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## Faculty Development Program for IIHMR Group of Institutions

## International Health Regulations & Global Pandemic Response

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Dr. Preetha GS has done her MBBS from Government Medical College, Trivandrum and MD in Community Health Administration[MD(CHA)] from the National Institute of Health and Family Welfare(NIHFW), New Delhi. She has a rich and diverse work experience across private & public sector as well as international agencies with assignments in NGO and private hospitals, NIHFW, Ministry of Health and Family Welfare Govt of India and the United Nations,. Her professional experience of more than fourteen years in the health sector has given her immense exposure to training, research and project/programme management.

# International Health Regulations & Global Pandemic Response

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- Evolution of International Health Regulations
- Provisions of IHR 2005
- Pandemics
- Pandemic Alert Phases
- Global response to Pandemic H<sub>1</sub>N<sub>1</sub>

# SPANISH FLU – 1918



Mar 11000

- Albert Gitchell, a U.S. Army cook in Kansas, was one of the first few to be hospitalized with a 104-degree fever
- By the **end of the month, 1,100 troops** (out of 54,000) had been hospitalized and 38 had died after developing pneumonia

# By January 1918

- H1N1 had spread across the globe and killed at least 50 million (out of the world population of 2 billion), in three waves
- U.S. troops carried the Spanish flu with them to Europe
- The entire military exercise of moving lots of men and material in crowded conditions contributed to its wide spread

# SARS 2002

- Emerged in Guangdong province of China in Nov 2002
- Reported in Hong Kong on February 21, 2003
- In March 2003 a novel coronavirus (SARS-CoV) was found to be the causative agent
- In the next few months, an additional 27 countries were affected
- Last known new case - 15 June 2003

- Outbreak declared to be contained in July 2003 after a new case free two incubation periods (2 x10 days)after the last known case

*"We observe a milestone: the global SARS outbreak has been contained,"*

Dr. Gro Harlem Brundtland, DG, WHO

3 July 2003

- Total 8096 cases and 774 deaths
- 66% cent of the cases occurred in China, 22% in Hong Kong, 4% in Taiwan and 3% in both Singapore and Canada



# What worked for SARS

- Prompt reporting of cases of the disease with the potential for international spread
- Timely global alerts, supported by a responsible press and amplified by electronic communications contributed significantly in outbreak control
- Travel recommendations, including screening measures at airports
- International collaboration greatly advanced understanding of the science of SARS - scientists, clinicians & public health experts
- The most severely affected areas in the SARS outbreak had well-developed health care systems
- in the absence of a curative drug and a preventive vaccine, efforts were supported by political commitment and great public concern

# Counter to potential international spread from new risks

- 48<sup>th</sup> WHA in 1995 had already called for a revision of the existing International Health Regulations (IHR 1969)
- SARS (the first global public health emergency of the 21st century) created the perfect momentum
- Inter-governmental working group in 2003-draft reviewed by all member states
- Adopted by 58<sup>th</sup> WHA in May 2005
- Entered into force on 15 June 2007

# International Health Regulation (IHR)

- The International Health Regulations (IHR) are an international legal instrument that is binding on 194 countries across the globe, including all member states of the World Health Organization (WHO).
- IHR are intended to:
  - help prevent the spread of disease across borders
  - outline the minimum requirements for functional public health system that allows countries to quickly detect and respond to disease outbreaks in their communities

# International Health Regulations

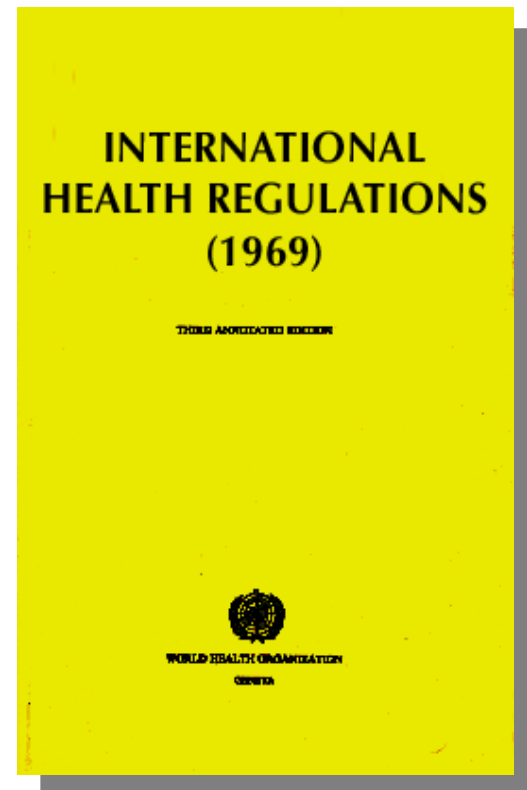
- Countries are required to quickly notify WHO of severe disease events that could spread internationally, also referred to as public health emergencies of international concern
- This rapid notification allows WHO to quickly guide a coordinated global response to such an event and minimize unnecessary interference on travel or trade

# Evolution of IHR

- The Constitution of WHO confers upon the World Health Assembly the authority to adopt regulations “designed to prevent the international spread of disease”
- International Sanitary Regulations, 1951– adopted by 4<sup>th</sup> WHA, which was in place since the International Sanitary Conference, 1851
- International Health Regulations, 1969 – adopted, revised and consolidated by 22<sup>nd</sup> WHA which was amended in 1973 and 1981 - (Cholera, Plague, Relapsing Fever, Small pox, Typhus and yellow fever)

