PATOLOGIE EMERGENTI E RIEMERGENTI

Globalizzazione, Migrazione, Salute e Vaccini

Giovedì 6 novembre 2008, ore 08.30 – 16.30

CAMERA DEI DEPUTATI
Palazzo Marini - Sala delle Conferenze
Via del Pozzetto, 158 Roma

MALATTIE INFETTIVE RARE EMERGENTI E RIEMERGENTI

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Direttore U.O.C. Infezioni Sistemiche e dell'Immunodepresso Istituto Nazionale per le Malattie Infettive "Lazzaro Spallanzani", IRCCS - Roma

Nonostante che lo sviluppo di vaccini, ed l'introduzione dei farmaci antinfettivi abbiano contribuito a rendere meno frequenti o addirittura a debellare varie malattie del passato, ancora oggi le malattie infettive rimangono la principale causa di morte nel mondo, essendo responsabili di quasi di un terzo di tutti i decessi nel mondo, e rappresentando una delle principali cause di morte anche nei paesi industrializzati.

Negli ultimi anni si è assistito ad una modificazione sostanziale delle tre componenti principali della catena epidemiologica (agente infettivo - modalità di trasmissione - ospite suscettibile) in gioco nel determinismo delle malattie infettive. Ciò ha determinato l'emergere di nuove patologie infettive e la ricomparsa di altre, già conosciute in passato e che, in larga parte, sembravano destinate a ridursi a pochi casi o, addirittura, ad estinguersi.

Le principali cause di queste variazioni sono ascrivibili a:

- adattamenti e modificazioni microbiche;
- modificazioni del clima e delle temperature;
- cambiamento degli ecosistemi;
- modificazioni demografiche e del comportamento umano;
- sviluppo economico e utilizzo del territorio;
- commercio e viaggi internazionali;
- tecnologia ed industria;
- interruzione delle misure di sanità pubblica;
- povertà ed ineguaglianze sociali;
- guerre e carestie;

- mancanza di volontà politica;
- volontà di provocare distruzione (bioterrorismo).

Inoltre, bisogna considerare che negli ultimi decenni si sono modificate le condizioni di suscettibilità dell'ospite (aumento della proporzione di immunodepressi nella popolazione generali – soggetti con infezione da HIV, soggetti sottoposti a trapianto o terapie immunosoppressive, popolazione anziana, denutrizione, alcoolismo) ed in alcuni casi le condizioni stesse di assistenza (aumentato utilizzo di procedure invasive nelle strutture sanitarie con conseguente sviluppo di infezioni ospedaliere) hanno condizionato lo sviluppo di malattie da infezione, talora emergenti (es. epidemie di *Acinetobacter* in terapia intensiva) o ri-emergenti (infezioni da patogeni multiantibiotico-resistenti).

La comparsa all'inizio del 1980 di casi di infezione da HIV/AIDS è stata il prologo di una serie di infezioni emergenti, talora rare, e del riemergere di vecchie infezioni considerate quasi del tutto eliminate, come la tubercolosi, o di infezioni che si sperava fossero scomparse, come il colera, che in pochi mesi ha causato 900 casi nel Chad. Negli ultimi decenni si è assistito infatti alla comparsa di epidemie di febbri emorragiche virali da virus Ebola and Marburg, di casi umani di vaiolo delle scimmie, di casi di encefalopatia spongiforme bovina e conseguente malattia di Creutzfeltd-Jacob in giovani adulti, di malattia da virus West Nile, e di sporadici casi umani di infezione da virus dell'influenza aviaria.

L'emergenza e la ri-emergenza di malattie infettive coinvolge molti fattori tra loro connessi. Viaggi e commerci internazionali, interazioni economiche e politiche, ed relazioni inter-umane e tra uomo ed animali continuano ad interessare il sistema della globalizzazione. Da queste interazioni può scaturire, per via accidentale o deliberate, la comparsa di nuovi e sconosciuti agenti di malattie infettive, così come la ricomparsa di malattie da tempo dimenticate e la modificazione di agenti infettivi tali da condizionarne la maggiore diffusibilità e virulenza. Le soluzioni per limitare la diffusione di infezioni emergenti e ri-emergenti richiedono la cooperazione di più discipline e di più entità in tutto il mondo. Le chiavi di successo in questa impresa saranno l'adeguamento delle risorse finanziare, lo scambio e la rapida comunicazione delle conoscenze, e la cooperazione tra esperti di sanità pubblica e di discipline biomediche con esperti di comportamento umano, politica, economia ed altre discipline.



Australia holding full dress rehearsal for foot-and-mouth fight

Sydney, September 9

Australia launches an ambitious nationwide war-game on Monday to test its ability to fight an enemy that could ravage the co tural heartland: foot- ease. Officials from agriculture, emerge and police forces will day Exercise manoeuvers to prepa ficials say would b

WHO warns of meningitis threat to Rwanda's capital

September 11, 2002

A meningitis outbreak is threatening two million people in Rwanda, amid concerns that the disease may spread to the capital Kigali, which would be potentially catastrophic. There is regular movement of people between Bugesera and the city, so we should be prepa-

New flu virus appears

A new strain of influenza appeared last winter, public health experts said yesterday. It was not sufficiently different from circulating strains to defeat the flu vaccine, but the subtype does

Dengue cases surge in Singapore

September 9, 2002

A surge in dengue fever cases has prompted Singapore's National Environment Agency to distribute more than 6800 sachets of insecticide to be placed in mosquito-breeding places, officials said Monday. The number of cases since June has averaged 440 per month, compared

Liberia reports major cholera outbreak

Officials said 400 cholera cases had been admitted to the J.F. Kennedy Hospital and that measures had been taken to chlorinate water in the areas worst affected. The epidemiologist at the Ministry of Health, Charles Nagbe, said the areas worst hit were central Monrovia, nearby Gardnes-

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ASSOCIAZIONE CULTURALE Giuseppe DOSSETTI i Valori TUTELA E SVILUPPO DEI DIRITTI

