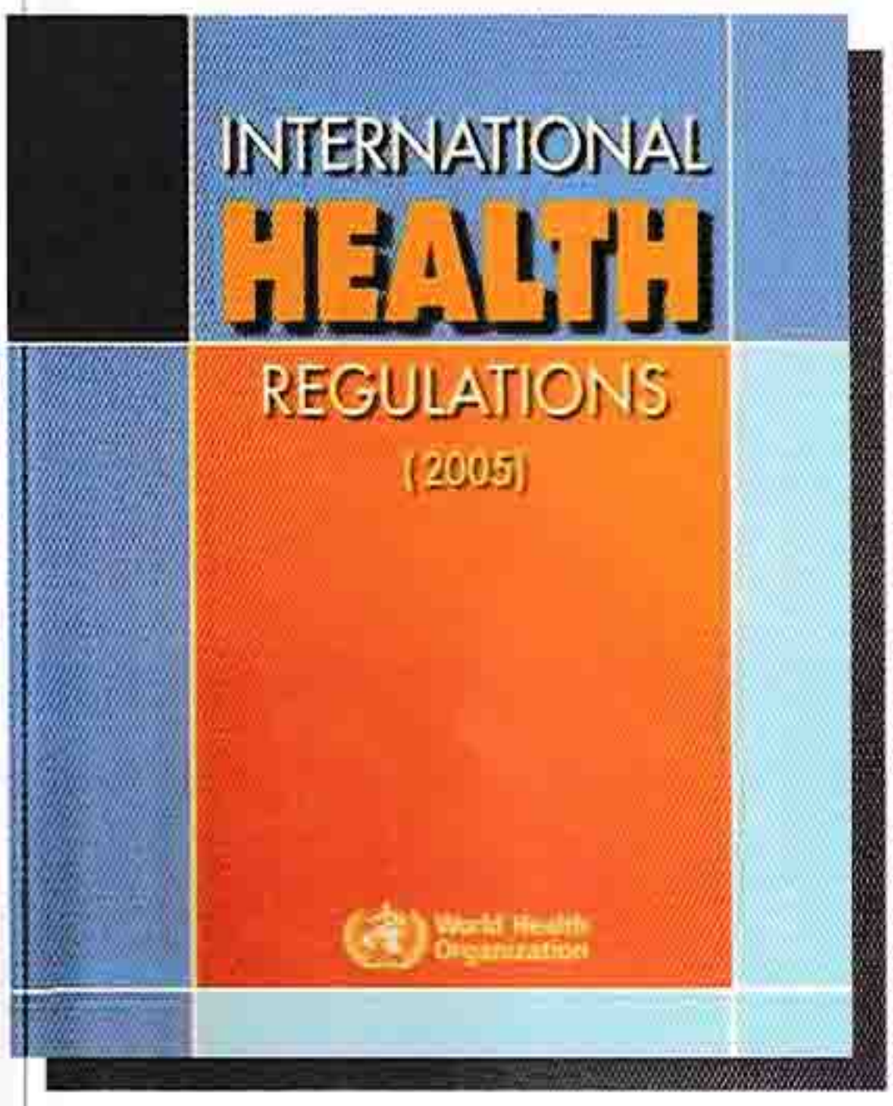

2023

INTERNATIONAL HEALTH REGULATION-2005 TRAINING MODULE

IHR, Migration Health, Emerging Re-Emerging Diseases Control Programme.
Communicable Disease Control Division (CDC), DGHS, Ministry of Health & Family Welfare

DGHS.MOH&FW BANGLADESH

IEDCR

আপনার স্বাস্থ্য আমাদের অঙ্গীকার
স্বাস্থ্য ও পরিবার কল্যাণ মন্ত্রণালয়

World Health Organization

Contents

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LIST OF ACRONYMS

BSL3	Bio Safety Level 3
BSTI	Bangladesh Standards and Testing Institution
CDC, DGHS	Communicable Disease Control, Directorate General of Health Services
DGHS	Directorate General of Health Services
DRRT	District Rapid Response Team
HEB	Health Education Bureau
HSIA	Hazrat Shahjalal International Airport
Icddr,b	International Center for Diarrheal Disease Research, Bangladesh
IEDCR	Institute of Epidemiology, Disease Control and Research
IHR	International Health Regulation 2005
IHR NFP	National Focal Point for International Health Regulation 2005 (Director, DC, DGHS)
IPC	Infection Prevention and Control
IPH	Institute of Public Health
IPHN	Institute of Public Health Nutrition
LD CDC	Line Director, Communicable Disease Control
NIPSOM	National Institute of Preventive and Social Medicine
NNS	National Nutrition Services
NRRT	National Rapid Response Team
OIE	Office International des Epizooties (World Organization for Animal Health)
PHEIC	Public Health Emergency of International Concern
PoE	Port of Entry
RRT	Rapid Response Team
SOP	Standard Operating Procedure
URRT	Upazila Rapid Response Team
UNICEF	United Nations Children's Fund
WHO	World Health Organization
WHA	World Health Assembly
ZIKAV	Zika Virus

Executive Summary

The International Health Regulations (IHR), first adopted by the World Health Assembly in 1969 and last revised in 2005, are a legally binding rules that only apply to the WHO that is an instrument that aims for international collaboration "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 that avoid unnecessary interference with international traffic and trade. The IHR is the only international legal treaty with the responsibility of empowering the World Health Organization (WHO) to act as the main global surveillance system.

In 2005, following the 2002–2004 SARS outbreak, several changes were made to the previous revised IHRs originating from 1969. The 2005 IHR came into force in June 2007, with 196 binding countries that recognized that certain public health incidents, extending beyond disease, ought to be designated as a Public Health Emergency of International Concern (PHEIC), as they pose a significant global threat. Its first full application was in response to the swine flu pandemic of 2009.

History

The original International Health Regulations (IHR) were adopted in 1969. However, its underpinnings can be traced to the mid-19th century, when measures to tackle the spread of plague, yellow fever, smallpox and particularly cholera across borders, with as little interference to global trade and commerce, were debated. To address the realization that countries varied with regards to their sanitary regulations and quarantine measures, the first of these series of early international sanitary conferences was convened in Paris in 1851. This was in the same year that telegraphic communications became established between London and Paris. 12 nations attended this conference, of which 11 were European states and three would sign the resulting convention.

Chronology of Events:

1948: the World Health Organization Constitution was founded.

1951: the WHO issued its first infectious disease prevention regulations, the International Sanitary Regulations (ISR 1951), which focused on six quarantinable diseases; cholera, plague, relapsing fever, smallpox, typhoid and yellow fever.

1969: the ISR were revised and renamed the 'International Health Regulations'.

Early history

1973: the Twenty-Sixth World Health Assembly amended the IHR (1969) in relation to provisions on cholera.

1981: in view of the global eradication of smallpox, the Thirty-fourth World Health Assembly amended the IHR (1969) to exclude smallpox in the list of notifiable diseases subject to the IHR (1969).

1995: during the Forty-Eighth World Health Assembly, the WHO and Member States agreed on the need to revise the IHR (1969). Several challenges were placed against the backdrop of the increased travel and trade characteristic of the 20th century. The revision of IHR (1969) came about because of its inherent limitations, most notably:

- narrow scope of notifiable diseases (cholera, plague, yellow fever). The past few decades had seen the emergence and re-emergence of infectious diseases. The emergence of "new" infectious agents Ebola Hemorrhagic Fever in Zaire (modern-day Democratic Republic of Congo) and the re-emergence of cholera and plague in South America and India, respectively;
- dependence on official country notification; and

- lack of a formal internationally coordinated mechanism to prevent the international spread of disease.

21st century developments

In 2005, a values statement document entitled "The Principles Embodying the IHR" was published and said inter alia:[11]

1. With full respect for the dignity, human rights and fundamental freedom of persons;
2. Guided by the Charter of the United Nations and the Constitution of the World Health Organization;
3. Guided by the goal of their universal application for the protection of all people of the world from the international spread of disease;
4. States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to legislate and to implement legislation in pursuance of their health policies. In doing so, they should uphold the purpose of these Regulations.

On 15 June 2007, the IHR (2005) entered into force, and were binding as of June 2020 on 196 States Parties, including all 194 Member States (countries) of WHO.[6]

In 2010, at the Meeting of the States Parties to the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and Their Destruction in Geneva,[12] the sanitary epidemiological reconnaissance was suggested as a well-tested means for enhancing the monitoring of infections and parasitic agents. The aim of this recommendation was to prevent and minimize the consequences of natural outbreaks of dangerous infectious diseases, as well as the threat of alleged use of biological weapons against BTWC States Parties. The conference also noted the significance of the sanitary epidemiological reconnaissance in assessing the sanitary-epidemiological situation, organizing and conducting preventive activities, indicating and identifying pathogenic biological agents in the environmental sites, conducting laboratory analysis of biological materials, suppressing hotbeds of infectious diseases, and providing advisory and practical assistance to local health authorities.

In January 2018, a group of WHO bureaucrats published an article in the British Medical Journal on Global Health entitled "Strengthening global health security by embedding the International Health Regulations requirements into national health systems", in which the authors argued that "the 2014 Ebola and 2016 Zika outbreaks, and the findings of a number of high-level assessments of the global response to these crises, [clarified] that there is a need for more joined-up thinking between health system strengthening activities and health security efforts for prevention, alert and response."[13]

Public Health Emergency of International Concern (PHEIC)

A Public Health Emergency of International Concern, or PHEIC, is defined in the IHR (2005) as, "an extraordinary event which is determined to constitute a public health risk to other States through the international spread of disease and to potentially require a coordinated international response". This definition implies a situation that is:

- serious, sudden, unusual or unexpected;
- carries implications for public health beyond the affected State's national border; and
- may require immediate international action.