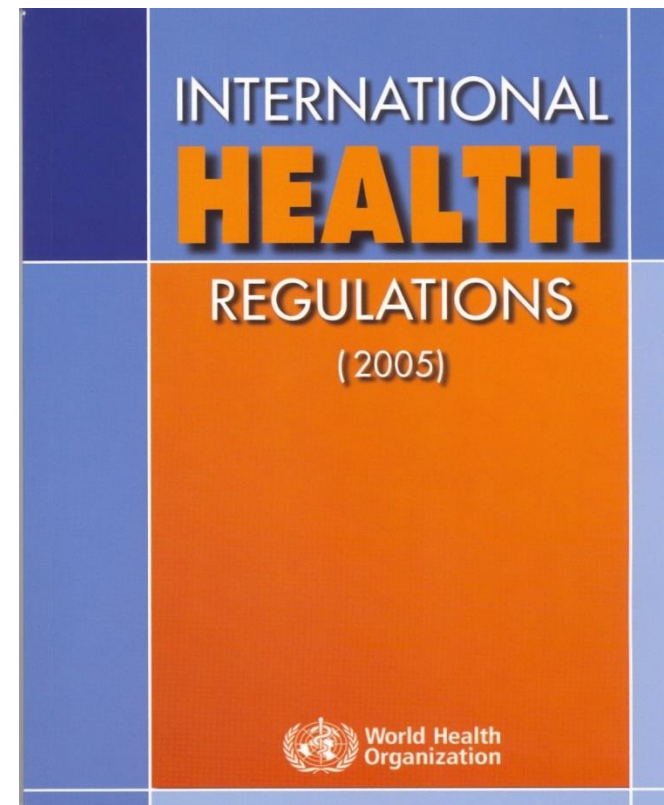
# IHR 100

- **Objective: Maximum security against international spread of diseases with minimum interference to world traffic**
- **Scope: narrow: only 3 diseases (Cholera, plague, yellow fever)**
- **Limitations:**
  - **Dependence on affected country to notify;**
  - **Not fulfilling purpose as evident from plague outbreak (1994), SARS outbreak(2003)**
  - **Lack of mechanisms for collaboration between WHO and affected country**
  - **Emergence and re- emergence of diseases of International concern in last decade**



# IHR (2005) Document

- Purpose & Scope : To prevent, protect against, control and provide a public health response to the international spread of disease in ways that are commensurate with and restricted to public health risks, and which avoid unnecessary interference with international traffic and trade
- 66 Articles organized in 10 Parts
- 9 Annexes
- Annex 1 – Core Capacity Requirements for Surveillance & Response, and for Designated Airports, Ports and Ground Crossings
- Annex 2 – Decision Instrument for Assessment & Notification of Events that may constitute a Public Health Emergency of International Concern
- 2 Appendices



# What's new in IHR 2005

- Concept of National focal point
- Covers all dangerous diseases both new and existing PHEIC
- WHO has the mandate to verify rumors, news from print/electronic media of disease / outbreaks
- Obligation to develop core capacity both at country level as well as ports/ airports
- Provision for WHO assistance for early diagnosis
- Provision of dispute solving through court of arbitration
- Covers notification for chemical & radio-nuclear events as well



# Public Health Emergency of International Concern

WHO

- An extraordinary public health event which
  - constitutes a public health risk to other countries through international spread of disease
  - potentially requires a coordinated international response



**“Disease means an illness or medical condition, irrespective of origin or source that presents or could present significant harm to humans”**

# What is a potential public health emergency of international concern?

- Four decision criteria are used to assess public health events:
  - Is the public health impact of this event potentially serious?
  - Is this event unusual or unexpected?
  - Is there the potential for international spread?
  - Is there the potential for travel and trade restrictions?
- *If 2 of the 4 criteria are met, countries are required to notify WHO within 24 hours*

- 4 diseases always need to be reported to WHO:
  - Severe acute respiratory syndrome or SARS
  - Smallpox
  - New influenza viruses
  - Wild-type polio
- The Director-General of WHO determines if the event is a public health emergency of international concern.
- The role of countries is to assess the magnitude and potential risk involved with an event, and WHO's role is to make the decision.

- With this design, WHO, as our global public health authority, can quickly assess the global risk of an event and, if needed, convene countries to mount a coordinated international response.
- Countries don't need to know what the cause or the source of an outbreak is to report it to WHO.
- The focus is on early detection and reporting to allow for a public health response before international spread occurs, or at least minimize the global impact of an outbreak.

**DECISION INSTRUMENT FOR THE ASSESSMENT AND NOTIFICATION  
OF EVENTS THAT MAY CONSTITUTE A PUBLIC HEALTH EMERGENCY  
OF INTERNATIONAL CONCERN**

**Events detected by national surveillance system (see Annex 1)**

A case of the following diseases is unusual or unexpected and may have serious public health impact, and thus shall be notified<sup>1, 2</sup>:

- Smallpox
- Poliomyelitis due to wild-type poliovirus
- Human influenza caused by a new subtype
- Severe acute respiratory syndrome (SARS).

**OR**

Any event of potential international public health concern, including those of unknown causes or sources and those involving other events or diseases than those listed in the box on the left and the box on the right shall lead to utilization of the algorithm.

**OR**

An event involving the following diseases shall always lead to utilization of the algorithm, because they have demonstrated the ability to cause serious public health impact and to spread rapidly internationally<sup>2</sup>:

- Cholera
- Pneumonic plague
- Yellow fever
- Viral haemorrhagic fevers (Ebola, Lassa, Marburg)
- West Nile fever
- Other diseases that are of special national or regional concern, e.g. dengue fever, Rift Valley fever, and meningococcal disease.