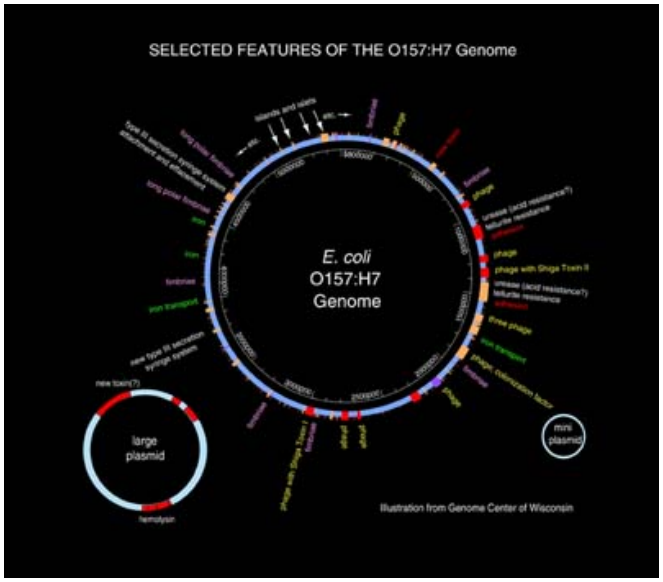
Infezioni rare emergenti e riemergenti

Nicola Petrosillo, M.D.
Director, 2nd Infectious Diseases Division
National Institute for Infectious Diseases
"Lazzaro Spallanzani", IRCCS-Rome,
Italy

What are emerging and re-emerging infections?

- **“New” infections.**
- **“Old” infections that have re-emerged due to change in environment.**
- **“Old” infections that have changed their patterns of pathogenesis.**

Contributing factors to emergence & re-emergence of infectious diseases

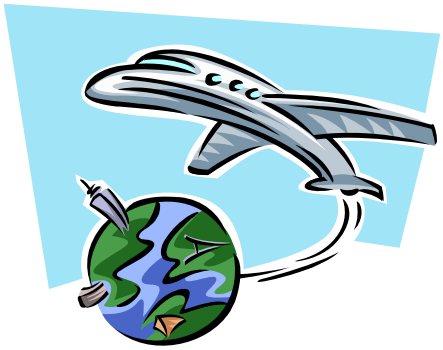
Factor	Specific example	Example of disease
Microbial adaptation and change	Microbial evolution 	Outbreaks caused by O157:H7 strain of *E. coli*, which is more virulent.
Climate and weather	Flood and draught The dengue mosquito *(Aedes aegypti)* 	Increased breeding sites for mosquito vectors and increase of mosquito-borne infectious diseases

Contributing factors to emergence & re-emergence of infectious diseases

Factor	Specific example	Example of disease
Ecological change	Agriculture; dams; changes in water ecosystem; deforestation/ reforestation; famine.	Rift Valley fever (dams); Argentine haemorrhagic fever (agriculture).
Population demogr. + Human behaviour	Rural/urban distribution; immunosuppression; sexual practices; drug; complacency regarding immunisation.	Spread of dengue, opportunistic spread of HIV,HCV; increased incidence of vaccine-preventable diseases

Contributing factors to emergence & re-emergence of infectious diseases

Factor	Specific example	Example of disease
Economic develop. + Land use	Clearing forests (increased cane mouse population)	Guanarito virus in Venezuela
International Travel & Commerce	Worldwide movement of goods and people; in food processing; air travel	Outbreak of cyclosporias Guatemalan raspberries; SARS; cholera 139



Contributing factors to emergence & re-emergence of infectious diseases

Factor	Specific example	Example of disease
Technology & Industry	Globalisation of food supply; changes in food processing	Outbreaks of E. coli 0111; antibiotic resistance
Breakdown in public health measures	Reduction in prevention programs; inadequate sanitation and vector control measures	Resurgence of diphteria in the former Soviet Union; dengue in America.

Contributing factors to emergence & re-emergence of infectious diseases

Factor	Specific example	Example of disease
Poverty & Social Inequality	Eating animals died from disease	Gastrointestinal anthrax
War & Famine	Civil unrest and natural disasters	Diseases caused by disruption of public health services, especially prevention
Intention to harm	Bioterrorism	Intentional distribution of *Bacillus anthracis* in US in 2001

Examples of highly resistant nosocomial pathogen

- Vancomycin R Enteroco
- Methicillin R Staph. au
- MRSE
- Pseudomonas aeruginosa
- S. maltophilia
- Enterobacter spp
- ESBL-producing Klebsiella
- E. coli
- Acinetobacter baumannii