Since 2007, the WHO Director-General has declared public health emergencies of international concern in response to the following:

- 2009 H1N1 swine flu pandemic
- 2014 setbacks in global polio eradication efforts

- 2013–2016 Western African Ebola virus epidemic
- 2016 Zika virus outbreak
- 2018–19 Kivu Ebola epidemic
- 2019–23 COVID-19 pandemic
- 2022 monkeypox outbreak

IHR Experts Roster

The IHR Experts Roster, which is regulated by Article 47 of the IHR, is tended by DGWHO, who "shall establish a roster composed of experts in all relevant fields of expertise... In addition, [s/he] shall appoint one member at the request of each State Party."

IHR Emergency Committee

In order to declare a PHEIC, the WHO Director-General is required to take into account factors which include the risk to human health and international spread as well as advice from an internationally made up committee of experts, the IHR Emergency Committee (EC), one of which should be an expert nominated by the State within whose region the event arises. Rather than being a standing committee, the EC is created ad hoc.

Until 2011, the names of IHR EC members were not publicly disclosed; in the wake of reforms now they are. These members are selected according to the disease in question and the nature of the event. Names are taken from the IHR Experts Roster. The Director-General takes the EC's advice following their technical assessment of the crisis using legal criteria and a predetermined algorithm after a review of all available data on the event. Upon declaration of the PHEIC, the EC then makes recommendations on what actions the Director-General and Member States should take to address the crisis. The recommendations are temporary and require three-monthly reviews.

IHR Review Committee

The formation of an IHR Review Committee is the responsibility of the DGWHO. They are selected from the IHR Experts Committee, and "when appropriate, other expert advisory panels of the Organization." Furthermore, the DGWHO "shall establish the number of members to be invited to a meeting, determine its date and duration, and convene the Committee."

"The DGWHO shall select the members of the Review Committee on the basis of the principles of equitable geographical representation, gender balance, a balance of experts from developed and developing countries, representation of a diversity of scientific opinion, approaches and practical experience in various parts of the world, and an appropriate interdisciplinary balance."

Criticism of international health regulations

Revisions to the International Health Regulations in 2005 were meant to lead to improved global health security and cooperation. However, the WHO's perceived delayed and inadequate response to the West African Ebola epidemic brought renewed international scrutiny to the International Health Regulations. By 2015, 127 of the 196 countries were unable to meet the eight core public health capacities and report public health events as outlined. Numerous published reports by high-level panels have assessed the International Health Regulations for inadequacies and proposed actions that can be taken to improve future responses to outbreaks.

One publication reviewed seven of these major reports and identified areas of consensus on action. The seven reports noted inadequate compliance with WHO's International Health Regulations as a major contributor to the slow response to Ebola. They found three major obstacles that contributed to poor compliance.

- countries' core capacities,
- unjustified trade and travel restrictions, and
- inability to ensure that governments report outbreaks quickly.

Core capacity

The IHR requires countries to assess their disease surveillance and response capacities and to identify if they can adequately meet their requirements. The seven Ebola reports universally agree that the country's self-assessment capabilities are insufficient and that verification measures need to be improved upon. A significant problem is the inadequate level of core capacities in some countries, and the question of how to build upon them has been frequently raised. The reports make several recommendations to encourage governments to increase investment in outbreak identification and response programs. These include technical help from external sources conditional on mobilizing domestic resources, external financing for low-income countries, pressure from the international community to increase investment, and considering outbreak preparedness as a factor in the International Monetary Fund's country economic assessments, which influence governments' budget priorities and access to capital markets. Another avenue under discussion is reform of Article 44 of the IHR, potentially through a new pandemic convention.

Trade and travel

The second issue frequently raised is ensuring that restrictions on trade and travel during outbreaks are justified. Because of increased attention and concern from the public and the media, many governments and private companies restricted trade and travel during the Ebola outbreak, though many of these measures were not necessary from a public health standpoint. These restrictions worsened financial repercussions and made the work of aid organizations sending support to affected regions more difficult.

There was broad consensus across the reports that bringing such restrictions to a minimum is critical to avoid further harm to countries experiencing outbreaks. Moreover, if governments assume that reporting will lead to inappropriate travel and trade restrictions, they may be hesitant to notify the international community about the outbreak. Potential solutions raised included the WHO and the UN more assertively "naming and shaming" countries and private companies that impose unjustified restrictions on WHO working with the World Trade Organization, International Civil Aviation Organization, and International Maritime Organization to develop standards and enforcement mechanisms for trade and travel restrictions.

Outbreak reporting

The third compliance issue relates to countries' obligation to rapidly report outbreaks. The reports recommend strengthening this obligation by WHO publicizing when countries delay reporting suspected outbreaks. In contrast, mechanisms ensuring that countries rapidly receive operational and financial support as soon as they do report were also recommended. A novel approach to encourage early notification is the World Bank's Pandemic Emergency Financing Facility. This was created to provide rapid financing for the control of outbreaks and to protect countries from the devastating economic effects of outbreaks via an insurance program.

Joint External Evaluations (JEE)

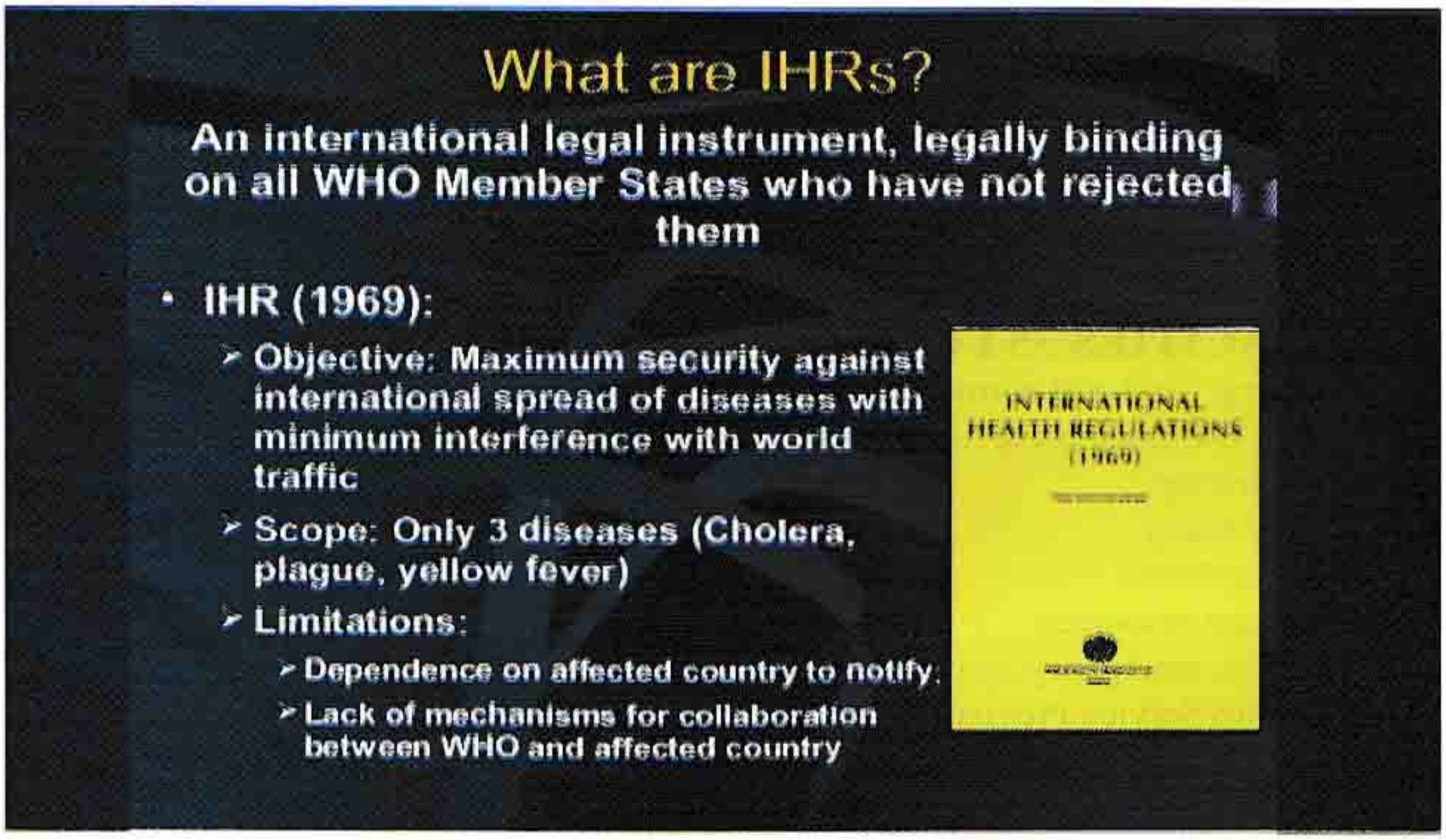
A Joint External Evaluation (JEE) is "a voluntary, collaborative, multisectoral process to assess country capacities to prevent, detect and rapidly respond to public health risks whether occurring naturally or due to deliberate or accidental events". The JEE helps countries to identify critical gaps within their biosecurity systems in order to improve them and help prevent, detect and quickly respond to public health risks (whether natural, accidental or deliberate) in the future. Developed as a result of the IHR Review Committee on Second Extensions for Establishing National Public Health Capacities and on IHR Implementation, WHO, in collaboration with partners and initiatives, developed the JEE process and published the first edition of the tool in 2016. A second edition was published in 2018.