**Is the public health impact of the event serious?**

**Yes**

**Is the event unusual or unexpected?**

**Yes**

**No**

**Is there a significant risk of international spread?**

**Yes**

**No**

**Is there a significant risk of international travel or trade restrictions?**

**Yes**

**No**

**Is the event unusual or unexpected?**

**Yes**

**No**

**Is there a significant risk of international spread?**

**Yes**

**No**

**Not notified at this stage. Reassess when more information becomes available.**

**EVENT SHALL BE NOTIFIED TO WHO UNDER THE INTERNATIONAL HEALTH REGULATIONS**

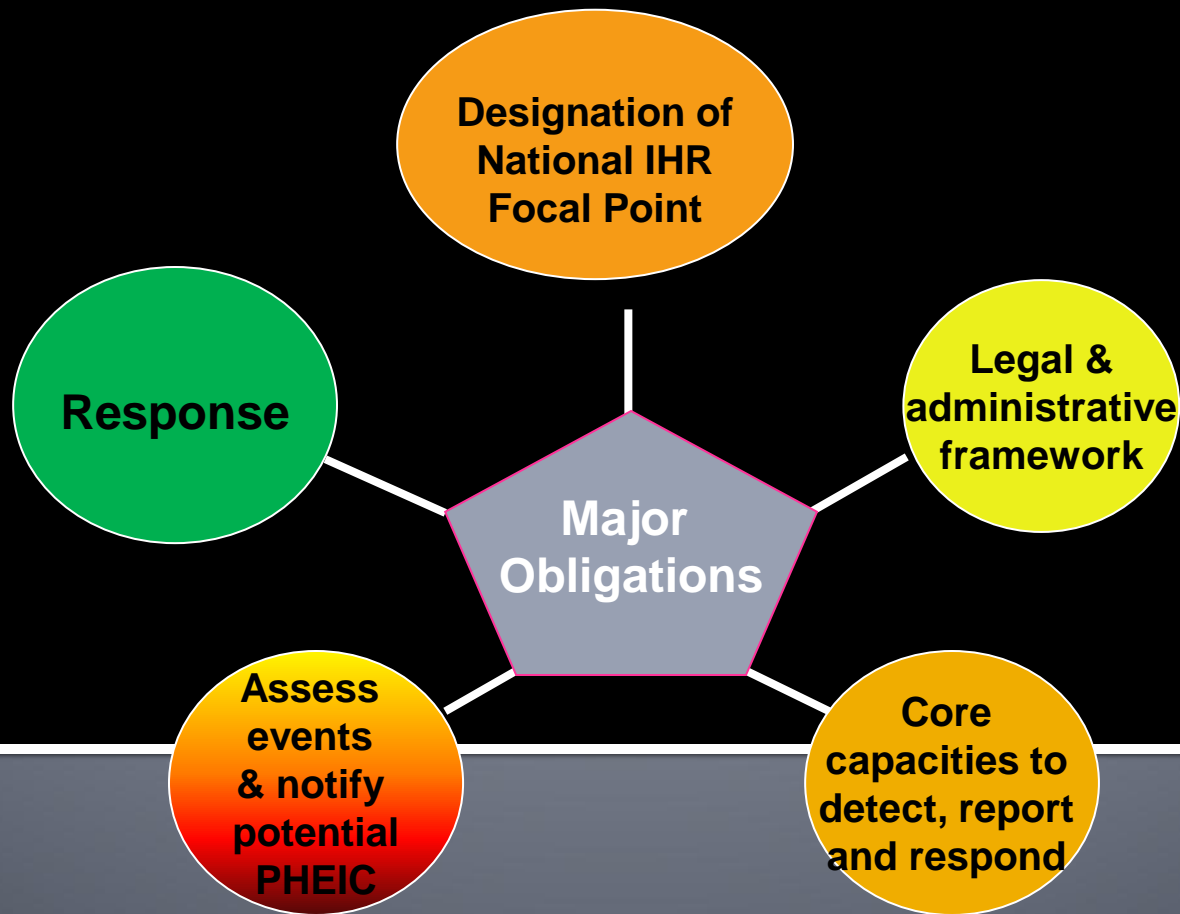
IHD



SARS

- Met 2 assessment criteria of a public health emergency of international concern:
  - Serious impact of public health: the disease caused serious illness and death, though nothing was known on what caused it, how it was transmitted, who was affected, means of prevention
  - Potential for international spread: it affected many travellers, who could potentially 'export' the disease to other countries.

# Obligations for Member States



# Responsibility of National Focal Point (NF)

- To notify PHEIC to WHO
- To respond to requests for verification of information of such events.
- Support field investigations, provide early diagnosis and provide technical guidance to states for timely and effective response to PHEIC
- Co-ordination with state units and WHO



# Notification

- The IHR(2005) requires notification of all events which may constitute PHEIC within 24 - 48 hours
- To respond to requests for verification of rumors / news received from print media or other sources

# Key Areas for effective implementation

- Legal provision – IHR
  - National - Epidemic Disease Act -1987
  - Disaster Management Act 2005
  - Draft Public Health (prevention, control and management of epidemics, bioterrorism and disasters) Bill provides for prevention, control & management of epidemics and public health consequences of disasters
  - Indian Aircraft (public Health) Rules, 1954 & Indian Port Health rules, 1955

# Key areas of content

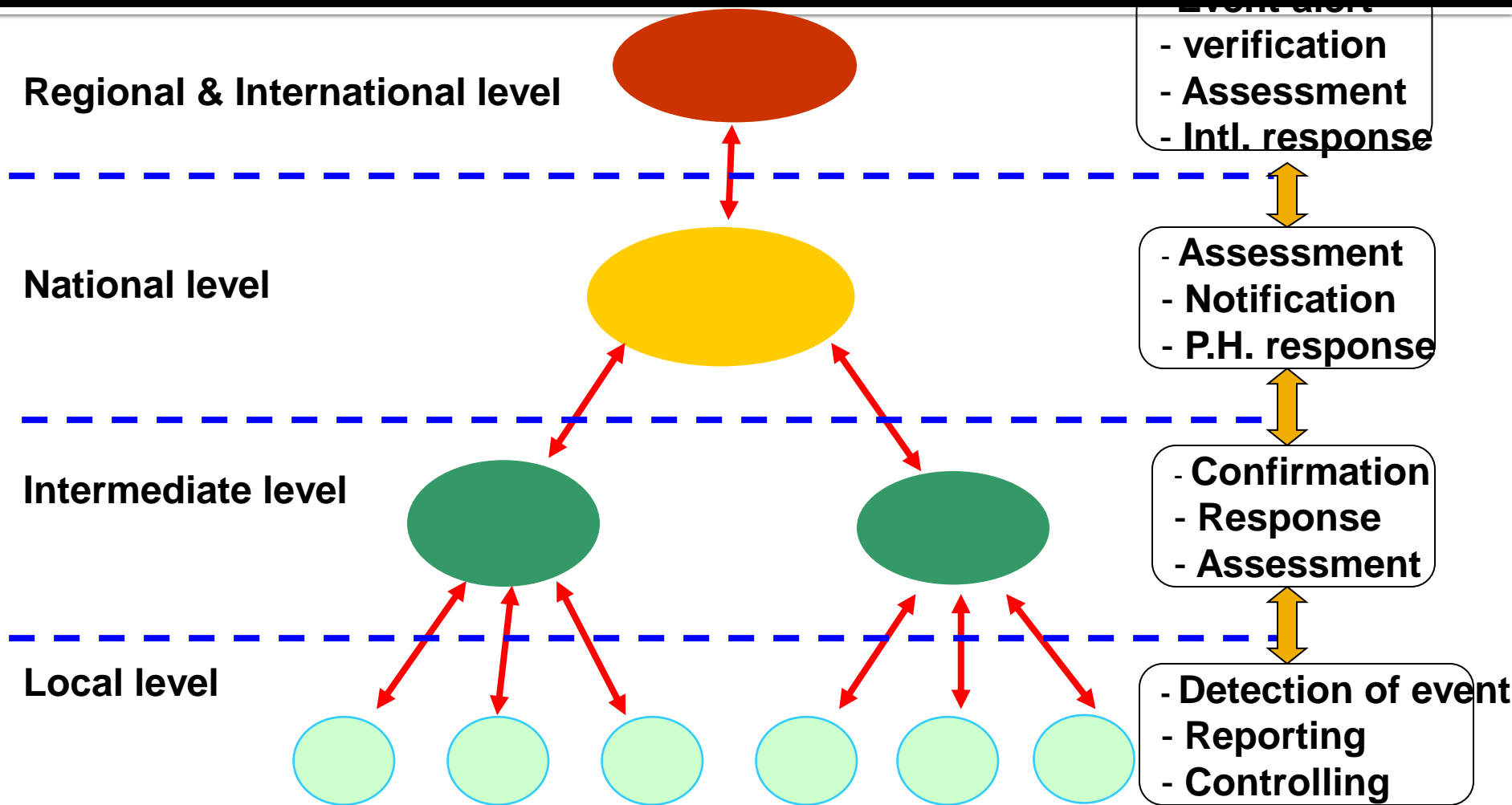
- Assessment & strengthening of core capacities at national/state/districts – nodal officers/RRTs (multidisciplinary)
- Trained manpower development – contingency plan
- SOPs for procedures – case management, screening, contact tracing, chemoprophylaxis, PPEs etc.
- Facilities for isolation, quarantine and case management – laboratory/hospital back-up support
- Risk assessment and Communication network
- Periodic review, data processing and reporting

