Public Health, Global Governance and the International Health Regulations
SARS: international spread from Hong Kong, 21 February – 14 March, 2003

Source: WHO/CDC

Hotel M
Hong Kong

Doctors from Guangdong

Canada

Ireland

USA

New York

Singapore

Viet Nam

Bangkok

Germany
1 HCW + 2

Hong Kong

Sendai

Source: WHO/CDC

World Health Organization
Global Alert: Severe Acute Respiratory Syndrome (SARS)

12 March: First global alert, WHO press release
– Described atypical pneumonia in Viet Nam and Hong Kong

14 March
– 4 persons Ontario, 3 persons in Singapore, with severe atypical pneumonia fitting description of 12 March alert reported to WHO

15 March
– Medical doctor with atypical pneumonia fitting description of 12 March reported by Ministry of Health, Singapore on return flight from New York
Atypical pneumonia with rapid progression to respiratory failure, none yet recovered

Health workers appeared to be at greatest risk

Unidentified cause, presumed to be an infectious agent

Antibiotics and antivirals did not appear effective

Spreading internationally within Asia and to Europe and North America
Global Outbreak Containment: Decision 15 March, 2003

Press Release, 15 March 2003

World Health Organization issues emergency travel advisory

15 March 2003 | GENEVA -- During the past week, WHO has received reports of more than 150 new suspected cases of Severe Acute Respiratory Syndrome (SARS), an atypical pneumonia for which cause has not yet been determined. Reports to date have been received from Canada, China, Hong Kong Special Administrative Region of China, Indonesia, Philippines, Singapore, Thailand, and Viet Nam. Early today, an ill passenger and companions who travelled from New York, United States, and who landed in Frankfurt, Germany were removed from their flight and taken to hospital isolation.

Due to the spread of SARS to several countries in a short period of time, the World Health Organization today has issued emergency guidance for travelers and airlines.

“This syndrome, SARS, is now a worldwide health threat,” said Dr. Gro Harlem Brundtland, Director General of the World Health Organization. “The world needs to work together to find its cause, cure the sick, and stop its spread.”

There is presently no recommendation for people to restrict travel to any destination. However in response to enquiries from governments, airlines, physicians and travelers, WHO is now offering guidance for travelers, airline crew and airlines. The exact nature of the infection is still under investigation and this guidance is based on the early information available to WHO.

TRAVELLERS INCLUDING AIRLINE CREW: All travelers should be aware of main symptoms and signs of SARS which include:

- high fever (>38oC)

  AND

- one or more respiratory symptoms including cough, shortness of breath, difficulty breathing

  AND

- one or more of the following:
  - close contact* with a person who has been diagnosed with SARS
  - recent history of travel to areas reporting cases of SARS.
Rift Valley Fever, Sudan, 2007

Cases of RVF reported in Sudan, by date of reporting
October 2007 – 16 November 2007, (n = 391 cases).
Livestock trade patterns, Sudan and Arabian Peninsula, 2007
Global alert: Rift Valley Fever, Sudan, 7 November

Sudan/Rift Valley Fever

Places
Ioa and Chino, Ioa Region
States of White Nile, River Nile, Sinnar and Gezira

Risk Assessment Comments

High case fatality rate and potential for epidemic spread, and are diseases of special concern under the IHR (2005). There is no commercial human RVF vaccine or specific treatment currently available. Prevention relies on reducing exposure to infected ruminant animals and their tissues and body fluids; the adoption of safe handling and slaughtering practices; and when vector densities are high, using personal and community-based methods to reduce the risk of mosquito bites. Unusual or unexpected - The occurrence of the event itself is unusual for the area, season, or population. Risk of international disease spread - There is potential for cross border movement of the agent, vehicle or host. Risk of interference with international travel or trade - Interference with travel and trade has resulted during outbreaks of viral haemorrhagic fevers in the past.
International Health Regulations (article 4): national IHR focal points

► Notification
► Consultation
► Verification

National IHR Focal Point
(One per State Party)

WHO IHR Contact Point
(One per WHO Region)
Information flow, national IHR focal points to WHO
Event management system of the International Health Regulations

WHO Portal

States Parties

Operations

Event Management System
Concern about public health security: plague, cholera, yellow fever and smallpox

<table>
<thead>
<tr>
<th>Year</th>
<th>Location</th>
<th>Event Description</th>
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<tbody>
<tr>
<td>1374</td>
<td>Venice</td>
<td>Ship Quarantine for Plague only</td>
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<tr>
<td>1851 - 1902</td>
<td>Europe/Americas</td>
<td>10 International Sanitary Conferences</td>
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<td>1920</td>
<td>Geneva</td>
<td>League of Nations Health Organization</td>
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<td>1951</td>
<td>Geneva</td>
<td>International Sanitary Regulations</td>
</tr>
<tr>
<td>1969</td>
<td>Geneva</td>
<td>International Health Regulations</td>
</tr>
</tbody>
</table>
"...ensure the maximum security against the international spread of disease with a minimum interference with world traffic."