A JEE of Australia's capacity following the 2013–2016 Western African Ebola virus epidemic showed that the nation had very high level of capacity of response. Australia's National Action Plan for Health Security 2019-2023 was developed to help to implement the recommendations from the JEE.

International Health Regulation-2005

Purpose of IHR (2005)

- The purpose of the IHR (2005) is to prevent, protect against, control and provide a public health response to the international spread of disease & other health risk and which avoid unnecessary interference with international traffic and trade.



IHR 2005

IHR 2005: Goal and responsibilities

- The goal is to prevent international spread of diseases & other health risk.
- Member states be able to timely detect, assess, notify and report events and respond to public health risks and Public Health Emergency of International Concern (PHEIC)

HISTORY OF INTERNATIONAL HEALTH REGULATIONS

- 1830, 1847: Cholera epidemics in Europe were catalyst for intense infectious disease diplomacy and multi-lateral co-operation.
- 1951: WHO issued first set of legally binding international sanitary regulation.
- 1969: WHO adopted international sanitary regulation and renamed as international health regulation.
- 1973, 1981: Minor modifications in IHR, amended world wide.
- 23rd May 2005: World health assembly adopted revised IHR
- 15th June 2007: Came in to force revised IHR.

Circulating Influenza Strains in Humans and Pandemics in 20th Century

1918:"Spanish Flu"
40-50 million
deaths H1N1

1957: "Asian Flu"
1 million deaths
H2N2

1968: "Hong Kong Flu"
1 million deaths
H3N2

15 CAPACITIES 35 FOR IMPLEMENTATION OF IHR 2005

1. Policy, legal and normative instruments to implement IHR
2. IHR coordination & national IHR Focal point functions and advocacy
3. Financing
4. Laboratory
5. Surveillance
6. Human resources
7. Health emergency management
8. Health Service Provision
9. Infection prevention and control (IPC)
10. Risk Communication and community engagement (RCCE)
11. Points of Entry and border health
12. Zoonotic diseases
13. Food safety
14. Chemical events
15. Radiation Emergencies

15 CAPACITIES & 35 INDICATORS

C1. POLICY, LEGAL AND NORMATIVE INSTRUMENTS TO IMPLEMENT IHR

C1.1. Policy, legal and normative instruments
C1.2. Gender equality in health emergencies

C2. IHR COORDINATION AND NATIONAL IHR FOCAL POINT

C2.1. National IHR Focal point functions under IHR
C2.2. Multisectoral IHR coordination mechanism
C.2.3. Advocacy for IHR implementation

C3. FINANCING

C3.1. Financing for IHR implementation.
C3.2. Financing for public health emergency response.

C4. LABORATORY

C4.1. Specimen referral and transport system
C4.2. Implementation of a laboratory bio-safety & biosecurity regime
C4.3. Laboratory quality system
C4.4. Laboratory testing capacity modalities
C4.5. Effective national diagnostic network.

C5. SURVEILLANCE

C5.1. Early warning surveillance function
C5.2. Event management

C6. HUMAN RESOURCES

C6.1. Human resources for the implementation of IHR
C6.2. Workforce surge during a public health event

C7. HEALTH EMERGENCY MANAGEMENT

C7.1) Planning for health emergencies
C7.2) Management of health emergency response
C7.3) Emergency logistic and supply chain management

C8. HEALTH SERVICE PROVISION

C8.1. Case management
C8.2. Utilization of Health Services
C8.3. Continuity of essential health services (EHS)

C.9 INFECTION PREVENTION AND CONTROL (IPC)

C9.1. IPC Programmes
C9.2. Health Care Associator infections (HCA) Surveillance
C9.3. Sate Environment in Health Facilities

C10. Risk Communication And Community Engagement (RCCE)

C10.1. RCCE Systems for Emergencies
C10.2. Risk Communication
C10.3. Community Engagement

C11. Points of entry (PoEs) and border Health

Section1. Information by type of POE
Section 2. Core capacities at PoEs and international travel-related measures
C.11.1. Core capacity requirements at all times for PoEs (airports, ports, and ground crossings)
C.11.2. Public health measures at PoEs
C.11.2. Risk-based approach to international travel related measures

C.12. Zoonotic diseases

12.1. One Health collaborative efforts across sectors on activities to address zoonosis

C13. Food safety

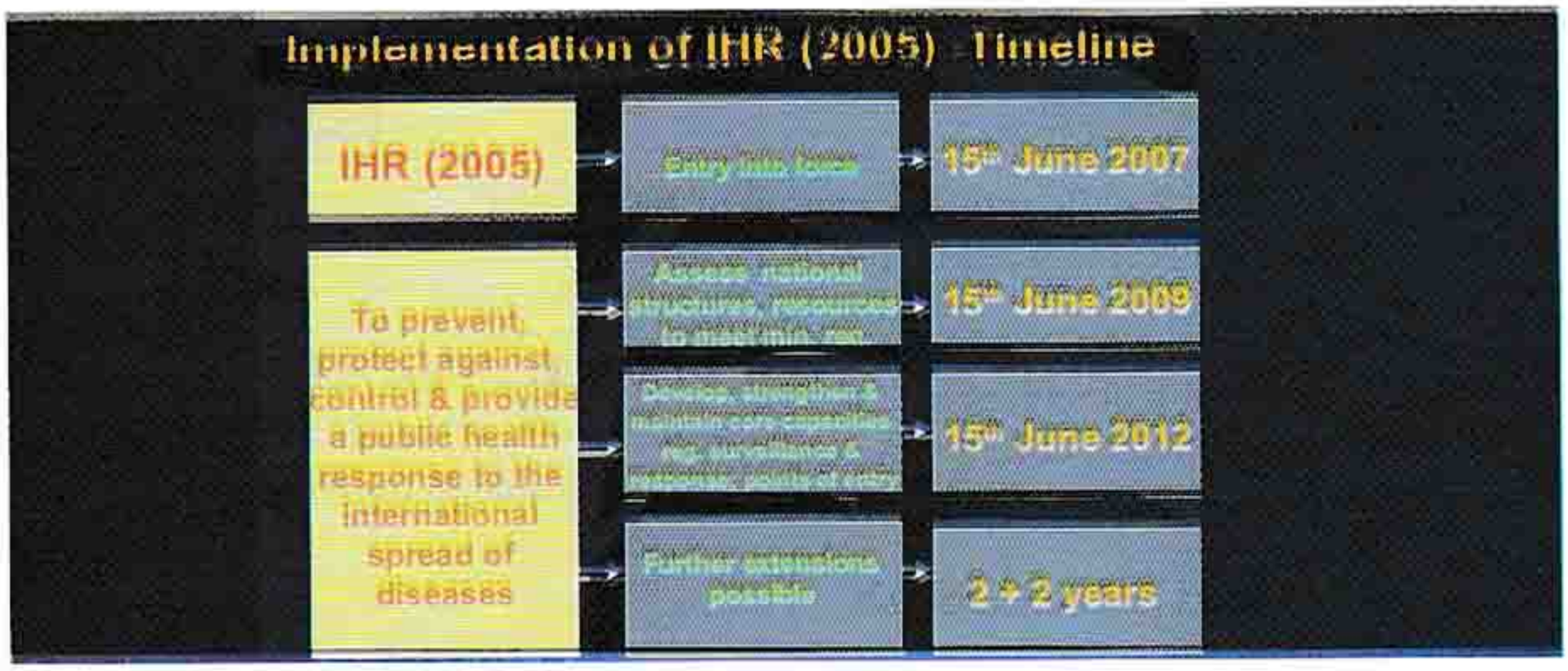
C13.1. Multisectoral collaboration mechanism for food safety events

C14. Chemical events

C.14.1. Resources for detection and alert

C.15. Radiation emergencies

C.15.1. Capacity and resources



IHR Committees and Institutes for implementation of IHR 2005 in Bangladesh

I. National Coordination Committee at ministry level
II. National Technical Committee
III. Core Committee at DGHS
IV. National IHR Focal point: Director, CDC. DGHS
V. National IHR Technical Focal Institute: IEDCR
VI. Designated Point of Entry (PoE)
VII. Coordination Committee, Hazrat Shahjalal International Airport, Dhaka
VIII. Coordination Committee, Chittagong Sea port, Chittagong
IX. Coordination Committee, Benapole Land Port, Jessore
X. IHR Focal Hospitals: Infectious Disease hospital (IDH) and Kurmitola General Hospital

TOR of Referral Hospitals

1. Isolation and quarantine
2. Inform national IHR focal point

National IHR Focal Point

President: Director, Disease Control and Line Director, CDC,

Members : 04

1. Deputy Director CDC
2. DPM IHR, CDC, DGHS
3. Representative MOHFW
4. Senior Adviser /consultant/ Representative CDC

TOR

1. Draft Strategy, Action Plan and Policy for IHR
2. Draft budget for IHR
3. Spokes person on behalf of DG on PHEIC
4. Manage and coordinate outbreak investigation
5. Contact with WHO IHR focal point and other relevant persons
6. Collect information on zoonotic, chemical, radio nuclear and food related diseases and events
7. Arrange workshop, seminar and round table discussion
8. Accessible at all times by WHO for urgent communications.
9. Will play a central role In the notification of potential public health mergencies of international concern.