# Activities for effective implementation

- **Activities at National level**
- **Activities by State Governments/ UTs and District Authorities**
- **Activities related to the Airports/Ports/ Ground Crossings**

THANK YOU

# Surveillance & response: can response be



# What has driven evolution of IHR achievements

- Emerging and re emerging infections
- Extensive increase in global travel and trade
- 3 key changes to IHR 1969:
  - Reporting of events by countries based on the 4 risk assessment criteria, when previously, only 3 predefined diseases needed to be reported.
  - Shift from preventing the international spread of disease through control at the border to containment at the source
  - 2005 IHR allow countries to adapt measures to best address the event rather than a prescribed set of measures

# Pandemics

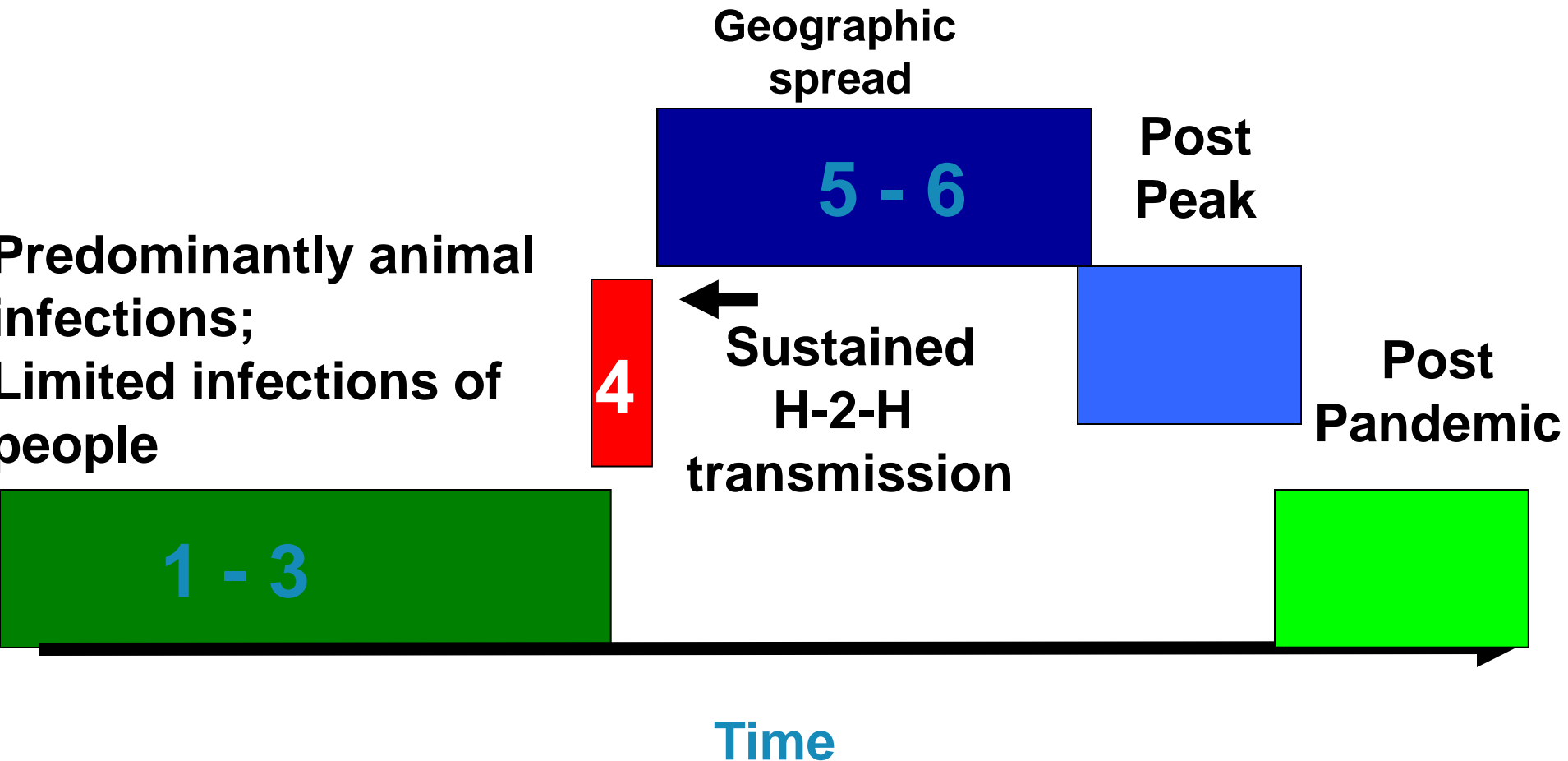
- Pandemic outbreaks have ravaged population groups from pre historic times
- Plague, influenza and viral haemorrhagic fevers

*Plague of Athens(430 BC), Antonian Plague (165-180 AD), Cyprian Plague (250-271 AD), Plague of Justinian (541-542 AD) the Black Death (1346-1353), the Great Plague of London (1665-1666)*

- Influenza - 5 pandemics since 1890, including the Spanish Flu of 2018, one of the most severe