International Health Regulations, 1969
International Health Regulations 1969: requirements

- **Notification** to WHO: cholera, plague or yellow fever – reports only accepted from countries where event is occurring (smallpox removed 1980)

- **Health Organization at borders**: ports, airports and frontier posts adequately equipped to prevent vector proliferation

- **Health Measures**: describe maximum measures that a country may require to protect against cholera, plague and yellow fever (e.g. yellow fever vaccination card)
WHO: vision for revision of the International Health Regulations, 1996

- A world on the alert and able to detect and respond to international infectious disease threats within 24 hours using the most up to date means of global communication and collaboration

- A change in the norms surrounding reporting of infectious disease outbreaks, making it expected and respected to report
Global Public Health Intelligence Network, Canada
Global Outbreak and Alert Network (GOARN): Institutions and Partner Network
Sample of International epidemic response field missions, 1998–1999

- Viral meningitis
  - Romania & Republic of Moldova 1999
- Cluster of infant deaths
  - Egypt 1999
- Acute respiratory infection
  - Afghanistan 1999
- Viral infection
  - Libyan Arab Jamahiriya 1998
- Relapsing fever
  - Sudan (southern) 1999
- VHF/Acute respiratory infection
  - Sudan (southern) 1999
- Meningococcal meningitis
  - Sudan 1999
- Nipah virus encephalitis
  - Malaysia 1999
- Cholera
  - Comoros 1999
- Rift Valley fever
  - Viral hemorrhagic fever
  - Kenya 1999

Source: WHO
Global outbreak alert and response network: surveillance network partners in Asia

- APEC
- SEAMIC
- SEANET
- GISN
- GPHIN
- Pacific Public Health Surveillance Network (PPHSN)
- EIDIOR
- ASEAN
- Mekong Basin Disease Surveillance (MBDS)
- + Red Cross, other NGOs

Health Security and Environment
SARS: a mutated virus that circled the globe

Suspected animals in the chain of transmission

The SARS Coronavirus
Strategies that increased power of epidemic control: global partnerships

Global Outbreak Alert and Response Network
- 115 experts from 26 institutions in 17 countries
- Field teams sent to 5 countries
- Specialized networks: clinical, epidemiological, virological
Strategies to control: WHO travel recommendations on www.who.int/csr/sars/

Update 79 - Situation in China

China’s Executive Vice Minister of Health, Mr Gao Qiang, and WHO’s Executive Director for Communicable Diseases briefed the press this morning on the situation of SARS control in China. Also in attendance were Dr Qi Ziaoqiu, Director-General of the Department of Disease Control in the Chinese Ministry of Health, and Dr Henk Bekedam, WHO Representative to China.

Cumulative Number of Reported Probable Cases Of SARS

From: 1 Nov 2002 To: 2 June 2003, 18:00 GMT+2

Revised: 3 June 2003, 9.00 GMT +2

Country Cumulative number of case(s) Number of new cases
Brazil 2 0 0 2 10/Apr/2003 24/Apr/2003

SARS Travel Recommendations Summary Table

This table, updated daily, indicates those areas with recent local transmission of SARS for which WHO has issued recommendations pertaining to international travel.
New norms for reporting and responding to infectious diseases, 2003

Severe acute respiratory syndrome (SARS)

Reporting of infectious diseases from other sources accepted by WHO Member States

All infectious diseases with potential for international spread to be reported

Revised International Health Regulations to serve as a formal framework for pro-active international surveillance and response through national IHR focal points
International Health Regulations
2005

From three diseases to all public health events
From passive to pro-active using real time surveillance/evidence
From control at borders to detection and containment at source
Requirements, International Health Regulations (2005)

- Strengthened national core capacity for surveillance and control including at border posts
- Mandatory reporting of possible public health emergency of international importance, and of four specific diseases: SARS, smallpox, avian influenza and polio
- Collective, pro-active global collaboration for risk assessment and risk management
- Monitoring of implementation by the World Health Assembly
Polio eradication progress
1988 - 2003