National IHR focal institute: IEDCR

1.Conduct surveillance

2. Investigate outbreak
3. Send update to control room of DGHS
4. Do lab tests for Influenza, Nipah and ERD
5. Draft , implement and coordinate implementation of IHR 2005
6. Inform PHEIC to National IHR Focal Point
7. Organize training for improving capacity for surveillance
8. Conduct IHR related research
9. Conduct above activities in coordination with National IHR Focal point
   - Bangladesh has to develop & maintain capabilities to detect, asses & report disease or other health risks/events at upozila, district & national levels.
   - Rapid Response Team(RRT) functioning in the country from national to community level.

URRT: 6 member

DRRT: 11 member

NRRT: IEDCR leading

Public Health Emergency of International Concern (PHEIC)

PHEIC is an extraordinary event which is determined, as provided in these Regulations:

i. to constitute a public health risk to other States through the international spread of disease and

ii. to potentially require a coordinated international response.

• DG of WHO determines whether an event constitutes a PHEIC

• 5 key criteria:

—Information from the State / States

—Decision instrument (Annex 2)

—Advice of the Emergency Committee

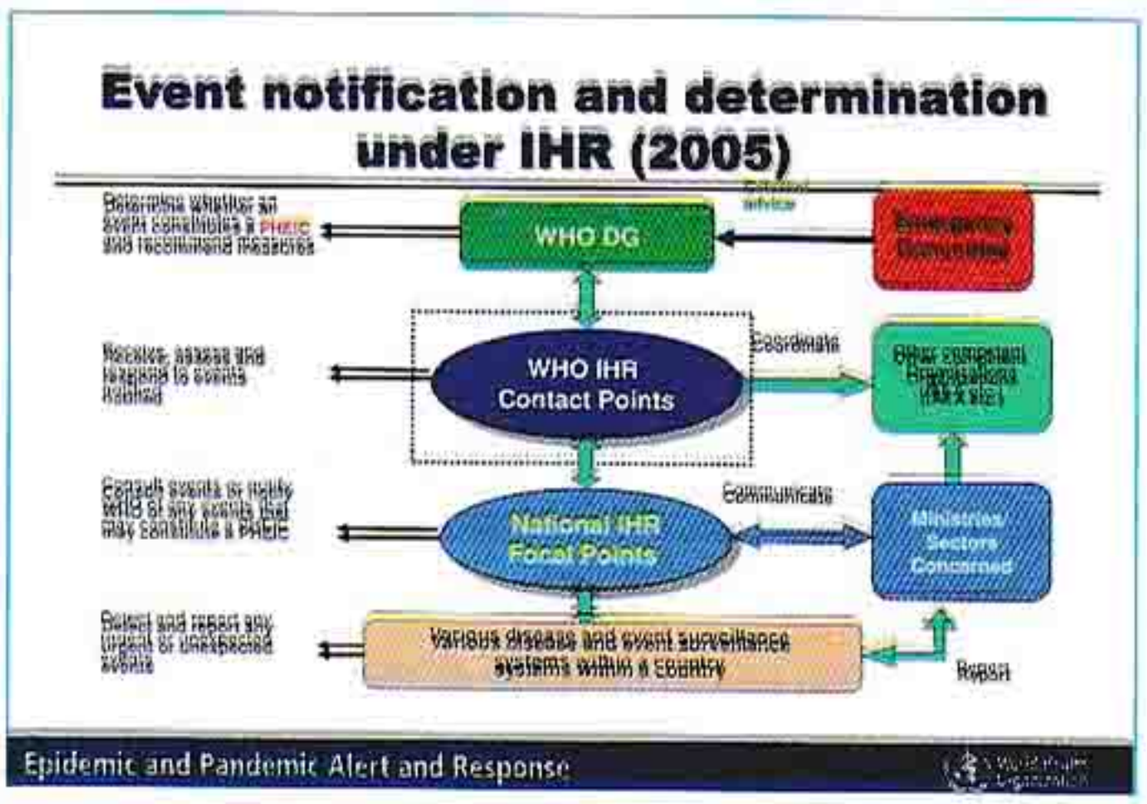
—Scientific principles, scientific information, other relevant information

—Risk assessment: to human health, of international spread and interference with international traffic

IHR 2005

PHEIC is an extraordinary event implies a situation on that is:

1. Sudden, serious, unexpected, unusual
2. Carries implications for public health beyond the affected states national border
3. May require immediate international action.
4. Since 2007, WHO DG has declared PHEIC in response:
   - 2009---Swine flu H1N1 influenza pandemic
   - 2014----Polio global eradication efforts
   - 2014----Ebola epidemic West Africa
   - 2016----Zika virus outbreak (Brazil)
   - 2019----Ebola in Africa (Congo,------)



Issues and challenges

- Administrative, Collaborative, and legal issues
- Development of specific National Plan for Multi sectoral Public Health Emergency Preparedness and Response
- Approval of draft law for implementation of IHR (2005)
- Some funds are allocated for some activities under different heads but no separate head as such for IHR has been created.
- Laboratory capacities
- Lack of capacity of detecting AI/H5N1, A/H1N1 (2009), Nipah, Polio or Anthrax at district level.

- No laboratory networking between human and animal health or inter-country agreement for laboratory networking.

➢ Infection Control and Prevention

- Lack of National Infection Control Committee nor National Focal Point for Infection Control.

➢ Core Capacities of Points of Entry (PoE):

- Building of minimum core capacity at designated PoEs as per IHR (2005) guideline within the timeframe of 2014.
- No agreement between Bangladesh and neighboring countries concerning prevention and control of disease at PoE
- Very few trained personnel for the control of vectors and reservoirs in and near points of entry.
- Majority of the PoEs had no Entry/exit control tools.
- Veterinary facilities for assessing potentially contaminated/ infected animals are absent at all PoEs.
- No practice for submission of Health part of Aircraft General Declaration by the Captain/crew member to the airport authority in case aircraft coming from an infected area.

IHR 2005

IHR require that all countries have the ability to do the following:

1. Detect: Surveillance & lab facilities
2. Asses: Work together with other countries to make decisions in public health emergencies
3. Report: Report specific diseases plus any PHEIC---through national IHR focal point
4. Response: Response to public health events

IHR—Specific measures at ports, airports & land ports

Jan2014 to Feb2015---321PHEIC reported to WHO

When PHEIC declared, WHO helps coordinate an immediate response with the ffected country & other countries around the world.

International Health Regulations (2005) Monitoring Framework

• Under the International Health Regulations (2005) (IHR (2005) all States Parties are required to have or to develop minimum public health capacities to implement the IHR (2005) effectively. Since 2010 monitoring process of the IHR implementation status involved assessing, through a self-assessment questionnaire sent to States Parties. In 2018 WHO provided a new State Parties Self-Assessment Annual Reporting Tool - SPAR, with a revised interpretation of national IHR 2005 capacities on a scale scoring system. of 15 capacities. Data from 2018 show that globally, progress has been reported across all 15 IHR core capacities, particularly in respect of surveillance, laboratory capacity and IHR coordination and National IHR National Focal Point functions, but the overall average scores suggest further and sustained efforts are needed in the areas of chemical events, capacities at points of entry and radiation emergencies.

What Member states need to do?

- Ten things you need to do to implement the IHR
  - Know the IHR; purpose, scope, principles and concepts
  - Update national legislation
  - Recognize shared realities and the need for collective defences
  - Monitor & report on IHR implementation progress.
  - Notify, report & inform WHO.
  - Understand WHO's role in international event detection, joint assessment & response.
  - Participate in PHEIC determination & WHO recommendations-making processes
  - Strengthen national surveillance & response capacities
  - Increased public health security at ports, airports & ground crossings.
  - Use & disseminate IHR health document at point of entry.

Surveillance, Response & preparedness

- Strong Surveillance System present at all levels
- Presence of National plans for Disease Surveillance and IHR
- Conducting surveillance of diseases of Public Health importance
- Strong Reporting and Notification mechanism for IHR related diseases and events

Laboratory capacities

- Government has diagnostic capacities for Potential PHEIC's at national level.
- All national level labs have internal quality control program and few labs have partial external quality assessment program.
- MoU for external referral of Potential PHEIC's (e.g Polio, influenza and Nipah) specimens to reference laboratories.
- IATA certified personnel are present at IEDCR and icddr,b for sample transport.
- Inter country agreement on laboratory networking is present between Bangladesh and OIE Thailand.

Event notification

- Any event that may constitute a public health emergency of international concern (PHEIC)
- To WHO within 24 hours of national assessment

- Continue to provide WHO with detailed public health information including: case definition, cases/deaths, conditions affecting spread, measures
- Does NOT mean an actual "PHEIC" is necessarily occurring

Management of PHEIC

- For management of PHEIC, a coordinated and concerted capacity is needed. It should be active from community to national level. For investigation and responding to disease outbreak, Rapid Response Teams (RRTs) are functioning at different tires of the health system.

