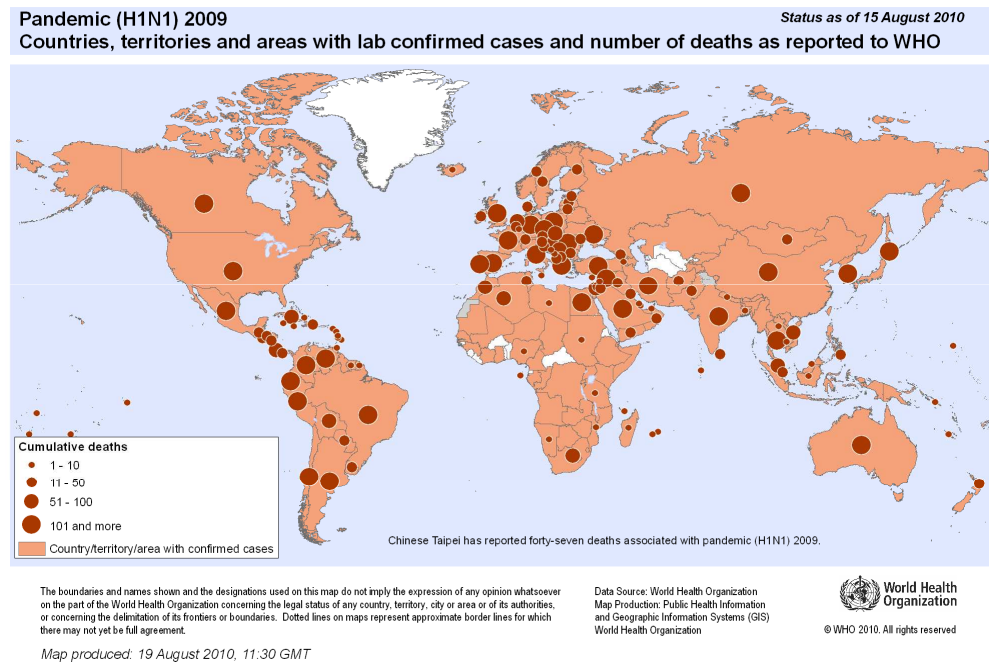
UN System
Influenza Coordination



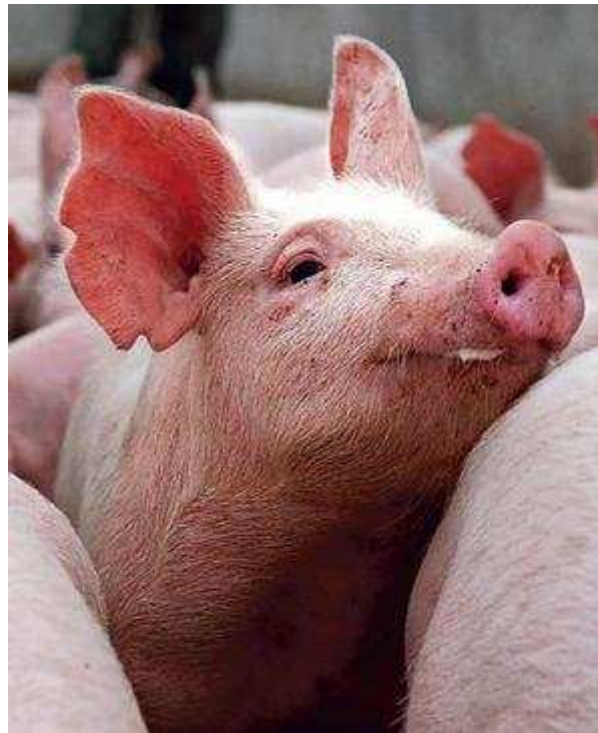
THE WORLD BANK

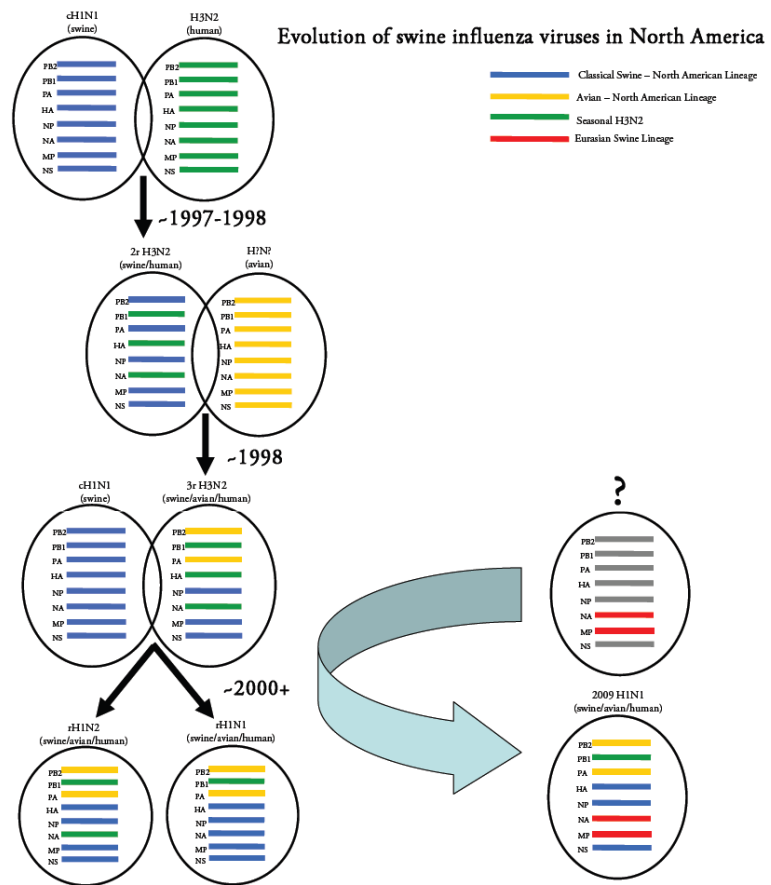
H1N1 - Real pandemic?