Main Risk Factors

-Invasive procedures
-Overuse of antibiotics
-Length of hospital stay

EMERGING AND RE-EMERGING INFECTIOUS DISEASES, 1996–2001

WHO/CDS/2003.15

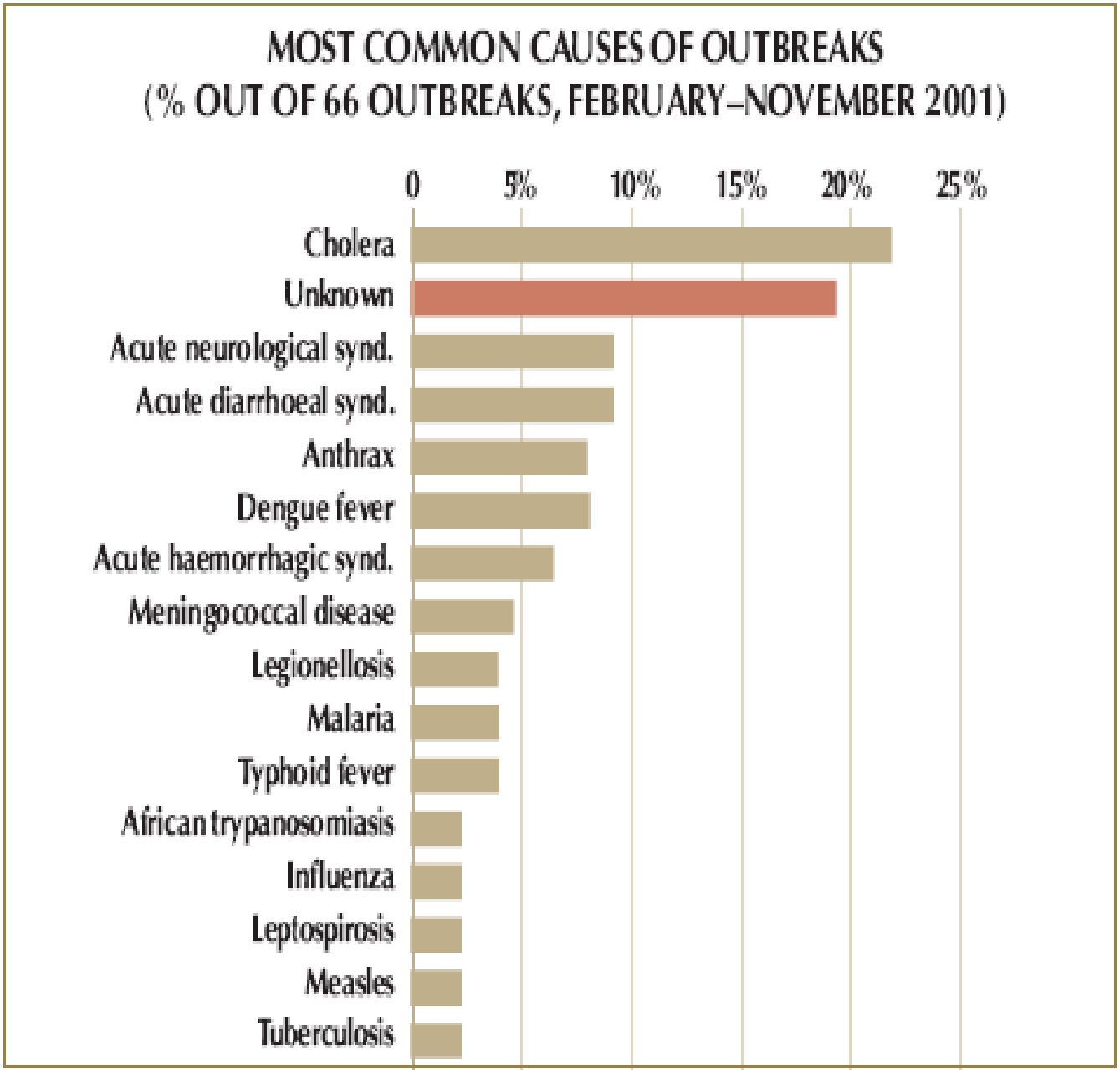


. Selected new pathogenic agents/ infectious diseases identified since 1992§

Agent	Disease condition
Anaplasma phagocytophilum	Human granulocytic anaplasmosis
Australian bat lyssavirus	Encephalitis
Bartonella clarridgeae	Cat scratch disease
Bartonella elizabethae	Endocarditis, bacteremia
Brachiola vesicularum	Microsporidiosis
Ehrlichia ewingii	Ehrlichiosis
Encephalitozoon intestinalis	Enteritis, disseminated infection
Gymnophalloides seoi	Gastrointestinal illness
Hantaviruses - Sin Nombre virus - Whitewater Arroyo virus	 Hantavirus pulmonary syndrome Hemorrhagic fever
Hendra virus	Encephalitis, respiratory disease
Hepatitis G virus	Hepatitis (suspected)
Human herpesvirus-8	Kaposi sarcoma
Metapneumovirus	Acute respiratory infections, pneumonia
Metorchis conjunctus	Liver disease
Nipah virus	Encephalitis
Nocardia veterana	Pulmonary disease
SARS-associated coronavirus	Severe acute respiratory syndrome
Trachipleistophora hominis	Microsporidiosis
TT virus	Hepatitis (possible)
Vibrio parahaemolyticus serotype 03K6	Gastroenteritis
§Agents identified prior to this time that were associated with large outbreaks in the specified period, such as West Nile, Ebola or Marburg viruses, are not included. This table is not all inclusive.	

Lashley FR. Online J Issues Nurs 2006;11:2.

WHO/CDS/2003.15



Emerging and Re-emerging diseases

Why are we afraid?

- **can be easily disseminated or transmitted person-to-person;**
- **cause high mortality, with potential for public health impact**

Recognized viral hemorrhagic fevers of humans

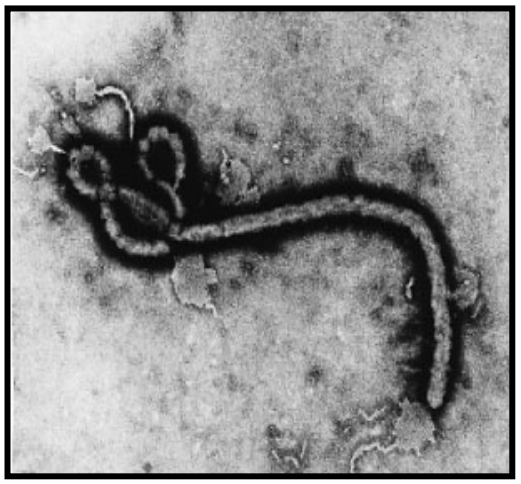
Virus family genus	Disease (virus)	Natural distribution	Source of human infection		Incubation (days)
			Usual	Less likely	
Arenaviridae					
Arenavirus	Lassa fever	Africa	Rodent	Nosocomial	5–16
	Argentine HF (Junin)	South America	Rodent	Nosocomial	7–14
	Bolivian HF (Machupo)	South America	Rodent	Nosocomial	9–15
	Brazilian HF (Sabia)	South America	Rodent	Nosocomial	7–14
	Venezuelan HF (Guanarito)	South America	Rodent	Nosocomial	7–14
Bunyaviridae					
Phlebovirus	Rift Valley fever	Africa	Mosquito	Slaughter of domestic animal	2–15
Nairovirus	Crimean-Congo HF	Europe, Asia, Africa	Tick	Slaughter of domestic animal; nosocomial	3–12
Hantavirus	HFRS (Hantaan and related viruses)	Asia, Europe; possible worldwide	Rodent		9–35
Filoviridae					
Filovirus	Marburg and Ebola HF	Africa	Unknown	Nosocomial	3–16
Flaviviridae					
Flavivirus					
(Mosquito-borne)	Yellow fever	Tropical Africa, South America	Mosquito		3–6
	Dengue HF	Asia, Americas, Africa	Mosquito		Unknown for dengue HF, but 3–5 for uncomplicated dengue
(Tick-borne)	Kyasanur Forest disease	India	Tick		3–8
	Omsk HF	Soviet Union	Tick	Muskrat-contaminated water	3–8

Abbreviations: HF, hemorrhagic fever; HFRS, hemorrhagic fever with renal syndrome.