# Pandemic Phases (W/LI)

*Phase 5 is a strong signal that a pandemic is imminent*





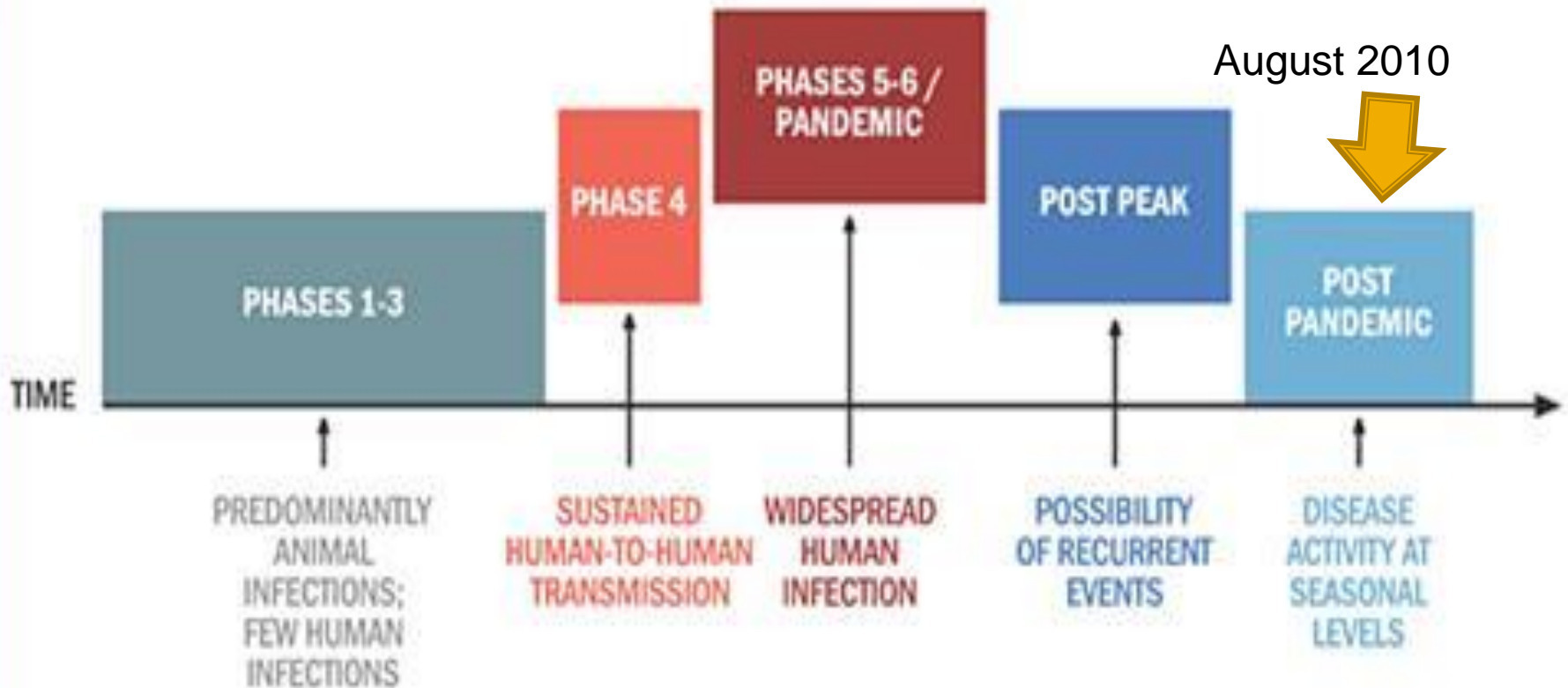
# Pandemic Influenza Phases

## PANDEMIC INFLUENZA PHASES (2009)

April 2009



August 2010



● 1918: Spanish Flu



*A(H1N1): 50m deaths*

1957: "Asian Flu"



*A(H2N2): 1-2m deaths*

1968: Hong Kong Flu"



*A (H3N2): 0.7m deaths*

From 2004: Highly Pathogenic Avian Influenza – pand. threat



*A (H5N1): 861 cases & 455 deaths*

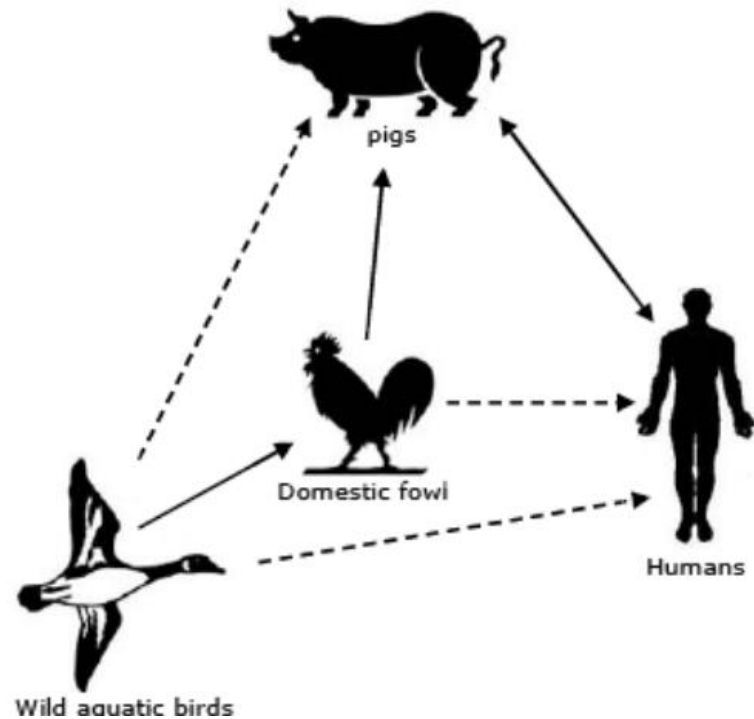
2009: "H1N1 flu "



*A (H1N1): 1.5-5.75 L deaths*

# Antigenic shift - evolution of novel viruses

- By 'genetic reassortment' or mixing when genetic material is exchanged between viruses, when an animal or human being is infected with different virus strains at the same time (co-infection)
- By adaptive mutation due to repeated infections in human beings