1988
350,000 children
125 countries
Inequitable access to polio vaccine

2003
784 children
6 countries
Equitable access to polio vaccine
Polio Vaccines - Western Countries Exploit Developing Ones Says Kano State Governor Shekarau

BYLINE: Daily Trust

BODY:
The Kano State governor, Malam Ibrahim Shekarau, has asserted that the people's objection to polio vaccines has confirmed that polio vaccination is damaging to young girls.
International spread of polio from Nigeria, 2003-2005

- 6 polio endemic countries
- 18 countries with imported virus

- Wild virus type 1
- Wild virus type 3

Health Security and Environment
Measures to restore confidence in vaccine safety, 2003 - 2004

- Testing of vaccines in Nigerian programme for presence of impurities/hormones: WHO Collaborating Centre South Africa and India
- Provision of polio vaccines manufactured in an Islamic country
- Personal discussions with governor of Kano and eventual decision to convene expert group of state paediatricians
Political advocacy for polio eradication

10th Islamic Summit Polio Resolution, Malaysia, 2003

Islamic Conference of Foreign Ministers Meeting Polio Resolutions (Turkey 2004, Pakistan 2007)

3rd Extraordinary Islamic Summit, Mecca, 2005

'Noting OIC countries now suffer the greatest burden of polio, call for political & financial support of OIC member states to finish eradication'
Religious advocacy for polio, 2004

Rulings & Fatwas on the need and safety of polio vaccines:

– the Grand Imam of El Azhar Al Sharif,
– International Union for Moslem Scholars
– The Mufti of Egypt
– Mawlana Fazul Rahman
– The Islamic Fiqh Academy - Jeddah
– Dr Y. Al Qaradawi, European Council for Fatwa and Research.

Visit of Imam Cheik Cisse to northern Nigeria.
The international spread of wild poliovirus

On 30 June 2005, WHO highlighted an increasing risk of international spread of wild poliovirus and updated its advice for travelers on steps they could take to increase their personal protection against wild poliovirus. Subsequently, on 16 July 2004, an *Ad Hoc Expert Consultative Group on Polio and Public Health* was convened by the Director-General of WHO to discuss potential measures to prevent or limit the international spread of wild poliovirus.
Evidence from previous polio outbreaks, 2000 - 2004

Review of outbreak epidemiology, WHO expert consultative group:

- Polio-immune adults have been suspected index cases in outbreaks in eastern Europe and Asia

- Immune adults can carry wild poliovirus in gut for up to one month

- Booster dose with oral polio vaccine decreases time of wild virus carriage
The kingdom of Saudi Arabia has required that all travelers from Nigeria must be properly immunized against all the communicable diseases before they could be allowed entry into the country to perform the 2006 Hajj, which is around the corner.

The new condition imposed on Nigerian pilgrims is given a primacy against the high incidence and resident nature of child killer diseases, which is rampant in the country, despite efforts to eradicate them.

By STELLATZE, Abuja

In a statement issued by the Interim Coordinator of the National Programme on Immunization (NPI), Dr (Ms) Edughe Abebe, and made available to New Age, the conditions include: A valid yellow fever vaccination certificate, in accordance with the International Health Regulations; and a certificate of vaccination against typhoid and paratyphoid, in accordance with the AIP (WHO) and the International Health Regulations.

In addition, travelers will be required to present their vaccination cards on arrival in Saudi Arabia.

Inoculation will be performed at the surgical unit in the King Abdul Aziz International Airport in Jeddah.

The conditions are: Tetanus toxoid, required for all travelers, and influenza vaccine, required for all travelers, including children less than 14 years of age. In addition, travelers will be administered an influenza vaccine, required for all travelers, including children less than 14 years of age.
World Health Assembly resolutions on polio eradication

- Original resolution on polio eradication 1998
- Resolutions on continued/strengthened effort in remaining endemic countries
  - 2004
  - 2006
  - 2007
  - 2008
WHO: Nigeria, Dragging Polio Eradication Back

World Health Organization (WHO), yesterday, said that the continued presence of polio in parts of Northern Nigeria was dragging backwards the total eradication of polio in the world.

The global health body said African countries and indeed the whole world were currently at risk of polio following the new outbreak of polio type one in Nigeria.

Director-General, WHO, Dr Margaret Chan, made this known at the opening of the 59th session of the WHO Regional Committee for Africa in Yaounde, Cameroon. (She who said the eradication of a disease is the ultimate form of sustainable campaign against any disease.)