Pigott DC. Crit Care Clin 2005; 21:765-83

Ebola Virus Infection

- Course of infection
  - Incubation period 2-21 days
  - Internal and external bleeding.
  - Ebola cases are fatal in 50% to 90% of clinically ill patients
- Diagnosis
  - Detection of specific antigen or antibody and/or virus isolation.
- Therapy
  - None – only supportive care







© Marcus Bleasdale

Outb ase



ngola

Germany
and Yugoslavia

cases
deaths

00 05

Emerging and Re-emerging diseases

Why are we afraid?

- **might cause public panic and social disruption; and**
- **require special action for public health preparedness.**

THE INDEPENDENT

No 5,154 www.independent.co.uk EUROPEAN EDITION FRIDAY 25 APRIL 2003

The first global epidemic of the 21st century

BY STEVE CONNOR
Science Editor

A HOSPITAL in China is surrounded by police, officials in Toronto meet in emergency session and airline chiefs discuss the billion-dollar losses from the collapse of international travel – welcome to the first global epidemic of the 21st century.

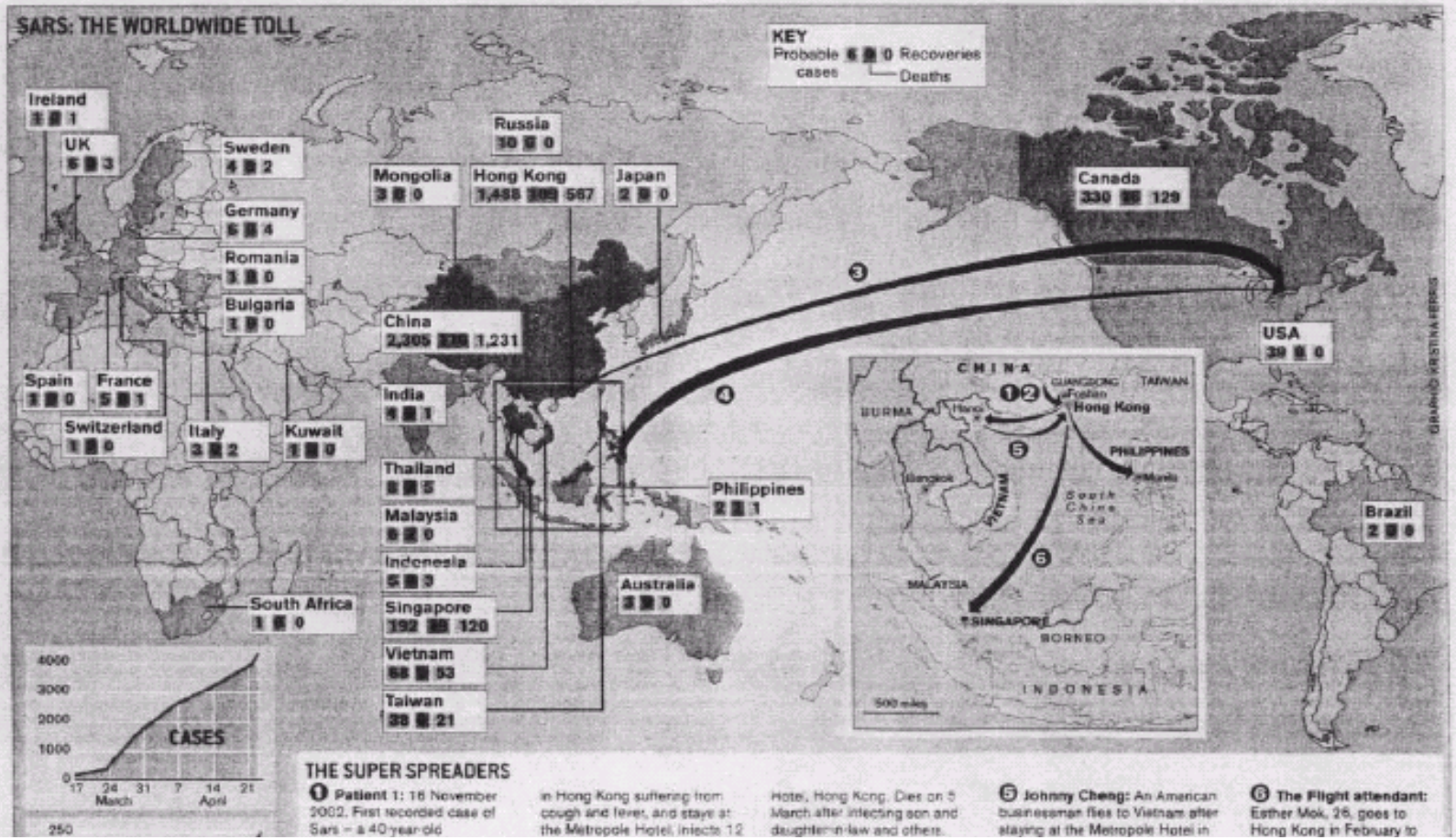
Panic was spreading as fast as the virus responsible for severe acute respiratory syndrome (Sars) as governments and health authorities around the world struggled yesterday to contain public anxiety over a disease that has so far killed 264 people and infected thousands more.

In Britain, the Chief Medical Officer, Sir Liam Donaldson, resisted intense pressure to make Sars a notifiable disease alongside cholera and smallpox, a measure that would allow health authorities to detain people suspected of being infected.

Sir Liam said that all six cases in Britain have so far been detected quickly and brought under control and there is no need, at the moment, to introduce further draconian measures.