**Swine/ Humans - Mixing vessel**

# Avian Flu

# H1N1 Flu

- A new virus subtype

✓

- Severe infection in humans

✓

- Sustained human to human transmission

X

- A new virus subtype

✓

- Severe infection in humans

✓

- Sustained human to human transmission

✓

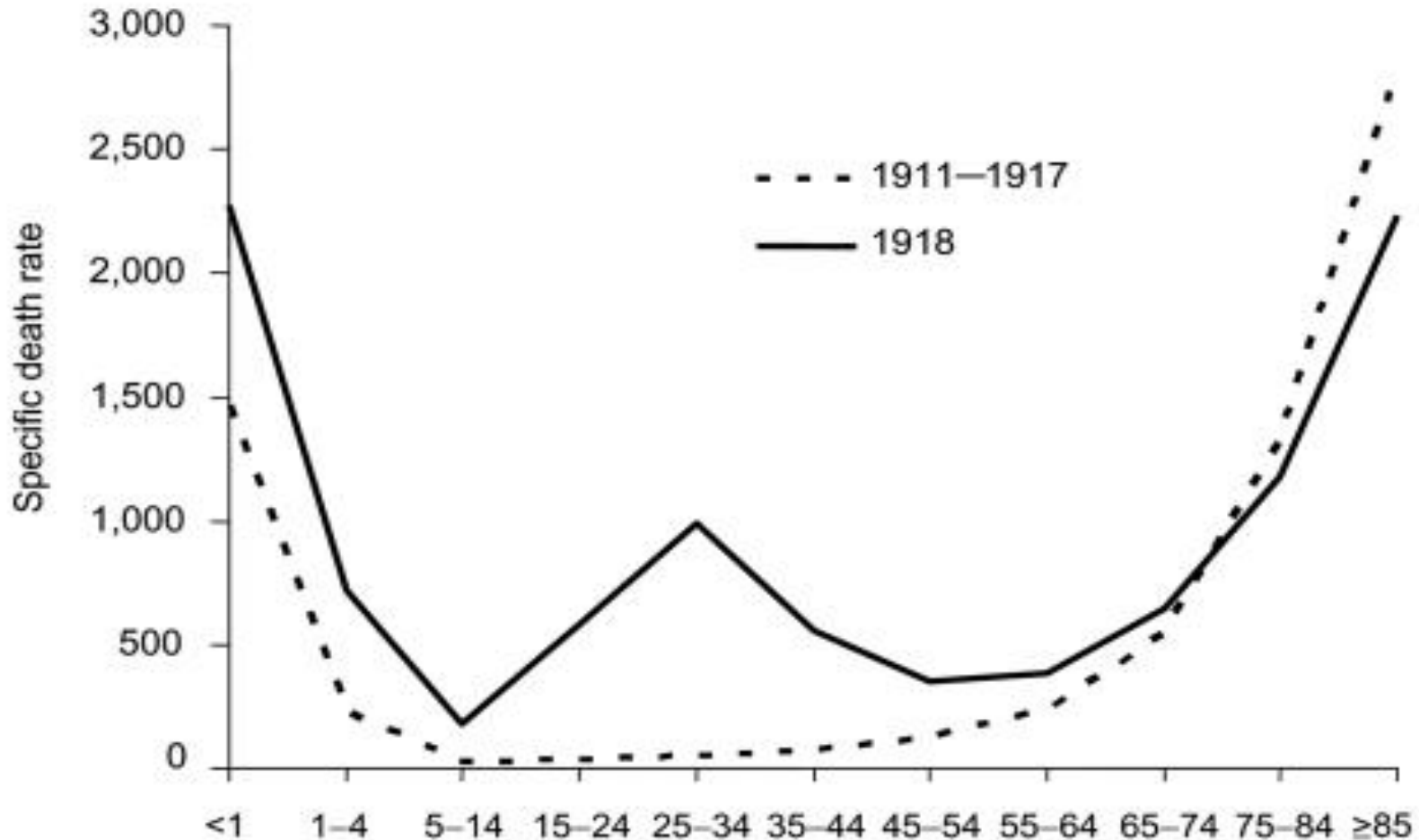
# Basic Reproduction Number

- “the number of secondary cases one case would produce in a completely susceptible population” (Dietz, 1993)
- “average number of secondary cases” ( Fine, 1993)
- “expected number of secondary cases” (Diekmann et al, 1990)
- Speaks about how contagious an infection is!

<b>Outbreak</b>	<b>R<sub>0</sub></b>	<b>CFR</b>
<b>Spanish Flu</b>	<b>1.4- 2.8</b>	<b>&gt;2.5%</b>
<b>SARS</b>	<b>0.19-1.08</b>	<b>10%</b>
<b>Pandemic H<sub>1</sub>N<sub>1</sub></b>	<b>1.4-1.6</b>	<b>&lt;1%</b>
<b>COVID-19</b>	<b>2- 5</b>	<b>3.62%</b>