- *Pandemic* – from the Greek
 - pan*: all
 - demos*: people



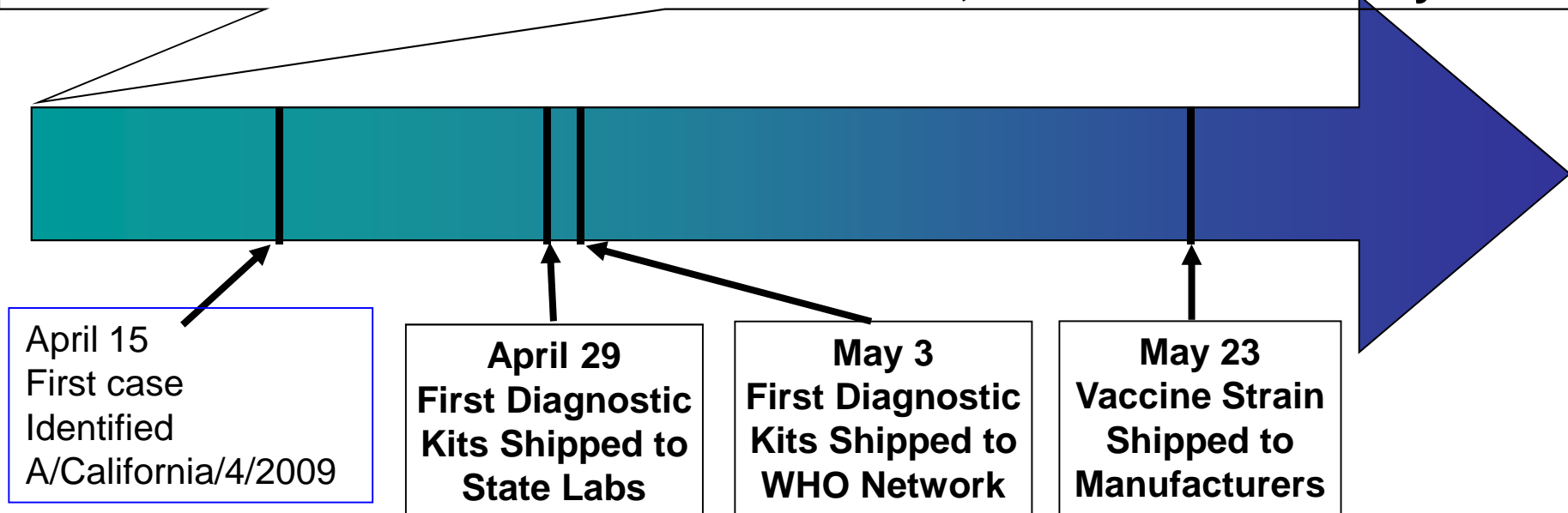
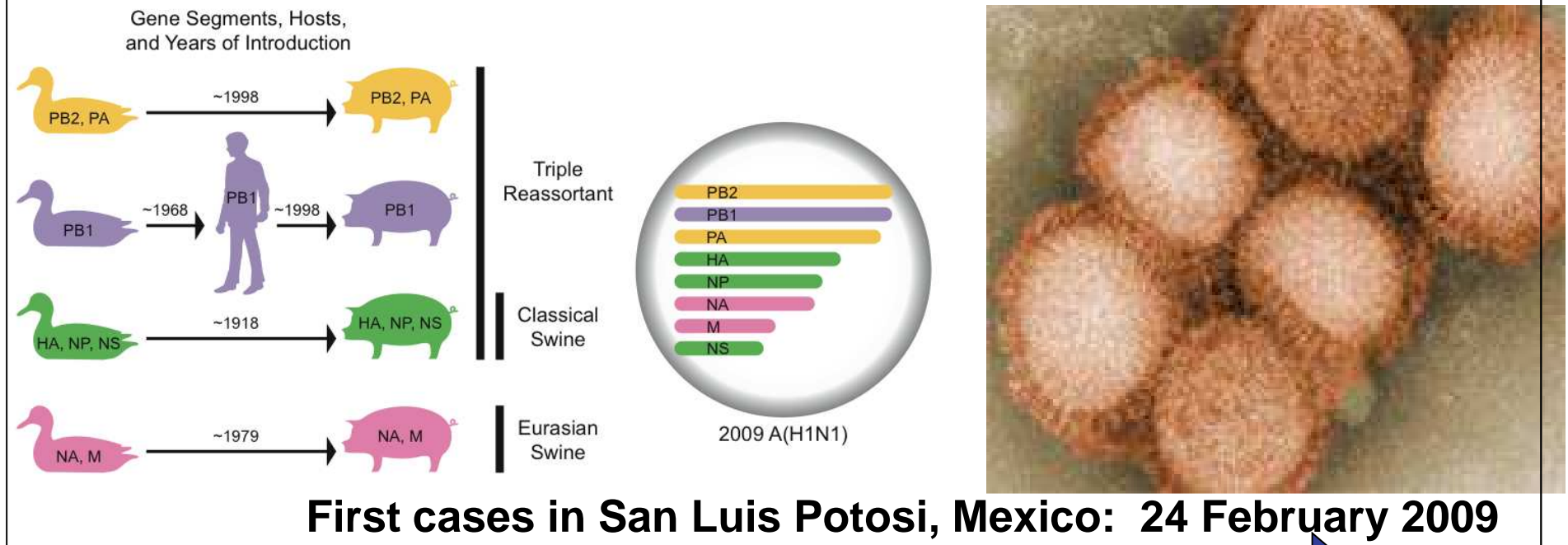
Gosh! From pigs...





2 genes of Eurasian lineage

Courtesy, N.Cox, CDC



Lessons learnt from H1N1pdm 2009

- The emergence (when and where and what subtype) of pandemic influenza cannot be predicted with current tools
- World-wide spread occurs within a few weeks of the index case
- The pathogenicity in the “new (human) host” including age or ethnic susceptibility was unknown
- Vaccine was available after the epidemic peak
- Pdm virus spills back into animals with unknown consequences

Two points of view: AH/PH



Animal health

- Fear of drop in consumption of pork/poultry meat
- Fear of trade restrictions
- Economic losses for the industry

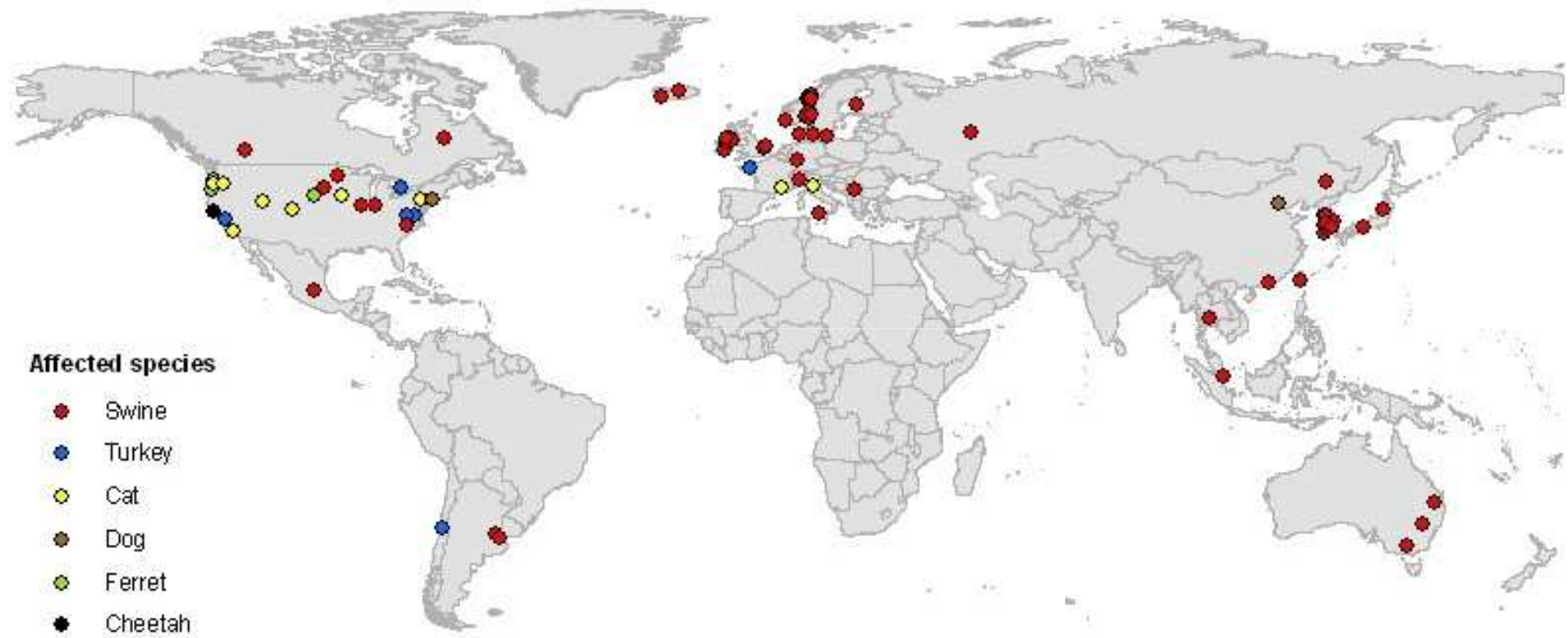
Public health

- Understand epidemiology of infection in swine and other animal populations
- Understand reassortment dynamics with animal influenzaviruses
- Evaluate PH aspects of H1N1pdm in animal populations

Pandemic H1N1 2009 events by country and affected species reported up to 31 January 2010

(Source: EMPRES-i FAO; <http://empres-i.fao.org/empres-i/home>)