Levels of Response to PHEIC

- Reporting of potential PHEIC will follow a chain of response from community to the national level:
- Community /first contact health service providers
- Upazila Rapid Response Team (URRT)
- District Rapid Response Team (DRRT)
- National Rapid response Team (NRRT)

Risk Communication & Human Resources

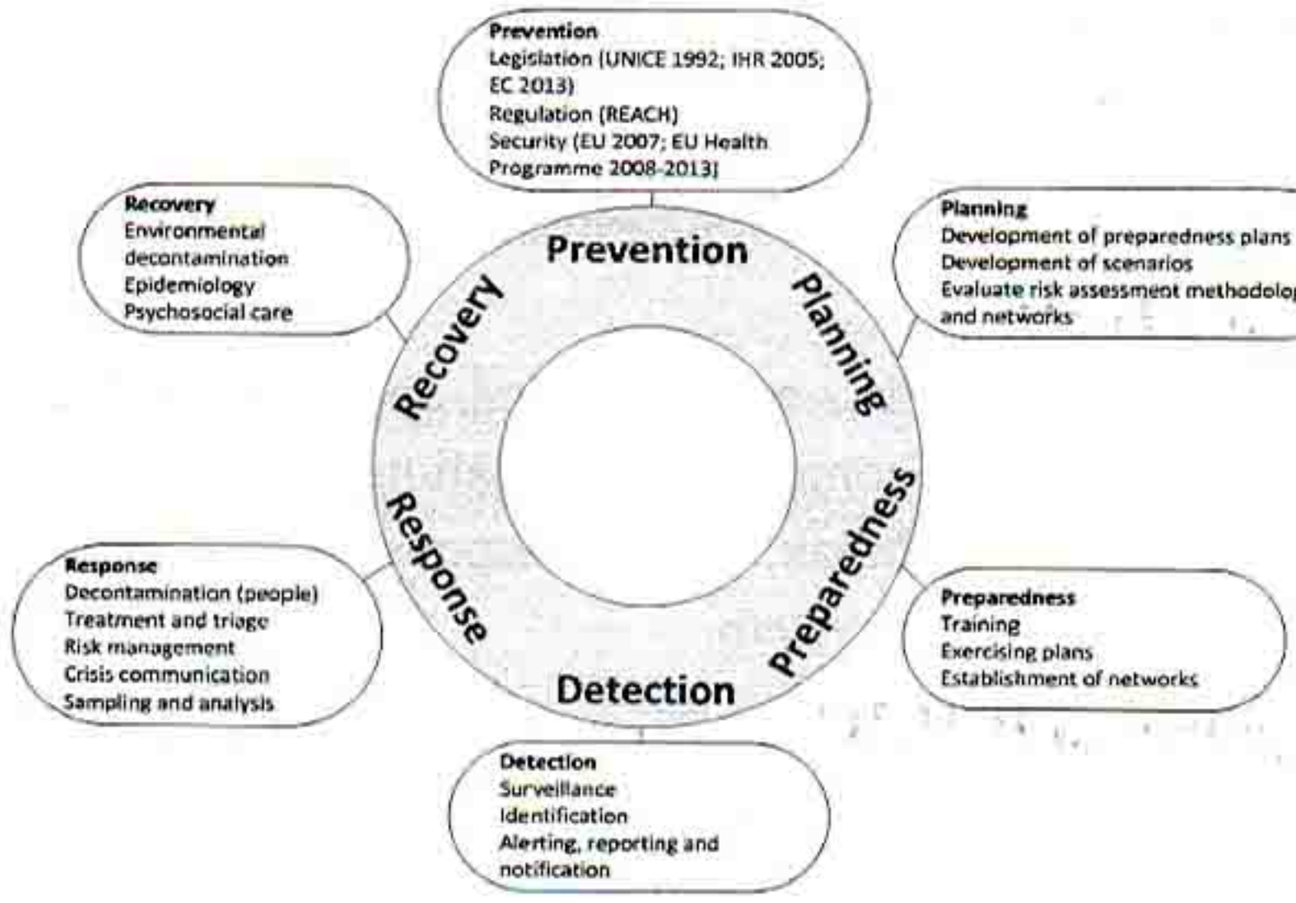
- Health Education Bureau, DGHS is the communication unit
- Developed Action Plans, Manuals, Strategy and Guideline for IHR (2005), Strategy and Guideline for Management of PHEIC at PoE & SOP on PHEIC (available at www.iedcr.gov.bd)
- 2nd National Avian nd Pandemic Influenza Preparedness and Response Plan, Bangladesh: 2011-2016 in the context of IHR 2005
- Two year FETP program at IEDCR with CDC Atlanta collaboration
- Capacity building for IHR (2005) implementation through IHR related trainings and workshops for different level of health policy makers, managers, clinicians, PoEs personnel.

Health threats have no borders

As early as the 14th century, people used quarantine to keep diseases like the plague from spreading across borders. We have known for a very long time that what affects one country can affect other parts of the world. This is especially true today, when we are so closely connected to everyone else.

The health of our world today is threatened by:

- Spread of new diseases, such as MERS-CoV and influenza H7N9
- Travel and trade between countries
- Rising antibiotic resistance
- The potential for accidental or deliberate release of dangerous pathogens



How does the IHR Emergency Committee work?

- The Emergency Committee is made up of international experts who provide technical advice to the WHO Director-General in the context of a "public health emergency of international concern" (PHEIC) The Committee provides views on:
- whether the event constitutes a public health emergency of international concern (PHEIC);
- the Temporary Recommendations that should be taken by the country experiencing an emergency of international concern, or by other countries, to prevent or reduce the international spread of disease and avoid unnecessary interference with international trade and travel; and
- the termination of a PHEIC.
- Under the IHR (2005), Temporary Recommendations automatically expire three months after their issuance. Emergency Committees are therefore reconvened at least every 3 months to review the current epidemiological situation and to review whether the event continues to be a public health emergency of international concern and whether changes need to be made to the Temporary Recommendations. A statement of the Emergency Committee meeting is published on the WHO website after each meeting of the Committee.

Thank You

Lab Diagnosis of IHR Related Infectious Diseases

Learning Objectives

- Generic approach to emerging infectious disease outbreak response
- Emerging infectious diseases
- Syndromic Approach of diagnosis
- Specimen collection
- Lab Diagnosis tools

Principles of Diagnosis of Emerging Infectious Diseases (EID)

- Epidemiological data
- Clinical features
- Laboratory findings
  - — Routine examination of blood, urine, feces
  - — Bio-chemical examinations
  - — Etiological examinations
- Molecular biological examinations
- Immunological examinations
- Endoscope examinations
- Image examinations

Epidemiological data of EID

- Essential for detection of pathogens
- Mode of transmission of pathogens
- Infection Prevention and Control
- Site or Organ of involvement
- Important for specimen collection
- Probable infectious agents

Clinical Features

- Syndromic approach to detect unknown pathogens
- Public health laboratory based on
  - — laboratory diagnosis on a syndromic or clinical signs and, symptoms approach
  - — IEDCR plays role in Bangladesh
  - — Reference Lab established in Agargaon, Dhaka

Advantages of Syndromic Approach

- A syndromic approach minimizes
  - — chance of missing an unknown pathogen
  - — provides early alert for investigation & control of infectious disease
  - — proper coordination between MOHFW & National Laboratories

Syndromic Approach

- acute neurological syndrome
- acute respiratory syndrome
- acute dermatological syndrome
- acute haemorrhagic syndrome
- acute jaundice syndrome
- acute diarrhoeal syndrome

Acute Neurological Syndrome

- Viral Meningitis
- Bacterial meningitis
- Encephalitis
- Nipah virus
- Rabies
- Japanese encephalitis
- Cerebral malaria

Acute Diarrhoeal Syndrome

- **Dysentery**

— Amoebic
— Bacillary (Shigellosis)

- **Watery**

— Cholera
— Giardiasis
— Crytosporodiosis
— Isosporiodosis
— Rota virus
— Enterotoxigenic Escherichia coli (ETEC)

SYNDROME	DISEASES /PATHOGENS
Acute Diarrhoeal Syndrome	Amoebic Dysentery, Cholera, Cryptosporidiosis, Ebola and other haemorrhagic fevers, E.coli (enterotoxigenic and enterohaemor- rhagic). Giardiasis, Salmonellosis, Shigellosis, Viral gastroenteritis (Norwalk-like and rotavirus)
Acute Haemorrhagic Fever Syndrome	Crimean-Congo HF, Dengue HF, Ebola HF, Hantaviruses, Lassa fever, Marburg HF, Rift Valley fever, South American arenavi- ruses, Tick-borne flaviviruses, Yellow fever
Acute Jaundice Syndrome	Hepatitis A, B, E, Leptospirosis, Yellow fever
Acute Neurological Syndrome	Enteroviral meningitis, Japanese encephalitis, Leptospirosis, Ma- laria, Meningococcal meningitis, Poliomyelitis, Rabies and other lyssaviruses, Tick-borne encephalitis viruses. Trypanosomiasis
Acute Respiratory Syndrome	Anthrax, Diphtheria, Hantavirus Pulmonary Syndrome, Influenza, Mycoplasma, Legionellosis, Pertussis, Pneumonic plague, Respi- ratory syncitial virus, Scarlet fever
Acute Dermatological Syndrome	Chickenpox*, Cutaneous anthrax, Measles, Monkeypox, Parvovi- rus B19, Rubella, Typhus
Acute Ophthalmological Syndrome	Epidemic adenoviral keratoconjunctivitis, Haemorrhagic enterovi- ral conjunctivitis, Trachoma
Acute "Systemic" Syndrome	Anthrax, Arboviral fevers, Brucellosis, Dengue fever, Hantaviral disease, Lassa fever, Leptospirosis, Lyme disease, Plague, Re- lapsing fever, Rift Valley fever, Typhoid fever. Typhus, Viral hepatitis including Yellow fever