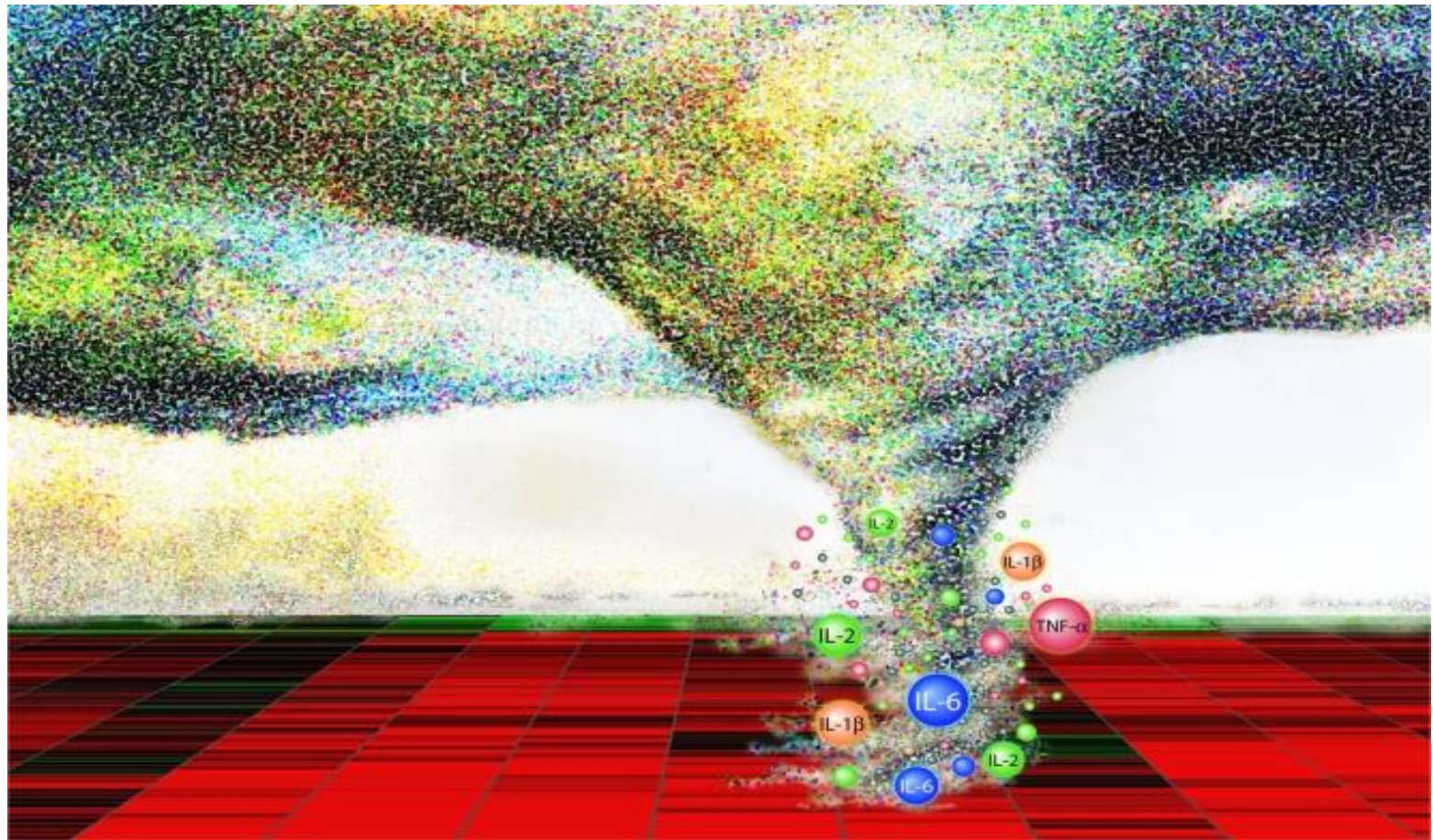
# Mortality (in 1000s) vs Age

## Spanish Flu



Age (y) Source: Taubenberger JK, Morens DM. 1918 influenza: the mother of all pandemics. Emerg Infect Dis 2006 January

# Cytokine Storm



**From: Into the eye of a storm. isoncik JR,  
Korth MJ, Simmons CP, Farrar J, Martin TR,  
Katze MG. *Microbiol Mol Biol Rev.* 2012 Mar;  
76(1): 16–32.**



# What is Cytokine Storm

- A hyperactive immune response characterized by the release of interferons, interleukins, tumor-necrosis factors, chemokines, and several other mediators
- These mediators are part of a well-conserved innate immune response necessary for efficient clearance of infectious agents
- Injurious to host cells
- Happens in young adults with robust immune systems

# Implications of a pandemic

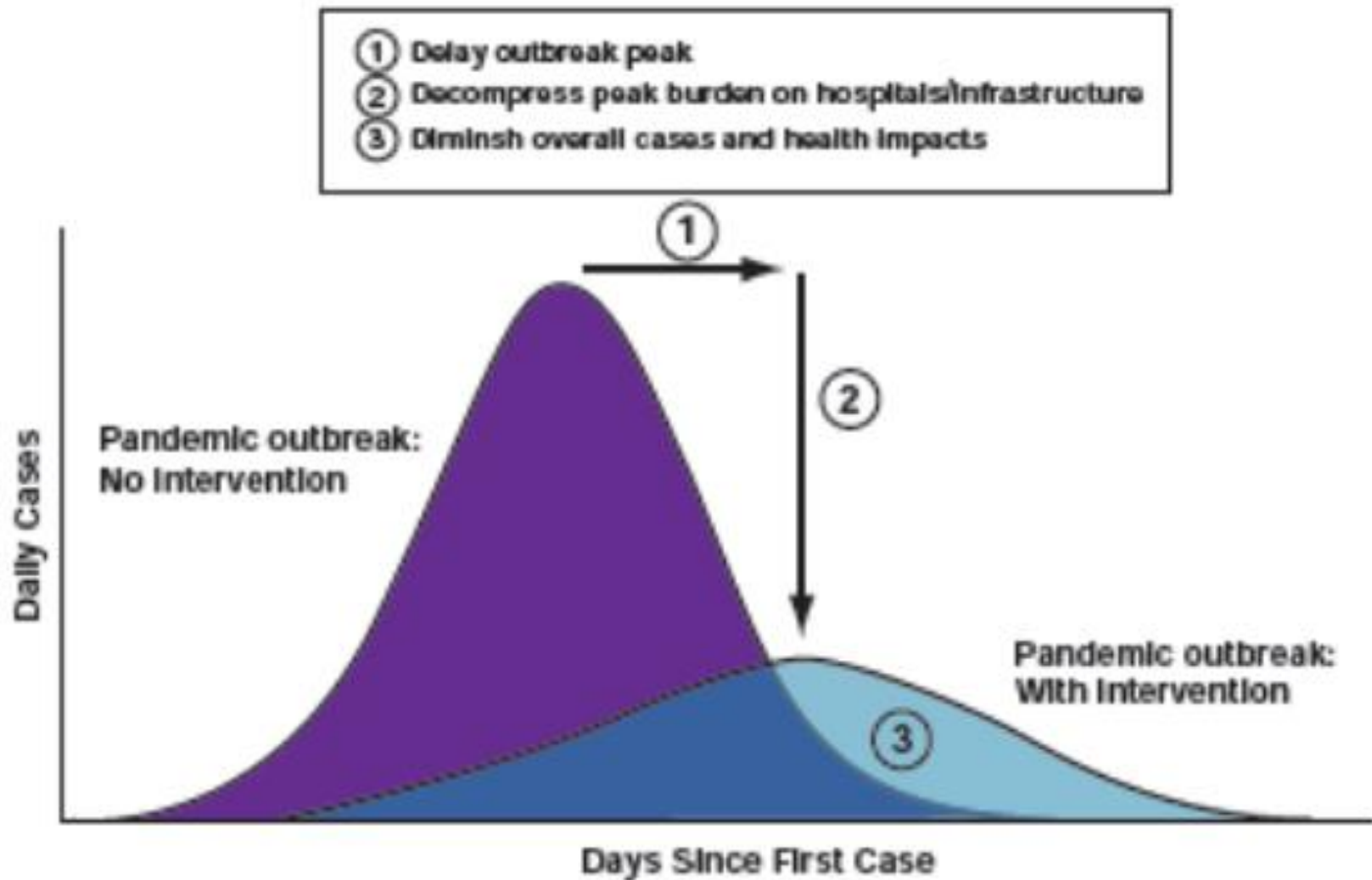
- High frequency of illness with a high death rate
- Surge in the demand for health services with overstretched health facilities
- Disproportionate impact on the vulnerable and marginalized groups
- Loss of livelihoods
- Higher public anxiety/ Deterioration of coping & support mechanisms
- Societal disruptions due to Interruption in public services
- Interruption of regular supply systems
- Trade & commerce disruptions
- Interruption of regular supply systems
- Economic impact