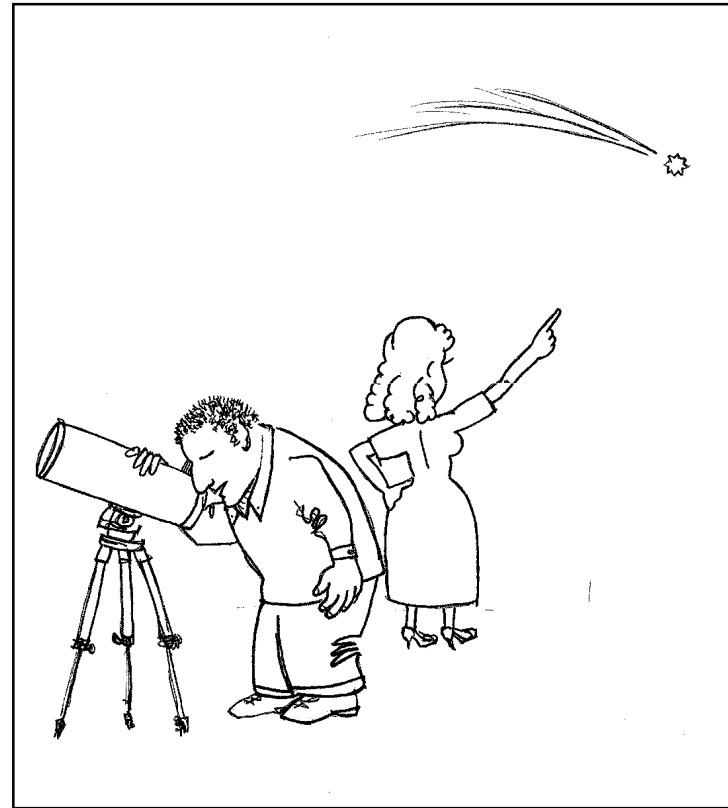
Country	Cats	Cheetah	Dogs	Ferrets	Swine	Turkeys	Grand Total
Argentina					2		2
Australia					3		3
Canada					2	1	3
Chile						2	2
China			1		5		6
Denmark					4		4
Finland					1		1
France	1					1	2
Germany					1		1
Iceland					2		2
Indonesia					1		1
Ireland					2		2
Italy	1				2		3
Japan					2		2
Mexico					1		1
Norway					39		39
Rep. of Korea					18		18
Rep. of Serbia					1		1
Russian Fed.					1		1
Singapore					1		1
Thailand					1		1
U.K.					6		6
U.S.A.	9	1	1	3	9	4	27
Grand Total	11	1	2	3	104	8	129



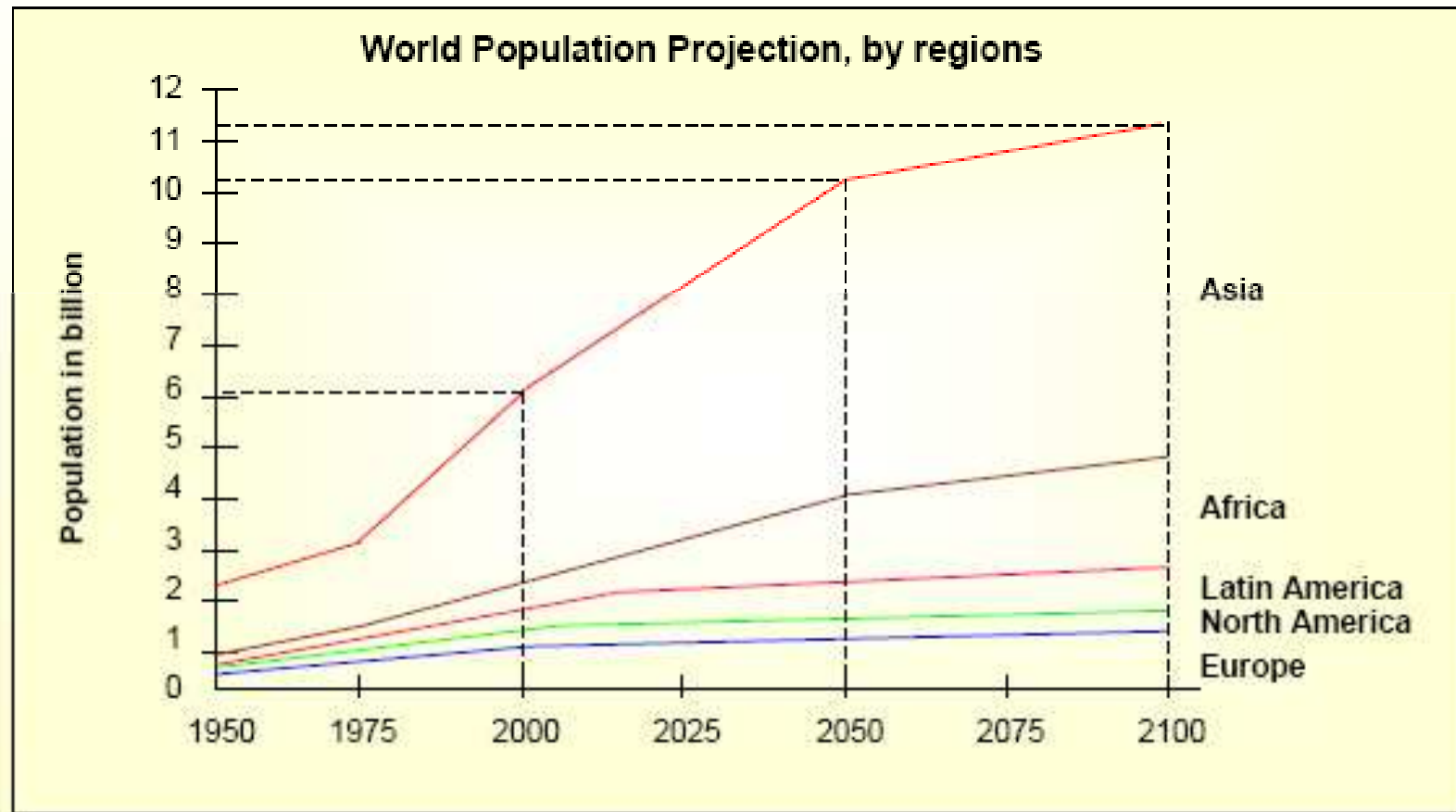
(Source: EMPRES-i FAO; <http://empres-i.fao.org/empres-i/home>)

Predicting the 3 W's

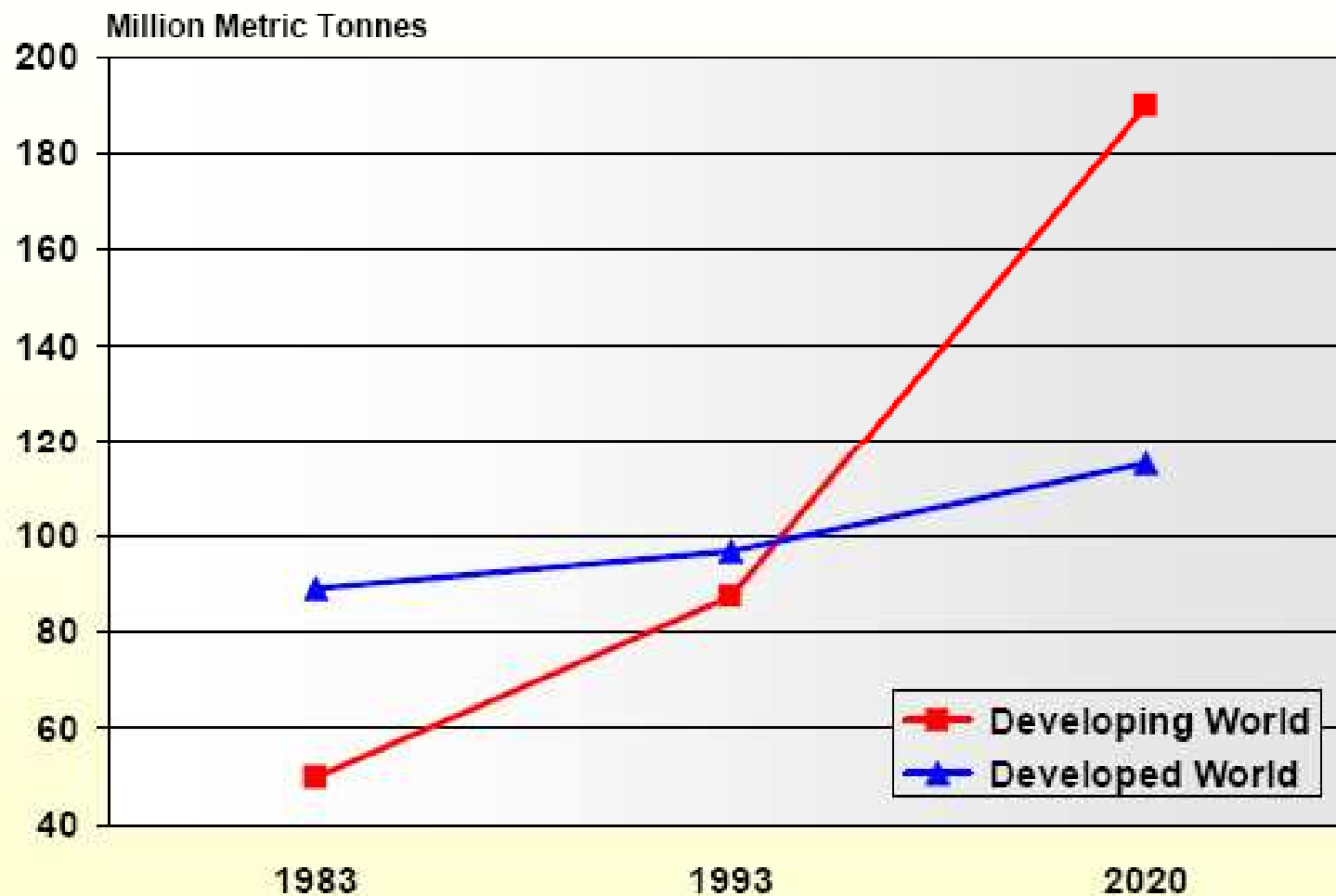
The emergence
(when and where
and what subtype)
of pandemic
influenza cannot be
predicted with
current tools