Laboratory Investigation of Microbial infections

Approach to detect isolate and identify pathogens:

1. Specimen/Sample
2. Microscopy
3. Culture techniques
4. Biochemical reactions
5. Serological identification
6. Molecular biology techniques
7. Bacteriophage typing

Specimen Selection, Collection, and Processing

- Collect adequate amount
- Select specimen on the basis of signs and symptoms

— should be representative of the disease process

- Avoid contamination of the specimen

— Use sterile equipment & aseptic precautions

- Send the specimen to laboratory
- Examine promptly

— Special transport media may be helpful

- To diagnose bacterial infections

— Collect before antibiotic use

Responsible Person of specimen Collection

Usually a hospital staff function

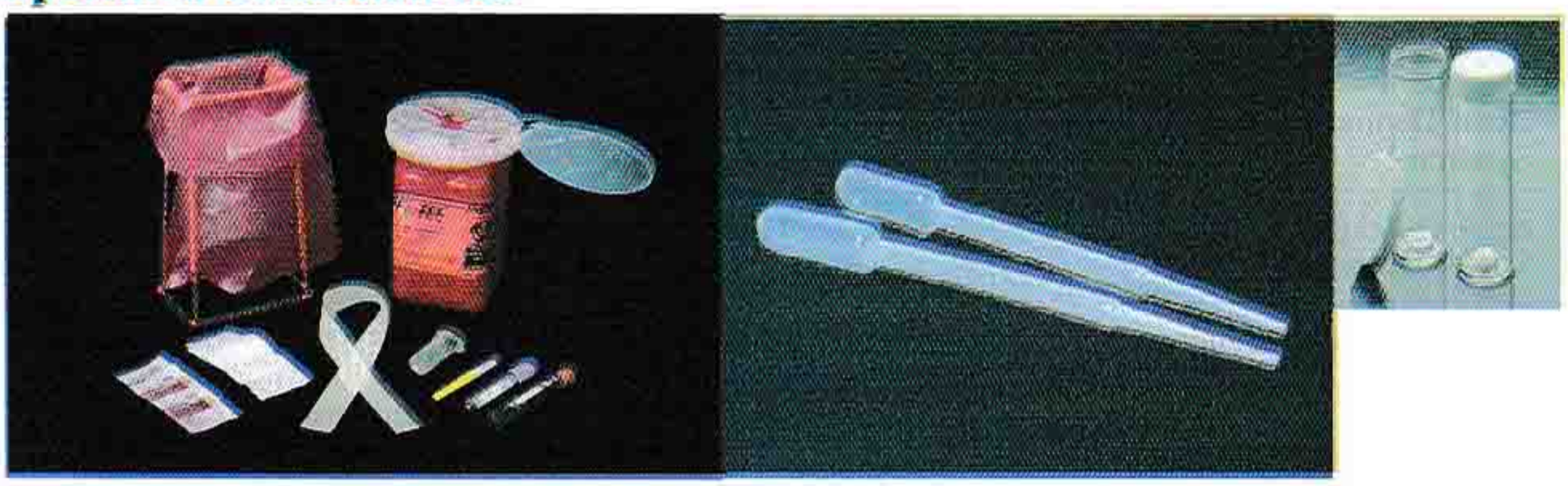
- Medical technologist
- Nurse
- Medical doctor

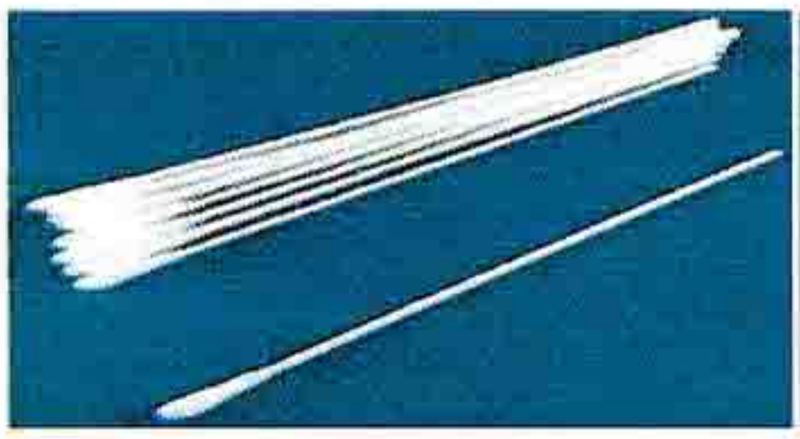
Time of Collection

- As soon as possible
- after case and contact identification
- Collect multiple specimens on multiple days

— if possible and required

Specimen Collection Kit





Specimen Collection Kit

- Items for blood collection
- Collection vials(eppendrof, cryo vial) :CSF, serum
- Polyester fiber-tipped applicators: Throat / nasal/wound swab
- Tongue depressors
- Transfer pipettes
- Personal protective equipment
- Hand sanitizer
- Disinfectant
- Biohazard Bag
- Data collection forms/lab. log book
- Packaging & Transport

— Secondary container
— Vaccine carrier
— Ice packs

- A pen or marker for labeling samples

How to Label Samples

Label each specimen with:

- Specimen name
- Pt's Unique identification number
- Place of collection
- Date of collection

Storage of specimens

- To preserve viability and integrity of pathogen
- placed in appropriate media
- stored and transported at recommended temperatures
- Consult with Laboratory specialist or with IEDCR.

Storage of specimens cont.

- For virus isolation in culture
- specimen to be collected in viral transport media
- Keep at 4 to 8°C for 24 hours

For Bacterial Culture

- kept in appropriate bacterial transport media
- kept at ambient temperature for 24 hours
- Store at 4 to 8°C for longer periods
  - Except cold-sensitive organisms like shigella, meningococcus, and pneumococcus
- Avoid Longer delays
- For antigen or antibody detection
  - At + 4° to 8°C for 24 to 48 hours
- Serum for antibody detection
  - at +4° to 8°C for up to 7 days

Sample Transportation

- From every corner of Bangladesh
  - it takes less than 24 hours to reach IEDCR and other Reference Lab
- should be transported with careful handling
- transported in Cold box
- Separate the Serum from blood before transport
- If delay during transportation in cold box
  - ice pack in cool box to be checked
  - if necessary, ice pack to be changed from adjacent district or Upazila

Personal Protective Equipment (PPE)

- Gloves
- Gowns/Coverall
- Masks (N95)
- Boots/Shoe covers
- Eye protection

Microscopy

Microorganisms can be examined microscopically for:

- Bacterial motility
- Morphology and staining reactions of bacteria

Culture Techniques

Culture media are used for:

- Isolation and identification of pathogenic organisms
- Antimicrobial sensitivity tests

Biochemical Reaction

Use of substrates and sugars to identify pathogens:

a. Sugar fermentation
b. Production of indole
c. H2S production
d. Methyl red reaction (MR)
e. Voges proskaur's reaction (VP)
f. Action on milk
g. Oxidase test
h. Catalase test
i. Coagulase test
j. Urease test

Animal Pathogenicity

- Animal pathogenicity test: commonly used animals

— guinea pigs
— Rabbits
— mice

Serological identification

A. Direct serological tests

- Identification of unknown organism
- Detection of antigens by using specific known antibodies
- Sero-grouping and serotyping of isolated organism

B. Indirect serological tests

- Detection of specific and non specific antibodies (IgM & IgG) by using antigens or organisms

DIAGNOSTIC TECHNOLOGIES

- Immunoserology
  - Hemagglutination
  - EIA
  - Latex agglutination
  - Complement fixation
  - Immunoflorecent

RAPID DIAGNOSTIC TESTS

- High sensitivity and specificity
- High negative and positive predictive values
- High accuracy compared to gold standard
- Simple to perform
- Rapid turn around time
- Cost effective

LIMITATIONS OF CONVENTIONAL CLINICAL MICROBIOLOGY

- Culture
  - Labor intensive
  - Need for special media
  - Prolonged period of time to culture
  - Some organisms are uncultivable on artificial media
  - Potential health hazards

Molecular Biology Techniques

A. Genetic probes (DNA or RNA probes):

B. Polymerase chain reaction (PCR):

- Amplification of a short sequence of target DNA or RNA
- Then It is detected by a labeled probe

C. Plasmid profile analysis:

- Isolation of plasmids from bacteria

Polymerase Chain Reaction

- Specific PCR
- Broad range PCR
- Multiplex PCR
- Real-time PCR
- Nested PCR

Real time PCR for Diagnosis of Infectious Disease

Advantages

- Less time for results
- Improved analytical sensitivity
- Broad applicability (target characterization, load determination etc)

OTHER USES OF MOLECULAR DIAGNOSTICS

- Viral load monitoring
- Viral genotyping
- Bacterial resistance detection
- Bacterial genotyping
- Whole Genome Sequencing
- Next Generation Sequencing

Bacteriophage: Practical applications

- Viruses that parasitize bacterial cell
- Important as a research tools
- Used as vectors in DNA recombinant technology
- Phage typing of bacteria is important in tracing source of infection for epidemiologic purposes

Antimicrobial Susceptibility testing

- can be down by three ways:

1. Disk Diffusion Method
2. Broth Dilution Method
3. E-test

Most important aspect of laboratory medicine

- Insufficient quantity
- Contamination
- Improper transport media
- Delay in transportation
- Inappropriate storage