"We are in very, very close daily contact with the World Health Organisation and the other countries involved and, far from being feeble and complacent, we are working very, very hard," Sir Liam said.

The WHO has warned travellers not to visit Toronto, the only epicentre of the virus outside Asia, as well as Beijing and Hong Kong, and the provinces of Guangdong and Shanxi in China where the Sars virus is thought to have originated.



THE SUPER SPREADERS

1 Patient 1: 16 November 2002. First recorded case of Sars – a 40-year-old in Hong Kong suffering from cough and fever, and stays at the Metropole Hotel, infects 12

Hotel, Hong Kong. Dies on 5 March after infecting son and daughter-in-law and others.

5 Johnny Cheng: An American businessman flies to Vietnam after staying at the Metropole Hotel in

6 The Flight attendant: Esther Mok, 26, goes to Hong Kong in February to

SARS and healthcare providers

Country	% SARS cases in healthcare workers
Hong Kong (Lee et al)	58%
Vietnam	53%



Hanoi ricorda– In un ospedale il ritratto di Carlo Urbani, il medico morto dopo aver scoperto la Sars.



United States 1918



Hong Kong 2003

UK 1918



Hong Kong 2003



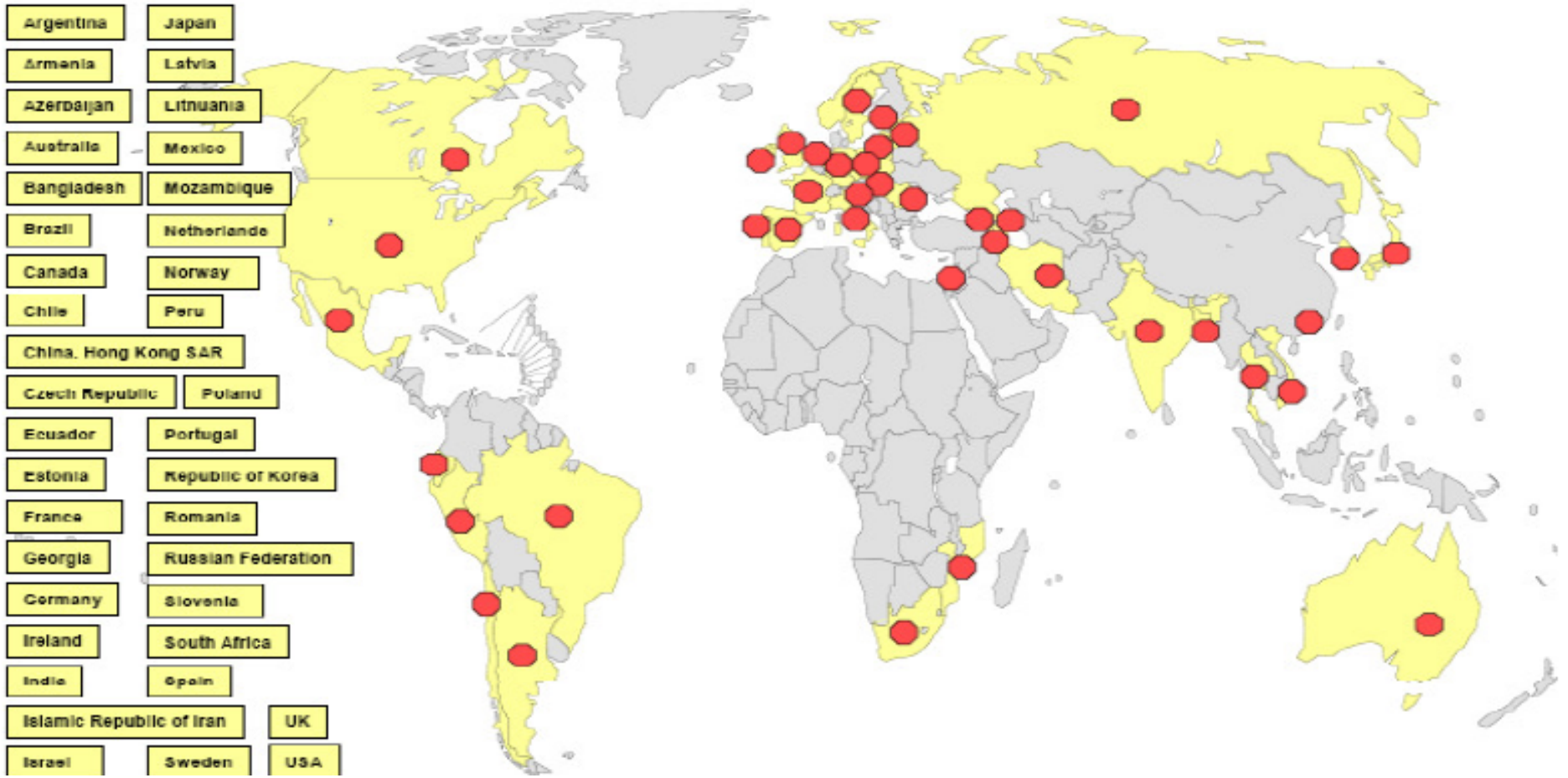
World Health Organization

TUBERCULOSIS
XDR-TB
THE FACTS

DEFINITION OF XDR-TB

- Extensively drug-resistant TB (XDR-TB) is a form of TB caused by germs resistant to all the most effective anti-TB drugs, and emerges through mismanagement of MDR-TB treatment. Once created, XDR-TB can spread from one person to another.
- XDR-TB is resistance to at least Isoniazid and Rifampicin (i.e. multidrug-resistant TB or MDR-TB), plus resistance to any fluroquinolones, and any one of the second-line anti-TB injectable drugs (Amikacin, Kanamycin or Capreomycin).
- XDR-TB raises concerns of a future TB epidemic with restricted treatment options, and jeopardizes the major gains made in TB control and progress on reducing TB deaths among people living with HIV/AIDS.

41 COUNTRIES WITH XDR-TB TO DATE



WHO November 2007

Emerging and Re-emerging diseases

Why are we afraid?