Population size estimates (1950-1990) and projection (1990-2025), by regions show a drastic increase in Asia and Africa.



Forecast of meat consumption 1983-2020



High risk species for generation of pandemic influenza



THE PIG AS A 'MIXING VESSEL'

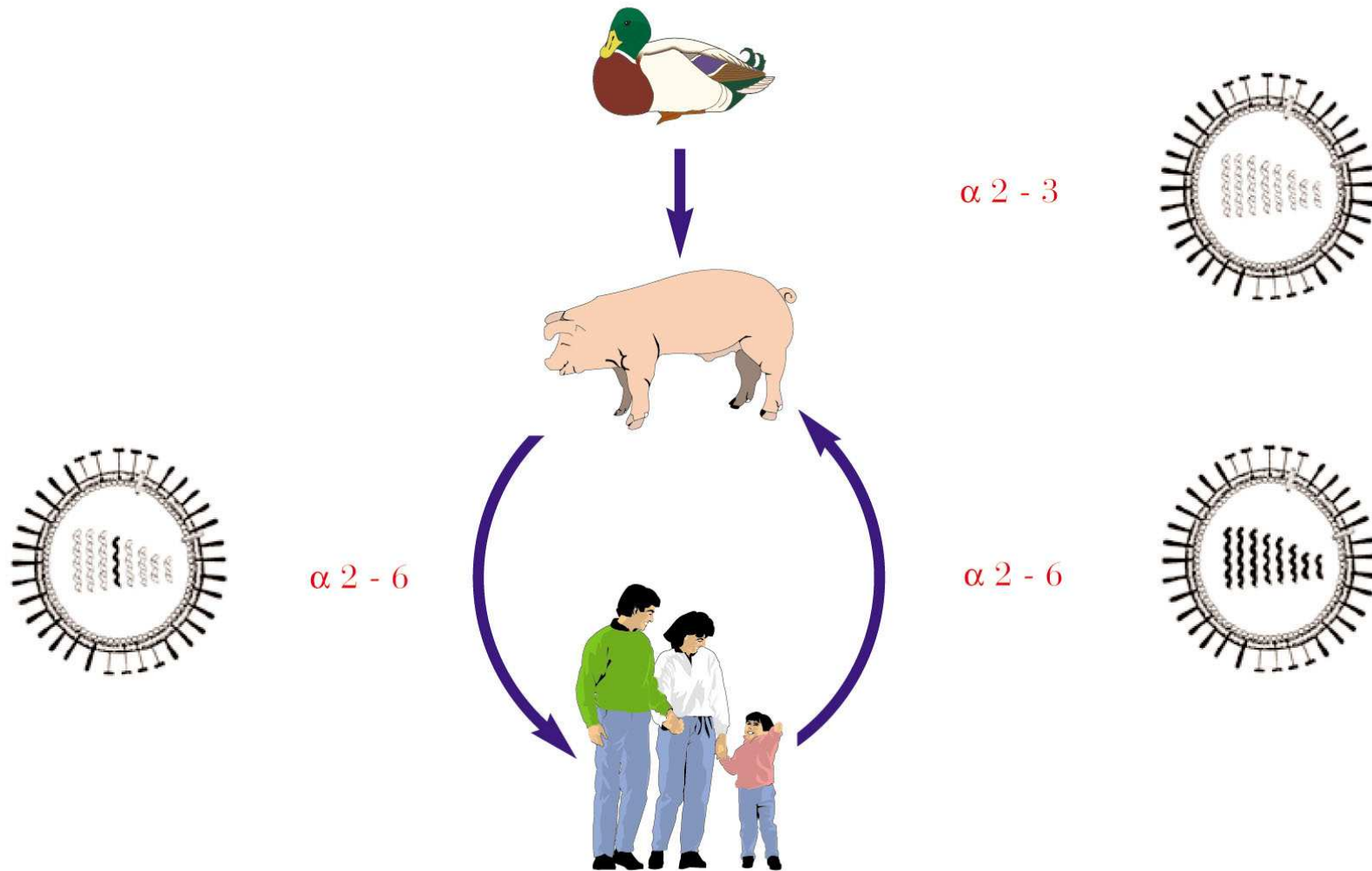




Photo credit: Fabio Frisca (FAO Vietnam)

Figure 27: Prices of selected meat products

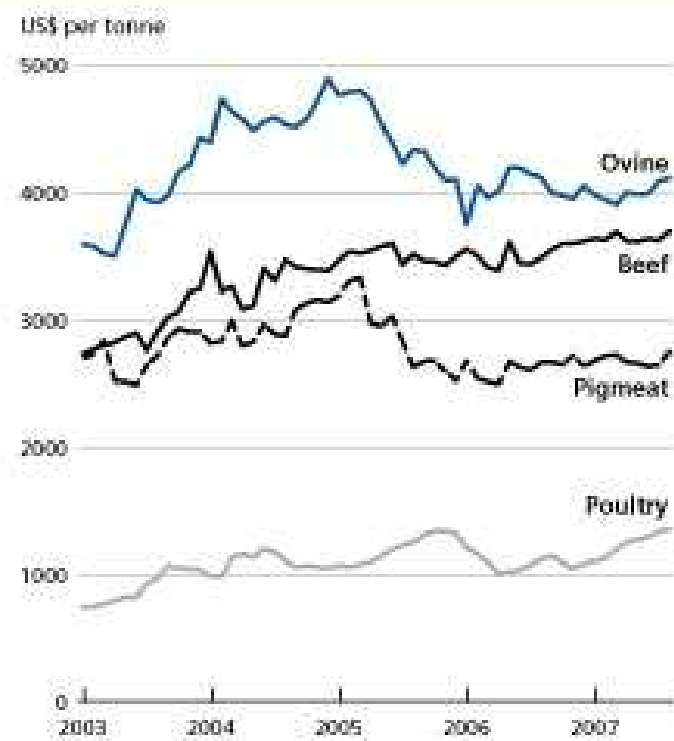
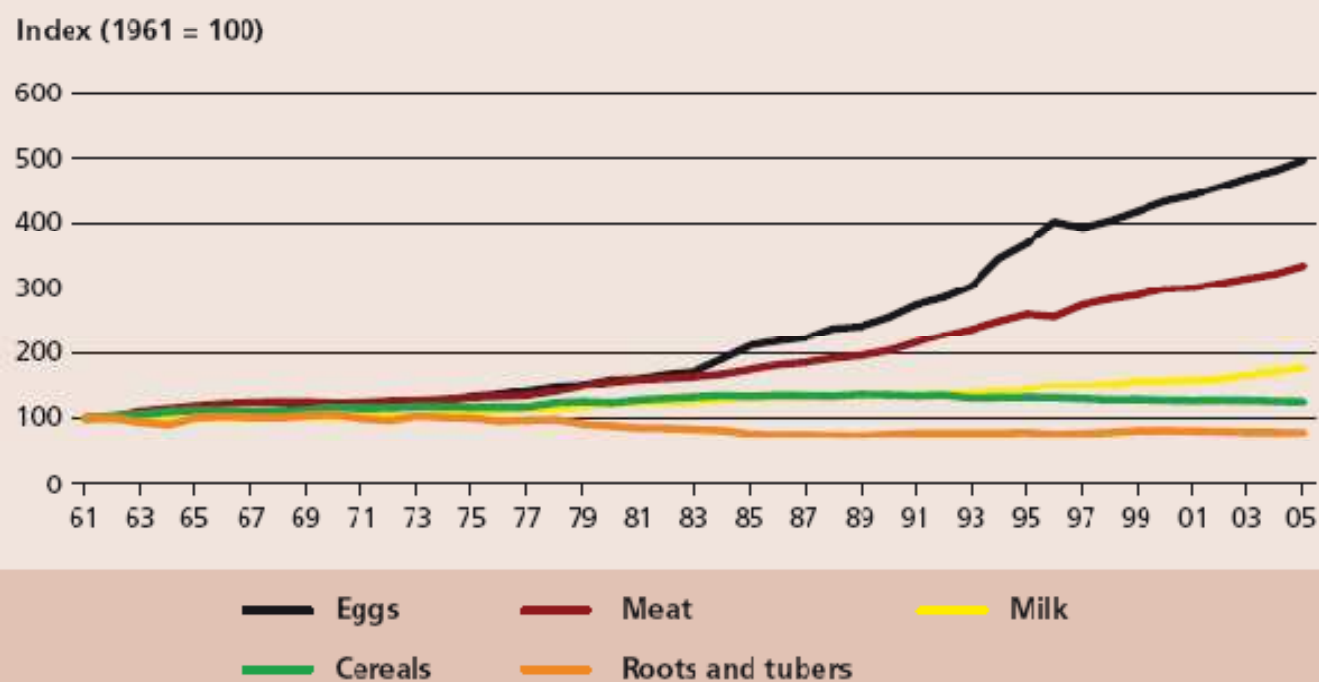