He noted that the new outbreak of polio was dangerous since the disease had recently begun to spread to neighboring countries.

According to her, emergency-immunization campaigns conducted against polio in Nigeria have not been good enough.

According to a report presented at the conference, Nigeria is the only country in Africa battling with the polio outbreak.

The report presented by the WHO Regional Director for Africa, Dr Luis Sambo, called for urgent action to stop the spread of polio, which continues to cause suffering among northern states in Nigeria.

We need to maintain high government commitment and coordination to ensure that polio is eradicated in Nigeria.

Although the number of wild polio virus cases in Nigeria has fallen below 75 percent from 11/2 cases in 2007 to 29 in 2008, and in the same region from 12/5 cases in 1996, it is only half the number of cases that occurred in the region in 1992.

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"We will do everything humanly possible to ensure that polio is finally and totally eradicated from Nigeria."

Umaru Yar'Adua
President of Nigeria
Children with acute flaccid paralysis/wild poliovirus isolate, 01 Dec 2007 – 01 Dec 2008

- Wild virus type 1
- Wild virus type 3
- Wild virus types 1 & 3

Data in WHO HQ as of 09 Sep 2008
Circulating Vaccine Derived Polio Virus, Nigeria, July 2006-present
Simultaneous oral polio vaccine cessation after certification

After interruption of wild poliovirus, continued use of OPV will compromise the goal of a polio-free world.

Expert Consultation on Vaccine-derived Polioviruses (VDPVs), Sept 2003, Geneva
Laboratory risks to polio eradication

Polio virus widespread in laboratories throughout the world:

- Known wild poliovirus
- Known Sabin poliovirus
- Potential infectious materials (wild and Sabin poliovirus)
- Wild and Sabin poliovirus used in production of inactivated polio vaccine (IPV)
Influenza pandemics, 20th Century

1918: Spanish Flu (H1N1) - 20-40 million deaths
1957: Asian Flu (H2N2) - ~2.5 million deaths
1968: Hong Kong Flu (H3N2) - ~1 million deaths

<table>
<thead>
<tr>
<th>Year</th>
<th>Virus</th>
<th>Vaccine Composition</th>
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<tbody>
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Public health response: seasonal influenza risk

Seasonal influenza vaccine production pathway

- Surveillance
- Select strains
- Prepare reassortants
- Standardize antigen
- Assign potency
- Review/license
- Formulate/test/package
- Vaccinate
## Seasonal influenza vaccine production capacity, 2006 estimate

<table>
<thead>
<tr>
<th>Region</th>
<th>Influenza Human Vaccine production in million doses</th>
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<tbody>
<tr>
<td>Latin America</td>
<td>19</td>
</tr>
<tr>
<td>North America</td>
<td>73</td>
</tr>
<tr>
<td>Europe</td>
<td>223</td>
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<td>Asia</td>
<td>32</td>
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<tr>
<td>Africa</td>
<td>0</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>347</strong></td>
</tr>
</tbody>
</table>
WHO influenza surveillance network: collective action to assess and manage risks

The WHO Global Influenza Surveillance Network (GISN), July 2008

![World map showing influenza surveillance network locations](image-url)
Confirmed Human and Poultry infections since 2003
Genetic diversity: H5N1 virus groups (clades) infecting humans since 2003

Source: WHO CCs
H5N1 avian influenza 2008

Will adaptive mutation occur in other mammals as hypothesized for 1918 pandemic?

Flu Family Tree

Seeking clues to the origin of the 1918 virus’s hemagglutinin (HA), the authors analyzed gene sequences for the H1 subtype of HA from a variety of flu strains and constructed a phylogeny showing their evolutionary relationships. Samples of the 1918 strain (S. Carolina, New York, Brevig) fell within the family of human-adapted flu viruses. The 1918 H1 gene’s distance from the known avian family could indicate that it originated in an avian flu strain but spent time evolving in an unidentified host before emerging in 1918. Supporting this conclusion, a contemporary avian strain found in a preserved Brant goose (Alaska 1917) was evolutionarily distant from the 1918 strain and more similar to modern bird flu.
H5N1 avian influenza 2008

Or will viral reassortment occur as occurred in 1957 and 1968 pandemics?