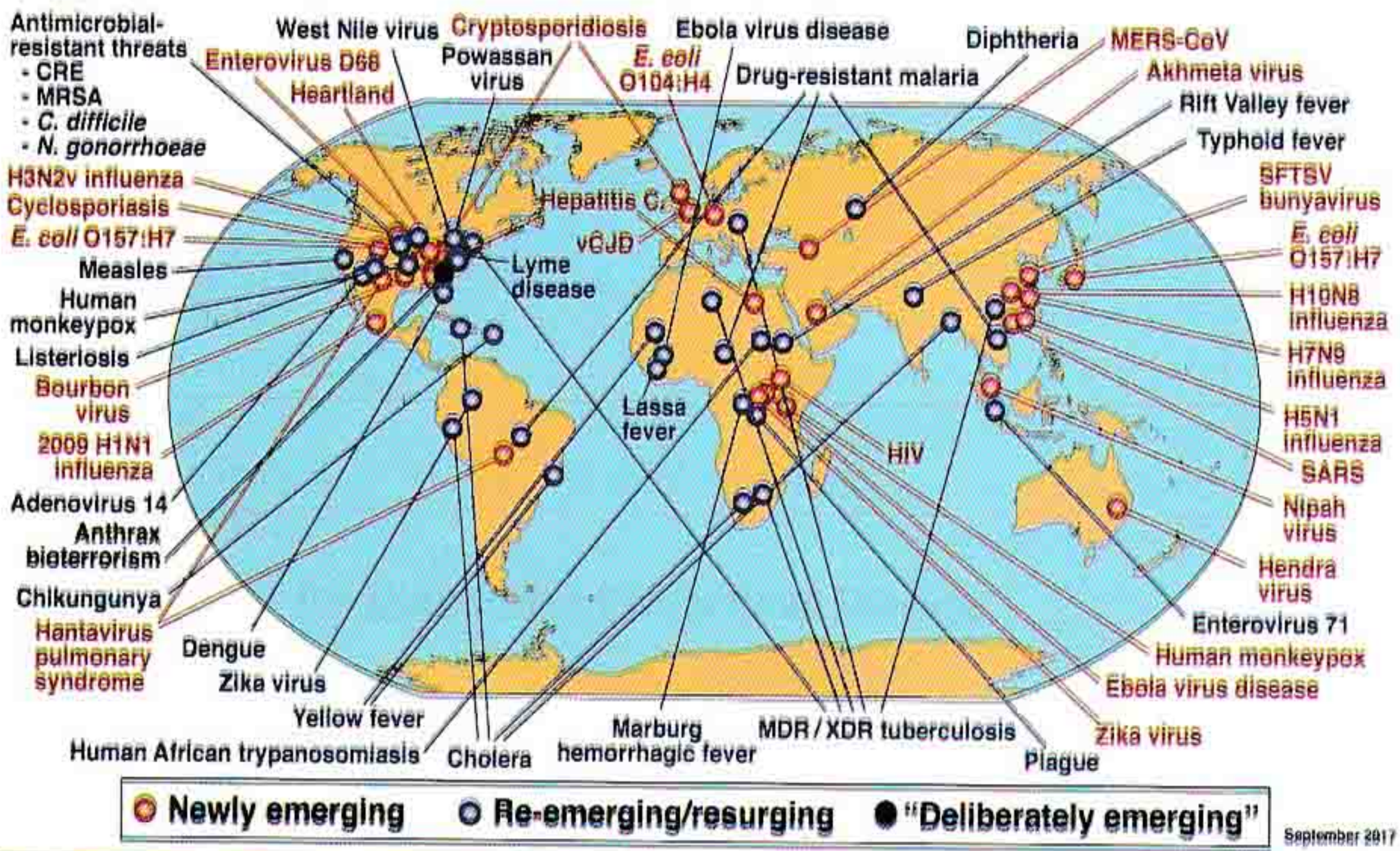
IHR Related Disease and It's Management.

International Health Regulation

- Is an internationally agreed instrument for global public health security .
- Is legally binding for WHO Member States since June 2007
- Public Health Emergency of International Concern(PHEIC).
- It include some Emerging and Remerging Disease.

Emerging infectious disease

Newly identified &
previously unknown
infectious agents that cause
public health problems either
locally or internationally.
eg: New type of influenza virus.



Re-emerging infectious disease

Infectious agents that have been known for some time, had fallen to such low levels that they were no longer considered public health problems & are now showing upward trends in incidence or prevalence worldwide.
eg: Malaria, Tuberculosis

PANDEMIC INFLUENZA

An influenza pandemic is a global outbreak of a new influenza A virus. Pandemics happen when new (novel) influenza A viruses emerge which are able to infect people easily and spread from person to person in an efficient and sustained way.

Past History:

1918 Pandemic (H1N1 virus)

- It is estimated that about 500 million people or one-third of the world's population became infected with this virus. The number of deaths was estimated to be at least 50 million worldwide

1957-1958 Pandemic (H2N2 virus)

- In February 1957, a new influenza A (H2N2) virus emerged in East Asia, triggering a pandemic ("Asian Flu").
- The estimated number of deaths was 1.1 million worldwide.
- 1968 Pandemic (H3N2 virus)
- The 1968 pandemic was caused by an influenza A (H3N2) virus.
- It was first noted in the United States in September 1968. The estimated number of deaths was 1 million worldwide.

2009 H1N1 Pandemic (H1N1pdm09 virus)

- In the spring of 2009, a novel influenza A (H1N1) virus emerged. It was detected first in the United States.
- Estimated that between 151,700 and 575,400 people worldwide died.

Seasonal flu VS Pandemic Flu

S/N		Seasonal Flu	Pandemic Flu
1	How often does it happen?	Happens annually and usually peaks between December and February	Rarely happens (three times in 20th century)
2	Will most people be immune?	Usually some immunity from previous exposures and influenza vaccination	Most people have little or no immunity because they have no previous exposure to the virus or similar viruses
3	Who is at risk for complications?	Certain people are at high -risk for serious complications (infants, elderly, pregnant women, extreme obesity and persons with certain chronic medical conditions)	Healthy people also may be at high risk for serious complications
4	Will a vaccine be available?	Vaccine available for annual flu season Usually, one dose of vaccine is needed for most people	vaccine may not be available in the early stages of a pandemic Two doses of vaccine may be needed

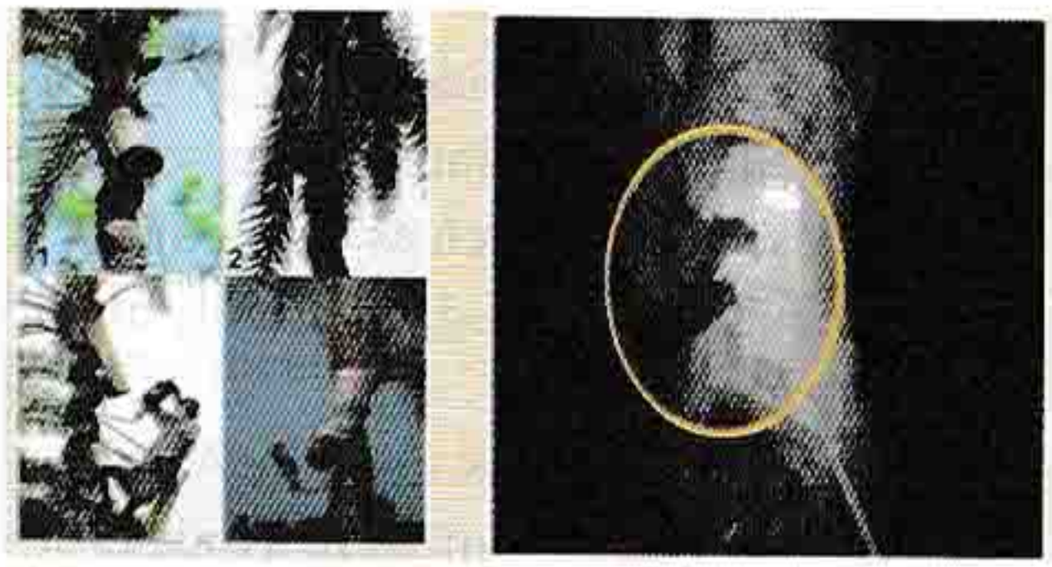
Pandemics and Pandemic Threats of the 20th Century

- 1918-19 "Spanish flu" H1N1
- 1957 "Asian flu" H2N2
- 1968 "Hong Kong flu" H3N2
- 1976 "Swine flu" episode H1N1
- 1977 "Russian flu" H1N1
- 1997 "Bird flu" in HK H5N1
- 1999 "Bird flu" in HK H9N2
- 2003 "Bird flu" in Netherlands H7N7
- 2004 "Bird flu" in SE Asia H5N1
- 2009 "Swine flu"

NIPAH:

- NiV was initially isolated and identified in 1999.
- Its name originated from Sungai Nipah, a village in the Malaysian Peninsula.
- In the 1999 outbreak, Nipah virus caused a relatively mild disease in pigs, but nearly 300 human cases with over 100 deaths were reported.
- In 2001, NiV was again identified as the causative agent in an outbreak of human disease occurring in Bangladesh.
- **Agent:** Nipah virus (NiV)
- **Carrier:** pigs and Bats
- **Mode of transmission:**

  Transmission of Nipah virus to humans may occur after direct contact with infected bats, infected pigs, or from other NiV infected people, drinking raw date palm sap



- Incubation Period: Incubation period of 5 to 14 days

Clinical Feature:

- Illness presents with 3-14 days of exposure.
- Fever and headache
- Followed by drowsiness, disorientation and mental confusion.
- These signs and symptoms can progress to coma within 24-with 3-14 days of 48 hours.
- Some patients have a respiratory illness

Lab investigation:

- Virus isolation attempts and real time polymerase chain reaction (RT-PCR) from throat and nasal swabs, cerebrospinal fluid, urine, and blood should be performed in the early stages of disease. Antibody detection by ELISA (IgG and IgM) can be used later on

Treatment:

- The drug ribavirin has been shown to be effective against the viruses in vitro.
- Passive immunization using a human monoclonal antibody targeting the Nipah G glycoprotein has been evaluated in the post-exposure therapy in the ferret model and found to be of benefit.