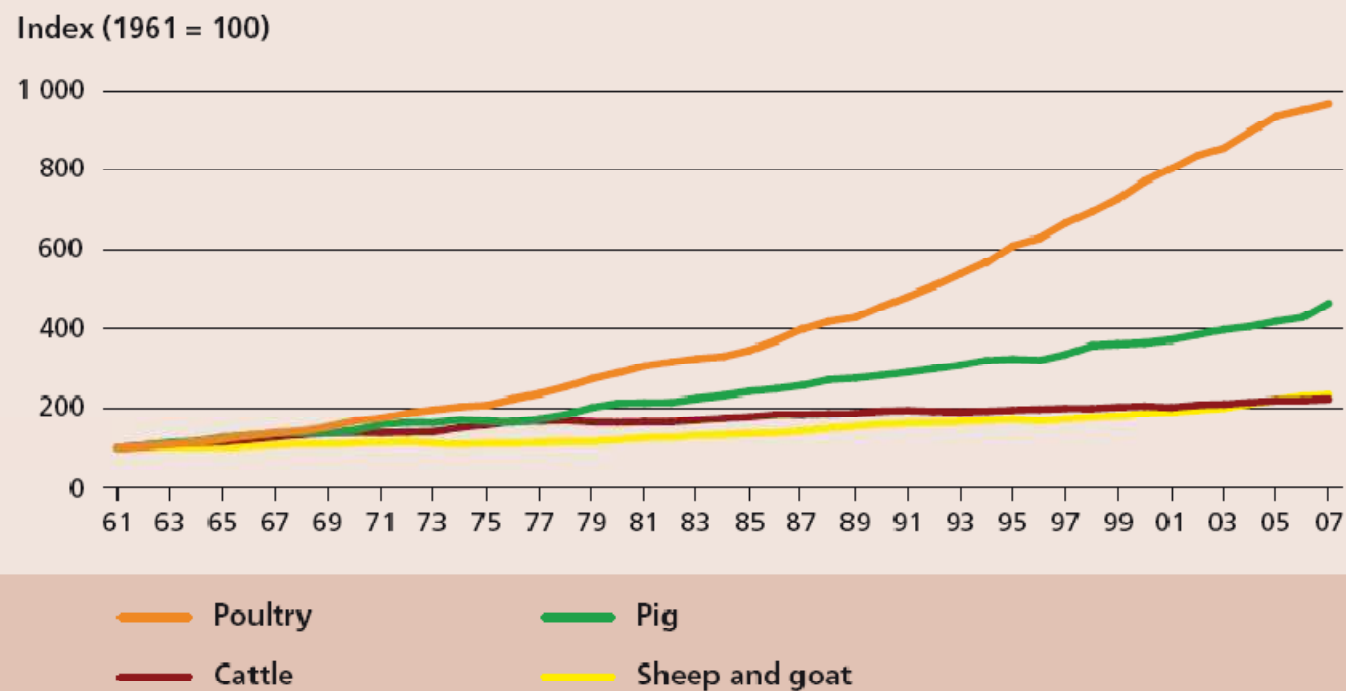
FIGURE 1

Per capita consumption of major food items in developing countries, 1961–2005

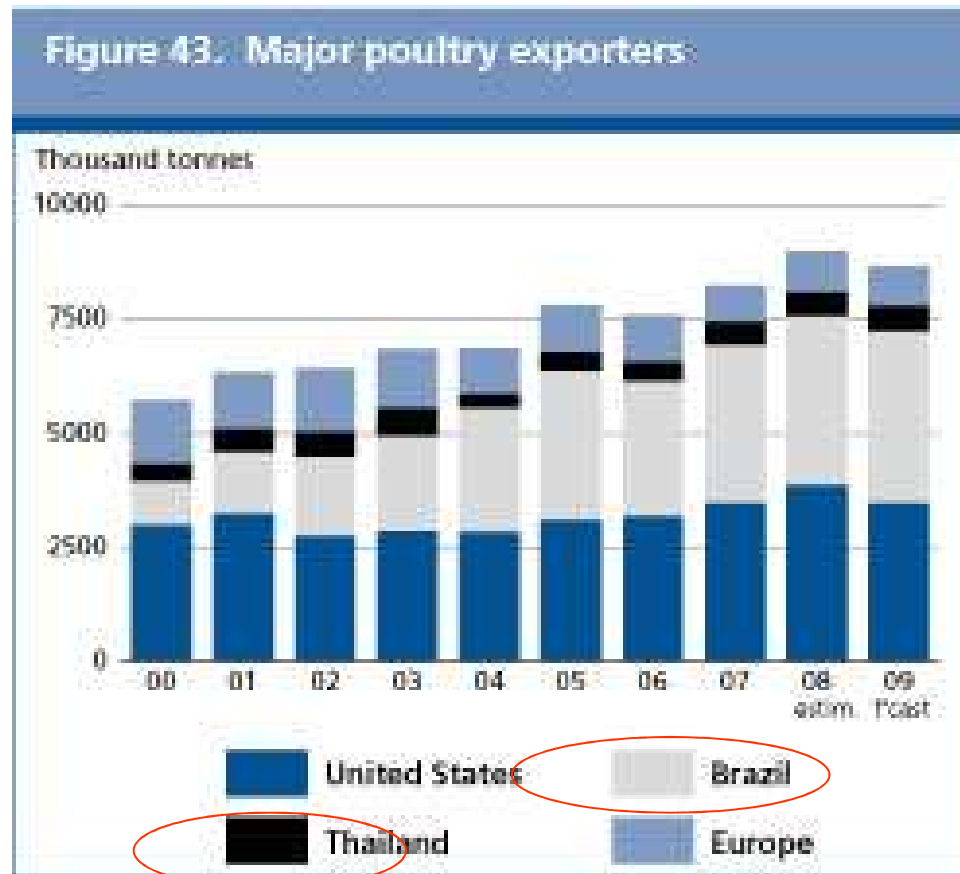


Source: FAO, 2009b.

FIGURE 5
World production of main categories of meat, 1961–2007



Source: FAO, 2009b.