- **the unpredictable**

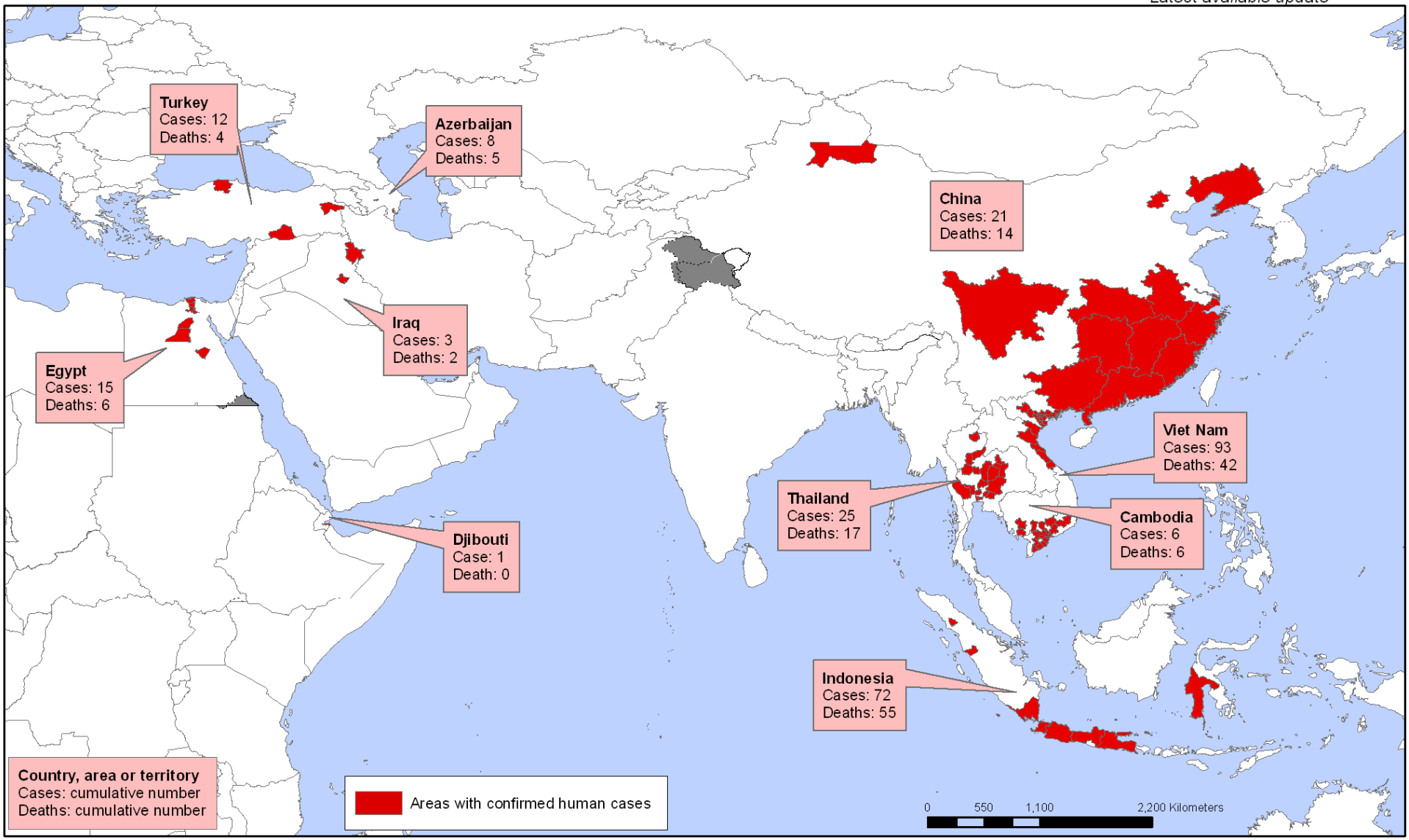
INFLUENZA PANDEMICS* AND RECENT OUTBREAKS, 1918–2002

Year	Name & subtype	Affected	No. of deaths
1918*	"Spanish flu" (H1N1)	all ages	40 million
1957*	"Asian flu" (H2N2)	> 65 & < 5	4.5 million
1968*	"Hong Kong flu" (H3N2)	> 65 & < 5	
1976	Swine flu (H1N1)	all ages	2
1997	Chicken flu (H5N1)	all ages	387 human cases → 245 deaths