Fig. 2. Origin of the 1957 Asian influenza pandemic. The genomes of human H1N1 and avian H2N2 influenza viruses have probably reassorted in an intermediate host. The resulting H2N2 virus consisting of five gene segments of human origin and three of avian origin was the cause of the pandemic of 1957.
## Current Level of WHO Pandemic Alert

<table>
<thead>
<tr>
<th>Inter-pandemic period</th>
<th>Phase 1</th>
<th>No new influenza virus detected in humans. If a new influenza virus presents in animals, the risk of human infection is considered to be low.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 2</td>
<td></td>
<td>No human infections, but a circulating animal influenza virus poses a risk to humans.</td>
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<tr>
<td>Pandemic alert period</td>
<td>Phase 3</td>
<td>Human infection(s) with a new virus, but no (or very infrequent) human-to-human spread.</td>
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<tr>
<td>Phase 4</td>
<td></td>
<td>Small cluster(s) with limited human-to-human transmission but spread is highly localized.</td>
</tr>
<tr>
<td>Phase 5</td>
<td></td>
<td>Larger cluster(s) but human-to-human spread still localized.</td>
</tr>
<tr>
<td>Pandemic period</td>
<td>Phase 6</td>
<td>Increased and sustained transmission in general population.</td>
</tr>
</tbody>
</table>
Requirements, rapid containment response operations in phase 4 – 5 pandemic alert

- Early detection
- Rapid response to prevent or slow human to human transmission
  - anti-viral drugs
  - vaccination using H5N1 vaccine (if event is caused by H5 virus)
  - social distancing
- Capacity building underway through regional training in Cambodia, Cameroon, Egypt, Indonesia, Kazakhstan
Vaccines and antiviral drugs for H5N1 and pandemic influenza

Antiviral drug stockpiles
- Number of courses available for national use/rapid response and containment:
  - WHO maintained: 5 million
  - APEC maintained
  - US maintained

H5N1 vaccine stockpile (under development)
- 50 million doses: rapid response and containment
- 60 million doses: for essential populations identified with countries in case of H5N1 pandemic
Influenza risk assessment: technical requirements

Epidemiological information to:
  – determine changes in transmissibility that indicate the current pandemic alert phase

Virus to:
  – study genetic, antigenic and functional characteristics for rapid comparison with other viruses in the context of currently understood global epidemiology
  – determine changes in anti-viral drug resistance
  – develop/distribute diagnostic test kits and reagents to National Influenza Centres
Public Health Response to risk of pandemic influenza

- Selection of appropriate virus strains for vaccine
  - Laboratory study/manipulation of virus to create vaccine strains

- Provision of vaccine virus strains to regulatory agencies and industry
  - Clinical trials and licensing
  - Industrial production
Minister of Health, Indonesia and H5N1 virus sharing: more equitable benefits
Jakarta meeting on sharing in the benefits of virus sharing, March 2007

Types of benefits anticipated, developing countries:

- Strengthened laboratory capacities to qualify for WHO Collaborating Centre designation
- More transparent virus handling within WHO
- Sustained access to H5N1 and pandemic influenza vaccines
- Linkage of virus sharing and vaccine production to sustained benefits
Article 2:

Prevent, protect against, control and provide a public health response to the international spread of disease commensurate with public health risks
Sharing of avian influenza viruses under the International Health Regulations

- Annex 2: helps determine if an event constitutes a public health emergency of international concern (PHEIC), and requires reporting of any human infection with a new influenza sub-type.

- Article 6; requires joint risk assessment to examine if the threat posed by the reported event constitutes a PHEIC.

*to conduct risk assessment, epidemiological information and virus strains are required.*
WHO resolution on influenza virus sharing (WHA 60.28) : May 2007

- Intergovernmental process to develop best practices for sharing of novel influenza viruses and ensuring access to the benefits
  - Interdisciplinary meeting on virus sharing, August 2007, Singapore
  - Intergovernmental meeting on virus sharing, November 2007
  - Open-ended working group meeting on virus sharing, April 2008
  - Intergovernmental meeting on virus sharing, December 2008
Key activities by WHO Relevant to resolution on virus sharing, May 2007

Advisory Mechanism

- Influenza Virus Traceability System
- H5N1 vaccine stockpile
- Global Pandemic Influenza Vaccine Plan (GAP) with manufacturing technology transfer
- Strengthening of Global Influenza Surveillance Network with developing country laboratories
- Antiviral stockpiles
- Financial mechanism to purchase pandemic vaccine
Will the world use the International Health Regulations (2005) to better ensure global public health security if the international governmental process does not result in virus sharing?
Possible policy instruments for global health governance

- Conventions and agreements
- International Regulations
- Resolutions
- Norms and standards
- Other (e.g. advocacy, advisory groups)

*Interpretation and implementation lies with the States concerned*