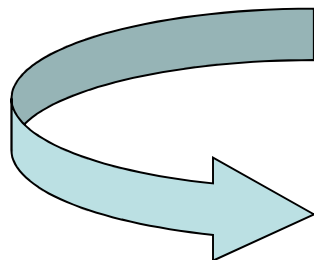
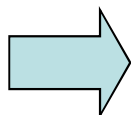
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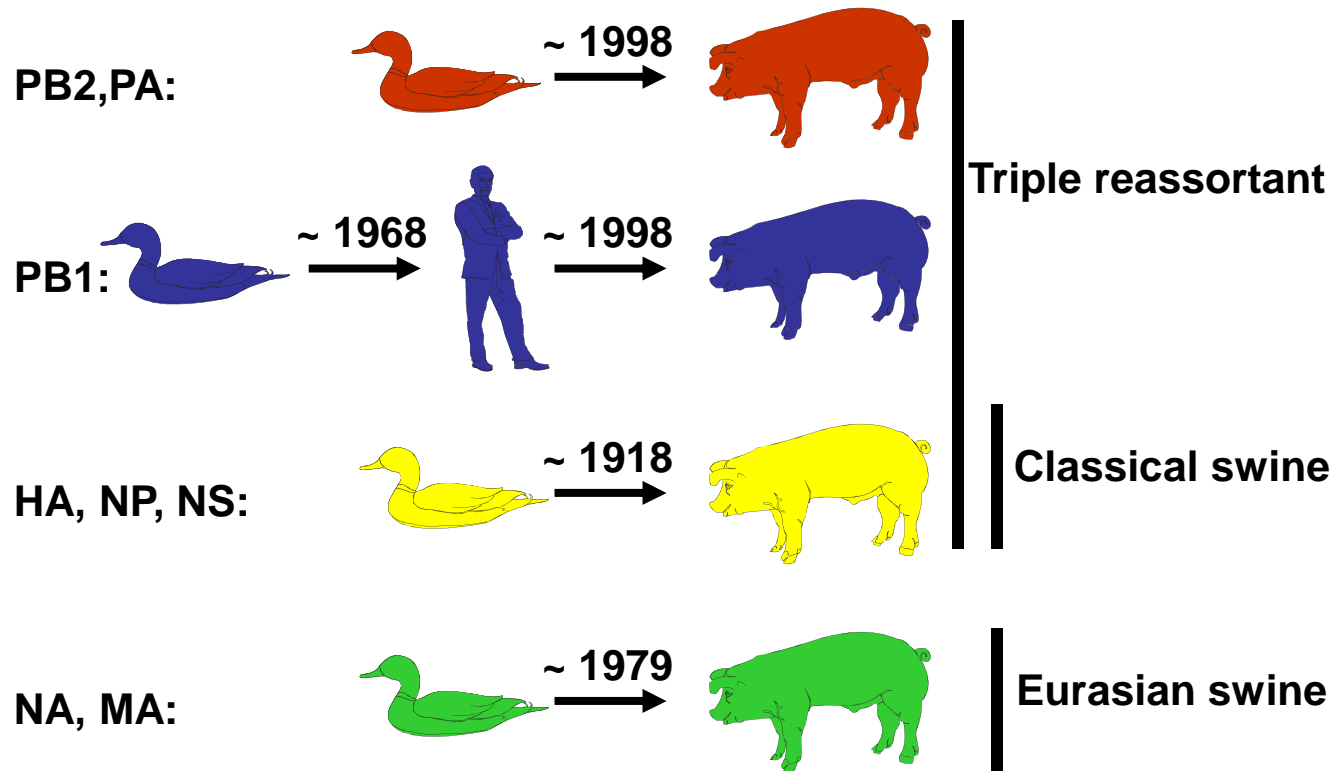
<http://www.fao.org/docrep/011/ai482e/ai482e08.htm#36>

Challenges for the future

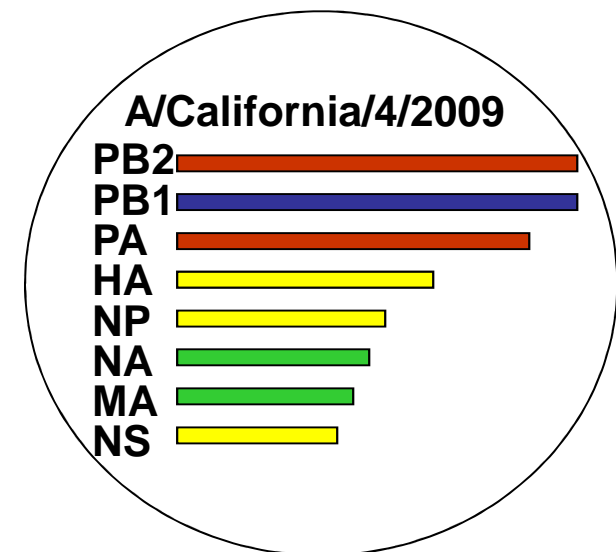
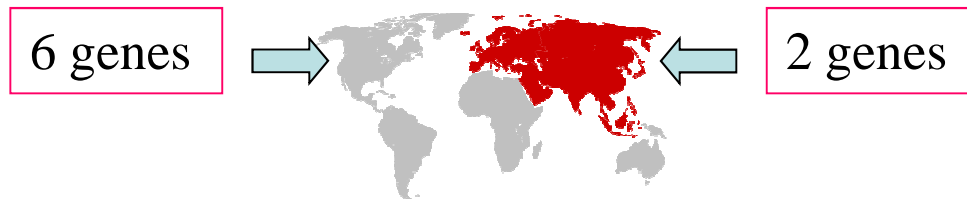


Is it appropriate
to put
influenzaviruses
in “boxes”?

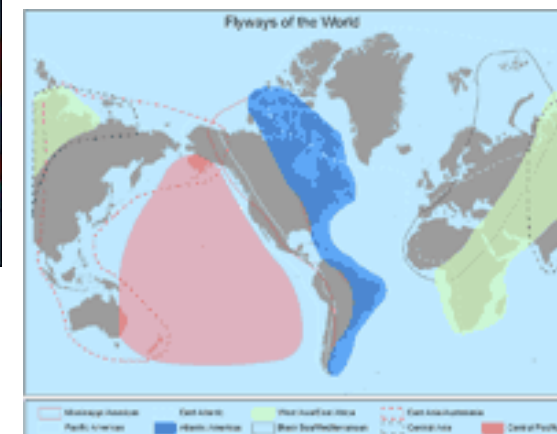
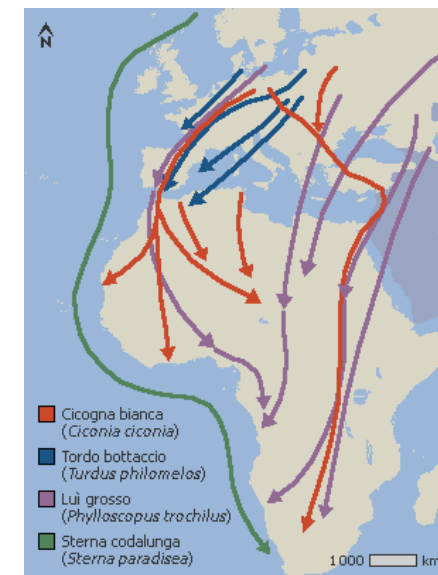
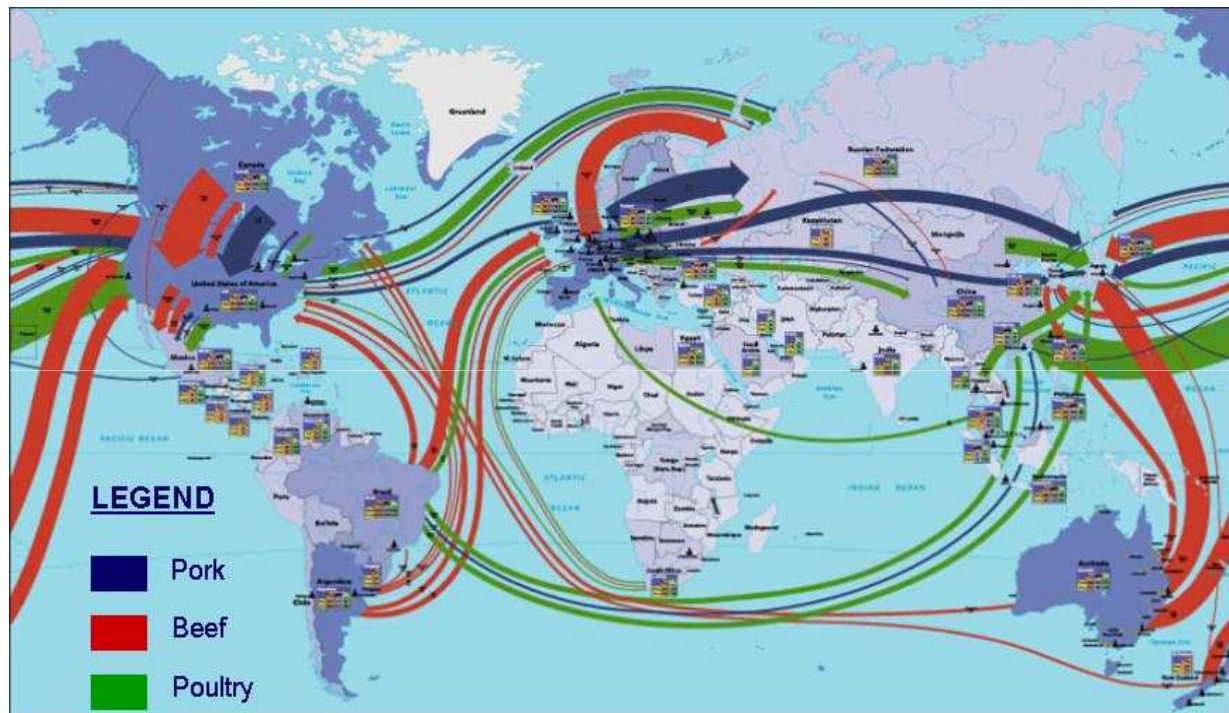