WHO 10 Sept 2008

Affected areas with confirmed human cases of H5N1 avian influenza since 2003

Status as of 16 October 2006
Latest available update



World Health Organization

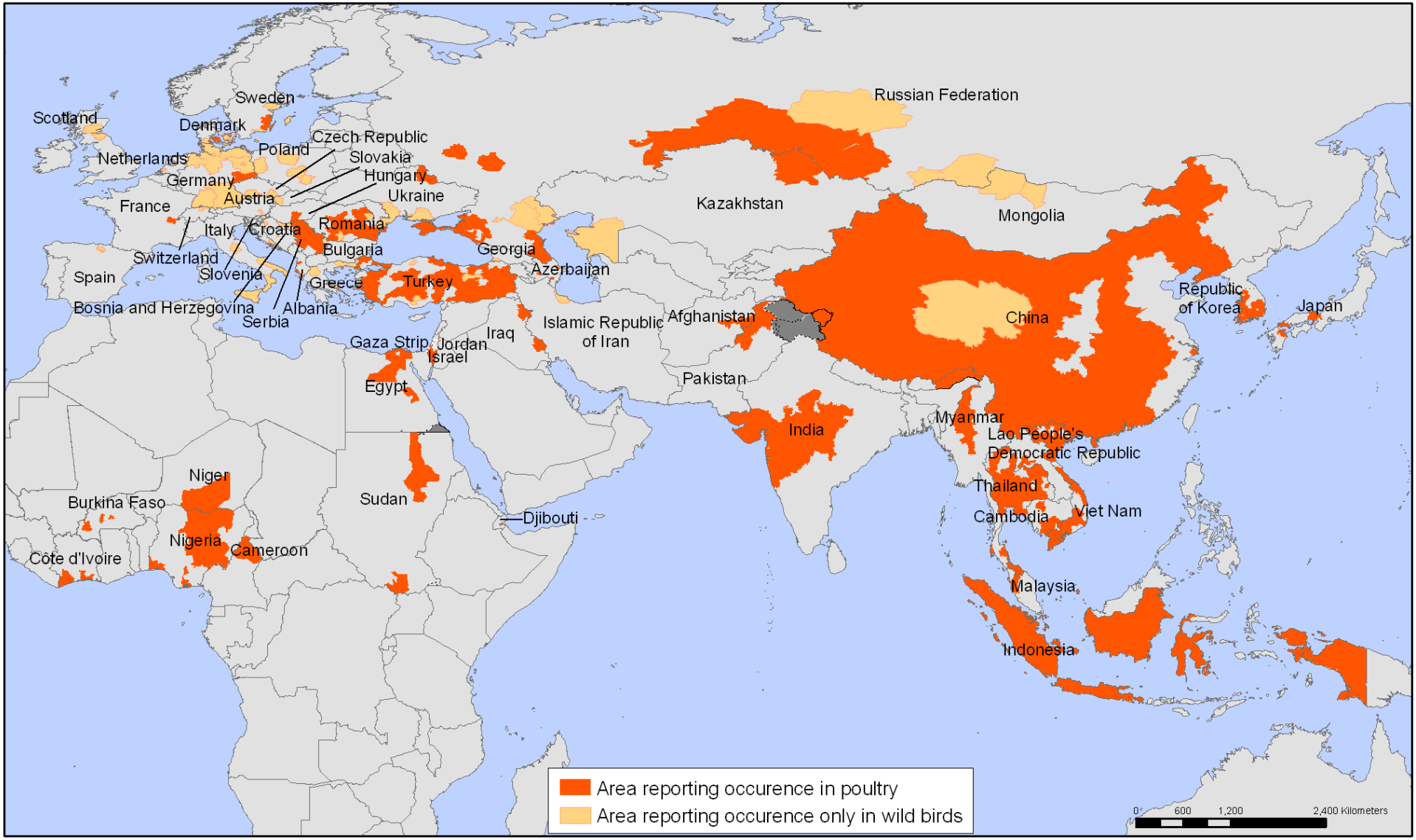
The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

Data Source: WHO / Map Production: Public Health Mapping and GIS
Communicable Diseases (CDS) World Health Organization

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Areas reporting confirmed occurrence of H5N1 avian influenza in poultry and wild birds since 2003

Status as of 17 November 2006
Latest available update



World Health Organization

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The boundaries and names shown and the designations used on this map do 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 area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

Data Source: World Organisation for Animal Health (OIE) and national governments

Map Production: Public Health Mapping and GIS
Communicable Diseases (CDS) World Health Organization

Rapid communications

Autochthonous chikungunya virus transmission may have occurred in Bologna, Italy, during the summer 2007 outbreak

T Seyler (thomas.seyler@iss.it)[1,2], C Rizzo[1], A C Finarelli[3], C Po[3], P Alessio[4], V Sambri[5], M L Ciofi Degli Atti[1], S Salmaso[6]

Eurosurveillance, Volume 13, Issue 3, 17 January 2008

Rapid communications

First human case of West Nile virus neuroinvasive infection in Italy, September 2008 – case report

G Rossini[1], F Cavrini[1], A Pierro[1], P Macini[2], A. C. Finarelli[2], C Po[2], G Peroni[3], A Di Caro[4], M Capobianchi[4], L Nicoletti[5], M P Landini[1], V Sambri (vittorio.sambri@unibo.it)[1]

Eurosurveillance, Volume 13, Issue 41, 09 October 2008

This is the 2nd [human] case within a few days in Emilia-Romagna after one found in Imolese. The province of Ferrara, already included in the national plan for control of the virus (which is transmitted