# Global Response to Pandemic H1N1

- March 18, 2009 – influenza like illness in Mexico
- April 18, 2009 – 2 cases in California – reported as probable PHEIC, using decision instrument in IHR 2005
- April 25, 2009 – for the first ever time a PHEIC declared as per IHR 2005 by WHO and Pandemic on 29 April 2009
- Led by WHO –WHO maintained communication with IHR focal points
- Coordinated response between countries and agencies as per IHR

- Measures :
  - Medical (antivirals, antibiotics, vaccines, supportive)
  - Non pharmaceutical interventions (hand washing, social distancing)
  - Pandemic plan by countries - execution
  - Stockpiling of oseltamivir

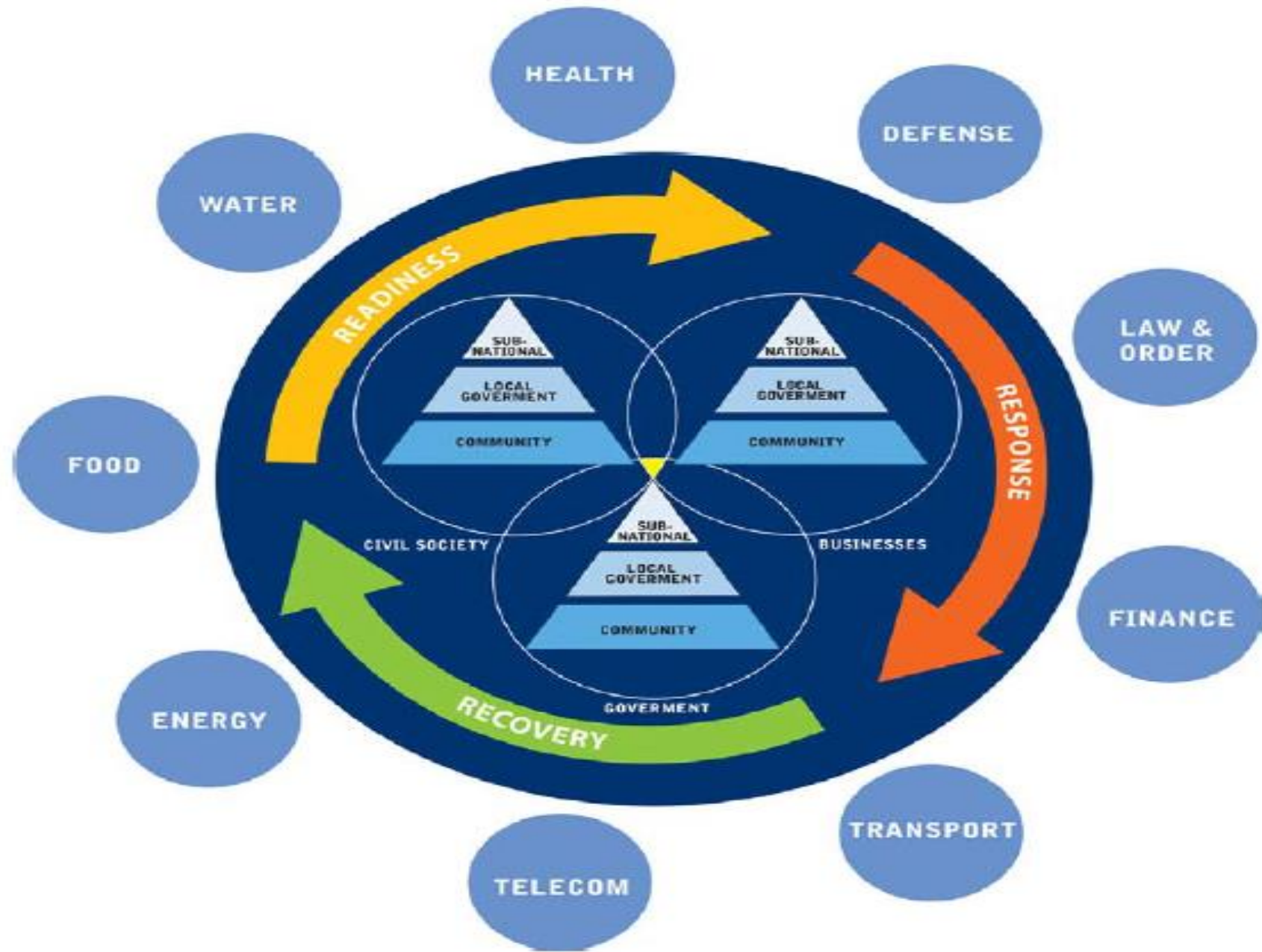
# Flatter curve



# Challenges

- Some countries restricted trade and travel with USA, Mexico though there was no WHO recommendation
- Citizens of North America were quarantined by some countries

# Whole of Society approach to preparedness by UN system



## What's next?

- Pandemics will strike again!!
- Identify and report under IHR 2005-  
capacity building, surveillance systems
- Prepare and practice pandemic plans
- W-O-S approach



09 July 2020

- Chinese embassy warns its citizens in Kazakhstan about an atypical respiratory illness
- 1772 have died since January 2020, 628 in June 2020
- CFR appears to be much higher than COVID-19



The image is a screenshot of a news article from the Global Times. At the top left is the Global Times logo with the tagline "DISCOVER CHINA, DISCOVER THE WORLD". To the right of the logo is a row of social media sharing icons: Facebook, Twitter, Google+, Email, Weibo, and RSS. Below these are three red icons representing a document, a smartphone, and a window. A red horizontal bar contains the word "Channels" in orange text and a black hamburger menu icon. The main headline of the article is "Chinese Embassy in Kazakhstan urges caution following reports of 'unknown pneumonia'", displayed in large, bold, black font. At the bottom of the screenshot, the source and publication information are listed: "Source: Global Times Published: 2020/7/9 21:33:40 Last".

- *"SARS is a warning, SARS pushed even the most advanced public health systems to the breaking point. Those protections held, but just barely. Next time, we may not be so lucky. We have an opportunity now, and we see the need clearly, to rebuild our public health protections. They will be needed for the next global outbreak, if it is SARS or another new infection."*

**Dr. Gro Harlem Brundtland, DG, WHO**

**3 July 2003**

**THANK YOU**