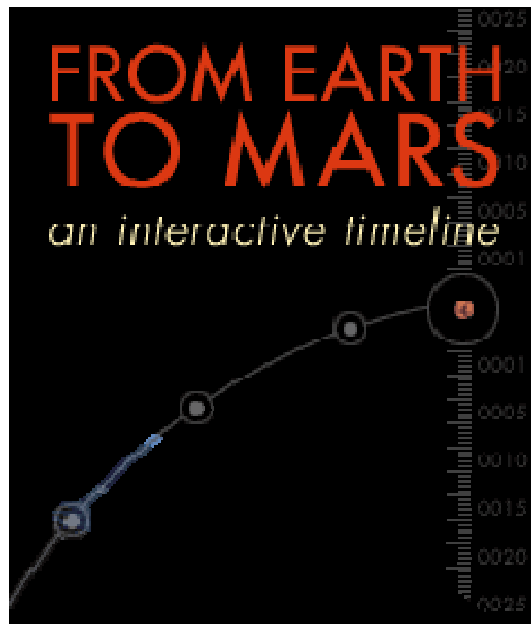
Genes originating from viruses of three animal species and two hemispheres



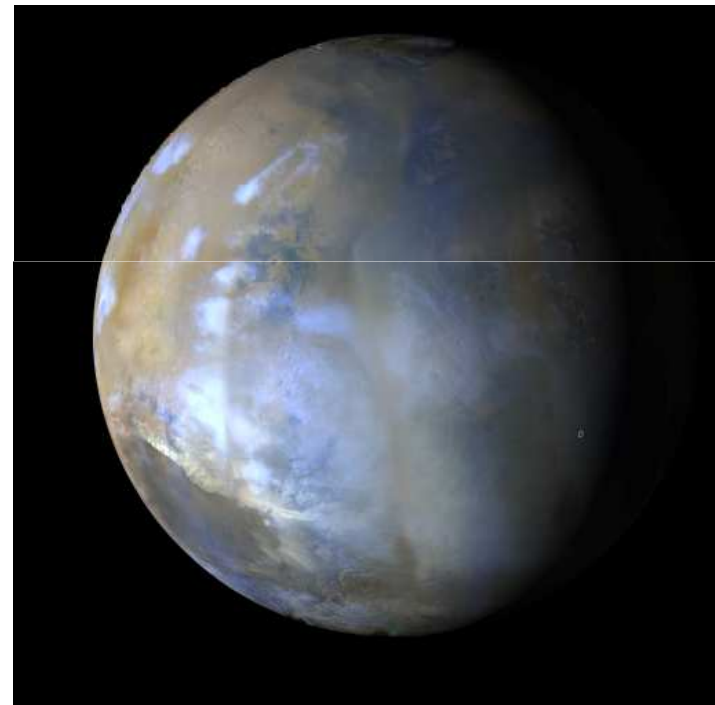
Slide credit Ron Fouchier, EMC







Mars Weather Report October 06 - 12, 2008:



“Throughout the week, clouds and dust were seen extending across Argyre and Hellas, while water-ice clouds continued to dominate the skies over all the large volcanoes”

Sharing of information



First appearance of H5N1 in Africa

- IZSVe was the first laboratory to isolate the H5N1 African strain
- Genetic characteristics of the first African isolates would shed light on H5N1 epidemiology and pathogenicity
- We declined offer to deposit sequence in password protected database (only 15 labs had access) and deposited the full sequence in GenBank



Science

3 March 2006 | \$10



NEWS>>



AVIAN INFLUENZA

As H5N1 Keeps Spreading, A Call to Release More Data

PARIS—An impassioned call by a prominent Italian influenza scientist has renewed the debate about how to balance global health against scientists' needs to publish and countries' demands for secrecy. On 16 February, Ilaria Capua of the Istituto Zooprofilattico

tricky from the start. WHO, FAO, and OIE encourage countries to send virus samples to specialized reference labs that can confirm the outbreak and study the virus further. Some have been reluctant to do so because they worry about intellectual-property rights or not

Showing her cards. Ilaria Capua says she will submit H5N1 sequences from her lab to public databases immediately.

dozens of individual governments, Brown says.

Capua counters that just isolating and sequencing a virus that comes in the mail does not give researchers the right to sit on the data—especially not at a government lab. “Most of us are paid to protect human and animal health,” she says. “If publishing one more paper becomes more important, we have our priorities messed up.” Governments can often be persuaded to release the sequences, adds Capua, who repeated her call at an OIE meeting in Paris on Monday and also plans to submit it to ProMED, an e-mail list about emerging infectious diseases.

WHO agrees that in an ideal world, scientists would share their data widely and voluntarily, says Wenqing Zhang of the agency's Global Influenza Programme. But because that's not happening, the agency created a special secured section at the Influenza Sequence Database at Los Alamos National Laboratory in New Mexico in 2004. Currently, some 15 labs have passwords to access these data, says Zhang, including WHO's eight reference labs. The system is invaluable for WHO, she adds, as it helps the agency track the virus and adjust risk assessments if necessary.

Virologist Yi Guan of the University of

THE WALL STREET JOURNAL

MONDAY, MARCH 13, 2006

Scientist Rebels Against WHO Over Bird Flu

Scientists around the world, racing to discover how avian influenza is spreading and whether it is evolving toward a pandemic strain, face a dilemma: Should they share their interim findings widely, show them only to a select set of peers, or keep them to themselves until they can publish papers, often critical to their careers?

Now, a lone Italian researcher has cast a harsh spotlight on the WHO's system, suggesting that it places academic pride over public health - and snubbing it by posting prized bird-flu data in plain view.

Ilaria Capua, a 39-year-old Italian veterinarian working on avian influenza in a government lab, last month received a sample of the virus in the mail from Nigerian health authorities. The virus had just attacked birds in Nigeria, the first confirmed case of the disease in Africa. The sample was something of a prize, a chance to study a specimen and explore how it spread from its stronghold in Asia.

Within days of isolating the virus, Dr. Capua says, she got an offer from a senior scientist at the WHO in Geneva, whom she declined to name, to enter her finding in the closed system. She could submit the virus's genetic information, or sequence, to the database. In exchange, she would be given the password to the WHO's massive stash of data. A spokesman for the WHO confirmed that the offer was made.

Instead, Dr. Capua posted the gene sequence in a public database accessible on the Internet. She also sent a letter on Feb. 16 to around 50 of her colleagues urging them to do the same with their bird-flu samples.

"If I had agreed" to the WHO's request, she said in an interview, "it would have been another secret sequence."