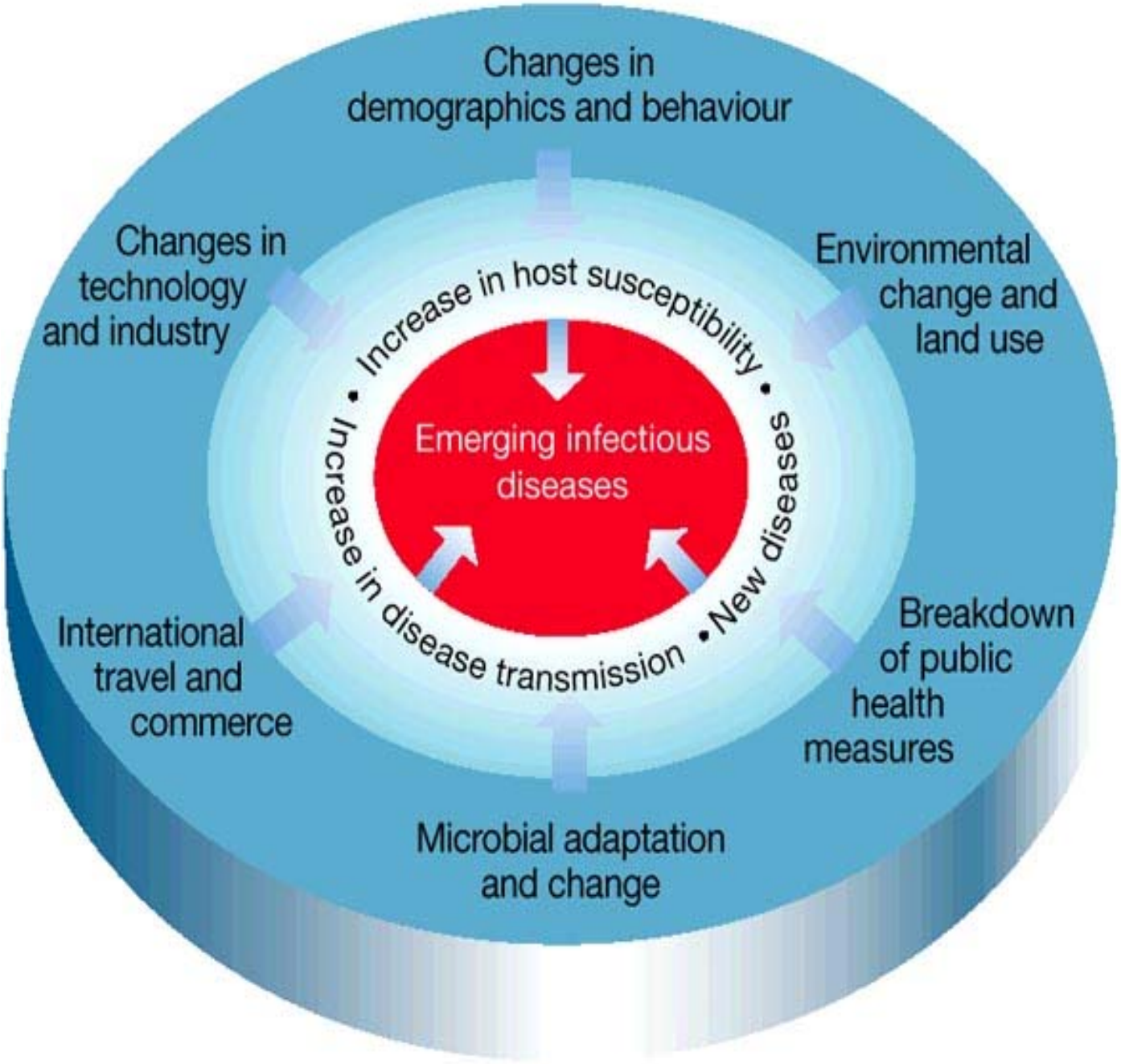
Promed 07-OCT-2008

In conclusion

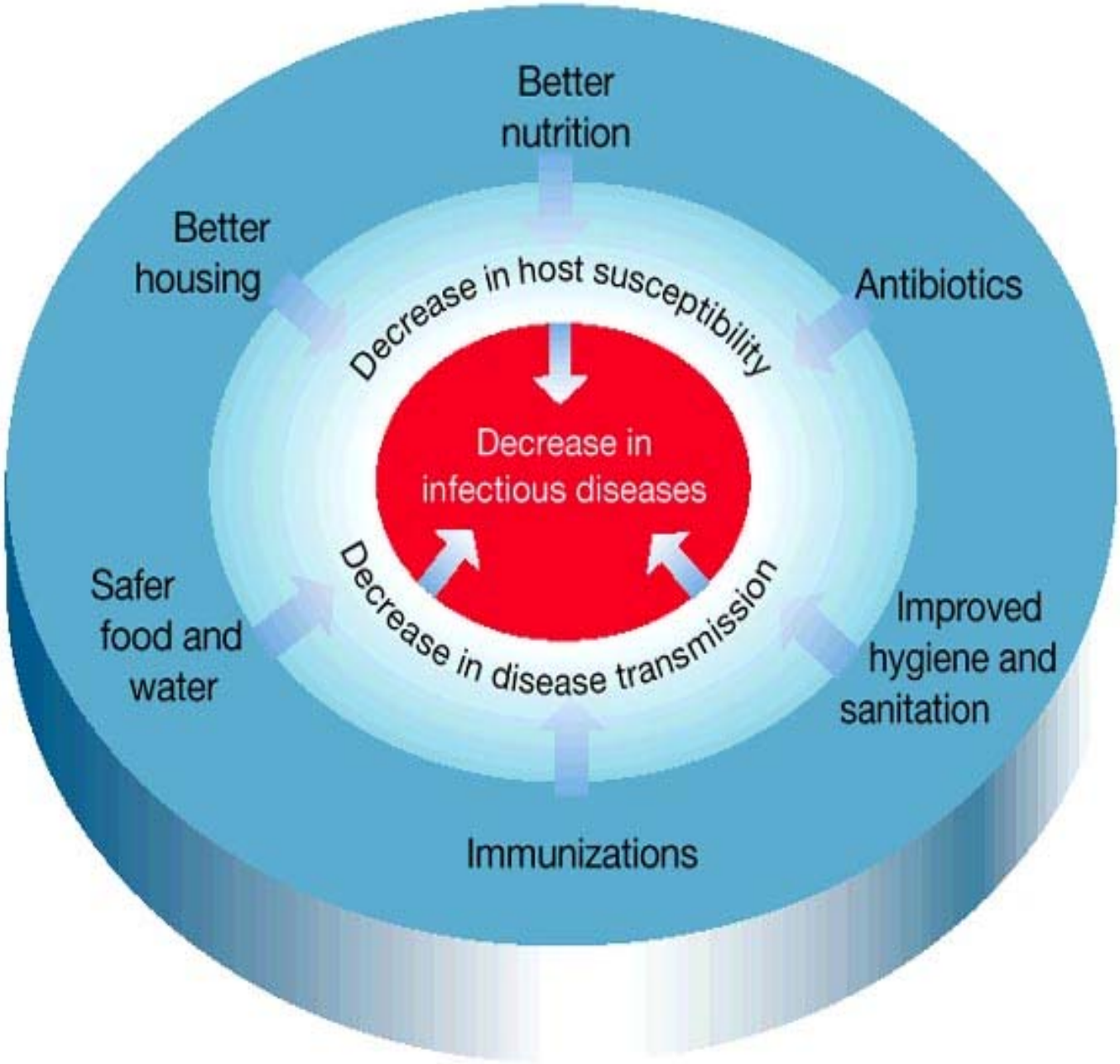
- Infectious diseases account for 1 out of 4 deaths worldwide. Around 80% are caused by AIDS, TB, malaria, diarrhoea, and respiratory infectious diseases

-Emerging infections have a lower impact, but they represent a threat because of their high morbility and mortality, and the potential spread and diffusion worldwide (international travel). Moreover, they may cause public panic and social disruption, and require special action for public health preparedness.

-Moreover, in developed countries, emerging infections often result from more intensive and invasive medical care (health care facility associated infections) and of the overuse of antimicrobials (selective pressure).



Cohen ML. Nature 2000; 406, 762 - 767



Cohen ML. Nature 2000; 406, 762 - 767



Grazie