Ilaria Capua

The New York Times

EDITORIAL

Secret Avian Flu Archive

Published: March 15, 2006

At a time when health authorities are racing to head off a possible avian flu pandemic, it is distressing to learn that the World Health Organization is operating a secret database that holds the virus's genetic information. A lone Italian scientist has challenged the system by refusing to send her own data to the password-protected archive. Instead, she released the information publicly and urged her colleagues to do the same. She is surely right. The limited-access archive should be opened or bypassed immediately to encourage research on this looming health menace.

The campaign by Ilaria Capua, an Italian veterinarian who works on avian influenza, was spotlighted in recent articles in the journal *Science* and *The Wall Street Journal*. The hidden data could be of immense value in determining how the virus is evolving and in developing effective vaccines or drugs. The possibility of breakthroughs can increase only if many more scientists can analyze the data.

washingtonpost.com

Bird Flu Fears Ignite Debate on Scientists' Sharing of Data

By David Brown
Washington Post Staff Writer
Thursday, May 25, 2006; A20

The issue gained public attention in February when Ilaria Capua, a 40-year-old virologist at the Tri-Veneto Region Experimental Animal Health Care Institute in Italy, sequenced the first H5N1 sample from Africa, isolated from a chicken farm in northern Nigeria. Someone at WHO invited her to contribute it to the Los Alamos data, but she declined and instead filed it in GenBank.

nature

Action stations

The time for sitting on flu data is over.

Concern about the accessibility of data on flu strains remains an acute issue, which research administrators and political leaders should step forward and address.

Indonesia has become the hot spot of avian flu, with the virus spreading quickly in animal populations, and human cases occurring more often there than elsewhere. Yet from 51 reported human cases so far — 39 of them fatal — the genetic sequence of only one flu virus strain has been deposited in GenBank, the publicly accessible database for such information.

And last week in China, researchers belatedly published details of

EDITORIALS

NATURE|Vol 441| 29 June 2006

the appearance of human-to-human transmission. In the Sumatra event, the transmission did not spread beyond the family.

Yet scientists outside the WHO networks have no access to these data. The problem last year spurred the US National Institutes of

"H5N1 sequences should be promptly deposited in a publicly accessible database."

frequently than had been previously thought.

Some political leaders are drawing the appropriate conclusions. Dennis Kucinich (Democrat, Ohio) and Wayne Gilchrest (Republican, Maryland) are circulating a letter in the House of Representatives

Health (NIH) to create a consortium to sequence and make public thousands of flu strains from humans and birds.

Very quickly, this more open approach led to the useful discovery that viruses swap genes with each other more

nature

CORRESPONDENCE

NATURE|Vol 440|30 March 2006

Shared data are key to beating threat from flu

SIR — We fully support Ilaria Capua in her call for avian-influenza researchers to release data to the public, rather than store them in restricted databases, as reported in your Editorial "Dreams of flu data" (*Nature* 440, 255–256; 2006). Keeping sequences secret, whatever the motivation, slows down scientific progress and hinders efforts to protect public health. The influenza genome sequencing project (www.niaid.nih.gov/dmid/genomes/mscs/influenza.htm) has, in the past year, sequenced more than 1,000 complete genomes of human influenza and



RESOLUTION No. XXVI

Sharing of avian influenza viral material and information in support of global avian influenza prevention and control

1. OIE Members reporting outbreaks of avian influenza should agree to **share animal avian influenza viral material and information** about avian influenza viruses through OFFLU with the international scientific community.
2. OIE Reference Laboratories must actively encourage sharing of material and data with the international scientific community, and as a minimum **deposit genetic data within 3 months of receiving an isolate into a public database** designated by the OFFLU Steering Committee, which will manage scientific relations with the WHO.
3. To enhance cooperation and transparency, the actions taken by countries must be recognised in subsequent publications and other benefits arising from the use of biological material or data that they have submitted to OIE Reference Laboratories.

Pandemic influenza preparedness: sharing of influenza viruses and access to vaccines and other benefits

Outcome of the resumed Intergovernmental Meeting

Report by the Director-General

5.2 Genetic sequence data

5.2.1 Genetic sequence data, and analyses arising from that data, relating to H5N1 and other influenza viruses with human pandemic potential should be shared in a rapid, timely and systematic manner with the originating laboratory and among [WHO Network] laboratories. (*Consensus*)

5.2.2 Recognizing that greater transparency and access concerning influenza virus genetic sequence data is important to public health and there is a movement towards the use of public-domain or public-access databases such as Genbank and GISAID respectively; and (*Consensus*)

Avian flu: global sharing of virus samples - Windows Internet Explorer

http://www.fao.org/newsroom/EN/news/2006/1000374/index.html

File Modifica Visualizza Preferiti Strumenti ?

Google fao roma Effettua la ricerca

Avian flu: global sharing of virus samples

FAO :: Newsroom :: News stories :: 2006 :: Avian flu: global s...

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Avian flu: global sharing of virus samples

Another joint FAO/OIE initiative

1 August 2006, Rome - OFFLU, the OIE/FAO joint network of expertise on avian influenza, will systematically make avian influenza virus sequences accessible to the entire scientific community. With this gesture OFFLU reiterates its call to the world's scientists, international organisations and countries for a global sharing of virus strains and sequences.

Since its launch in April 2005, OFFLU has been mainly working on promoting the key objectives "to exchange scientific data and biological materials (including virus strains) within the network, and to share such information with the wider scientific community". Under this new impetus, strains will be sent to the U.S. National Institutes of Health for sequencing and deposited in full transparency on the free-access database, GenBank.

On 14 March 2006, the Scientific Committee of OFFLU, made up of the world's leading veterinarian experts on avian influenza, revised its terms of reference to put new emphasis on the need for further collection, characterization and exchange of avian influenza viruses, and for the expansion of the genomic database for animal influenza viruses.

Critical to surveillance and control efforts

Sharing virus strains, samples and sequences is a critical part of the global work on the surveillance and control of the highly pathogenic H5N1 virus, and supports the preparation of

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One Health, One Flu –Why ?

- Need to improve our prediction capacity on pandemic potential and viral characteristics
- Established influenza surveillance capacity worldwide
- Increased awareness of the role of the animal reservoir in the generation of pandemic strains
- Sharing and transparency issues are being addressed

“One Flu” can improve prediction skills

- Understand how genes of influenzaviruses migrate across species and continents, as one evolving gene pool
- Joint surveillance and research efforts between the human and the veterinary components of the equation
- Identify viral determinants for virulence and transmissibility in animals and humans
- Improve human and animal health as a collaborative effort



Develop and maintain a permanent influenza gene pool observatory

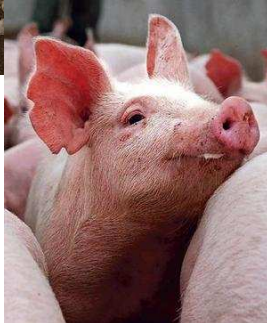
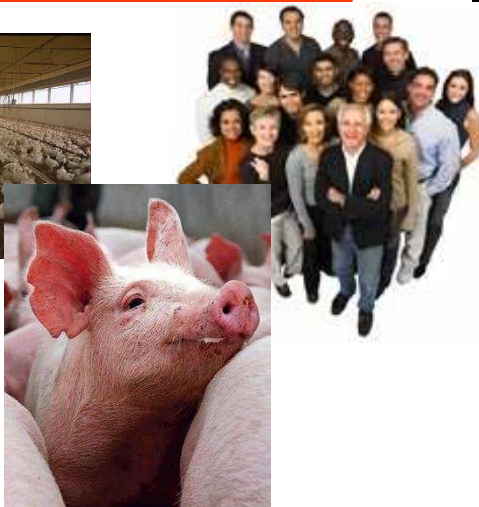
Capitalise on investments and networks established for H5N1

Perform harmonised and targeted surveillance in humans and animals



Improved human and animal health

- Preparedness
- Transdisciplinary collaboration
- Control and mitigation strategies
- Early warning systems





The FAO-OIE-WHO Collaboration

Sharing responsibilities
and coordinating global activities
to address health risks at the
animal-human-ecosystems interfaces

A Tripartite Concept Note



April 2010

http://www.oie.int/download/FINAL_CONCEPT_NOTE_Hanoi.pdf

Carpe diem