Preventive measure:

- Nipah virus infection can be prevented by avoiding exposure to sick pigs and bats in endemic areas and not drinking raw date palm sap.

MIDDLE EAST RESPIRATORY SYNDROME CORONAVIRUS (MERS-CoV)

- The first known cases of MERS-CoV occurred in Jordan in April 2012.
- Health officials first reported the disease in Saudi Arabia in September 2012.
- The largest known outbreak of MERS outside the Arabian Peninsula occurred in the Republic of Korea in 2015.
- Agent: Middle East Respiratory Syndrome Coronavirus (MERS-CoV)
- Carrier: Chemel
- Mode of transmission:
- spread from an infected person's respiratory secretions, such as through coughing
- close contact such as caring for or living with an infected person.
- Incubation Period: is usually about 5 or 6 days, but can range from 2 to 14 days.

Risk Factor:

- Recent Travelers from the Arabian Peninsula
- Close Contacts of an Ill Traveler from the Arabian Peninsula
- Close Contacts of a Confirmed Case of MERS
- Healthcare Personnel Not Using Recommended Infection-Control Precautions
- People with Exposure to Camels
- people with pre-existing medical comorbidities (diabetes; cancer; and chronic lung, heart, and kidney disease, weakened immune systems)

Clinical Feature:

- Most people confirmed to have MERS-CoV infection have had severe acute respiratory illness with symptoms of:
- Fever
- Cough
- shortness of breath
- Other early symptoms to watch for are chills, body aches, sore throat, headache, diarrhea, nausea/vomiting, and runny nose.
- Sometime Diarrhoea and vomiting

Lab investigation:

- Collection of lower respiratory, upper respiratory and serum specimens for testing using the MERS rRT-PCR assay is recommended.
- Collecting nasopharyngeal and oropharyngeal (NP/OP) specimens and serum, ideally within 7 days.

Treatment:

- There is no specific antiviral treatment recommended for MERS-CoV infection.
- Individuals with MERS often receive medical care to help relieve symptoms.
- For severe cases, current treatment includes care to support vital organ functions.
- Prognosis: About 3 to 4 out of every 10 patients reported with MERS have died.
- Complication: pneumonia and kidney failure

Preventive measure:

- Wash your hands often with soap and water for 20 seconds, If soap and water are not available, use an alcohol-based hand sanitizer.
- Cover your nose and mouth with a tissue when you cough or sneeze, then throw the tissue in the trash.
- Avoid touching your eyes, nose and mouth with unwashed hands.
- Avoid personal contact, such as kissing, or sharing cups or eating utensils, with sick people.
- Clean and disinfect frequently touched surfaces and objects, such as doorknobs.

Preventive measure:

- Avoid contact with camels
- Do not drink raw camel milk or raw camel urine
- Do not eat undercooked meat, particularly camel meat

ZIKA

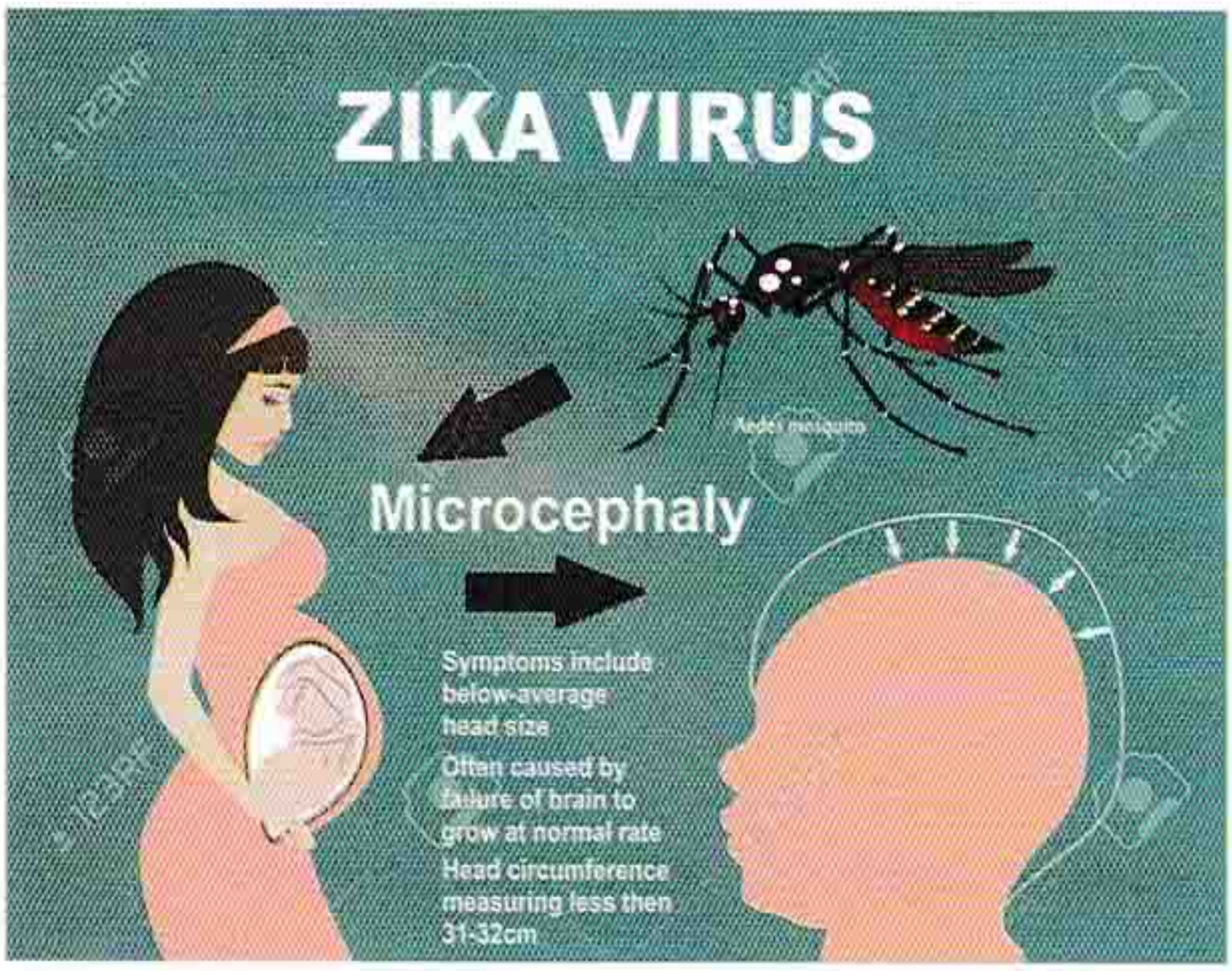
- Zika virus was first discovered in 1947 and is named after the Zika Forest in Uganda.
- In 1952, the first human cases of Zika were detected and since then, outbreaks of Zika have been reported in tropical Africa, Southeast Asia, and the Pacific Islands.
- Before 2007, at least 14 cases of Zika had been documented,

❖ **Agent:** Zika virus

❖ **Vector:** Aedes species mosquito (Ae. aegypti and Ae. albopictus).

❖ **Mode of transmission:**

- Zika can be transmitted
- Through mosquito bites
- From a pregnant woman to her fetus
- Through sex
- Through blood transfusion (very likely but not confirmed)



Clinical Feature:

Many people infected with Zika virus won't have symptoms or will only have mild symptoms. The most common symptoms of Zika are:

- Fever
- Rash
- Headache
- Joint pain
- Red eyes
- Muscle pain
- Symptoms can last for several days to a week.

Lab investigation:

- A blood or urine test can confirm a Zika infection.
- Symptoms of Zika are similar to other illnesses spread through mosquito bites, like dengue and chikungunya.
- The Zika IgM Antibody Capture Enzyme-Linked Immunosorbent Assay (Zika MAC-ELISA)
- confirmation by plaque-reduction neutralization testing (PRNT).
- rRT-PCR

Complication:

- Zika infection during pregnancy can cause a birth defect of the brain called microcephaly and other severe brain defects. It is also linked to other problems, such as miscarriage, stillbirth, and other birth defects. There have also been increased reports of Guillain-Barré syndrome, an uncommon sickness of the nervous system, in areas affected by Zika.

Treatment:

- There is no specific medicine or vaccine for Zika virus. Treat the symptoms:
- Get plenty of rest.
- Drink fluids to prevent dehydration.
- Take medicine such as acetaminophen to reduce fever and pain.
- Do not take aspirin or other non-steroidal anti-inflammatory drugs (NSAIDs).
- If you are taking medicine for another medical condition, talk to your healthcare provider before taking additional medication.

Prognosis:

- People usually don't get sick enough to go to the hospital, and they very rarely die of Zika. Once a person has been infected with Zika, they are likely to be protected from future infections.

Preventive measure:

- There is no vaccine to prevent Zika. The best way to prevent diseases spread by mosquitoes is to protect yourself and your family from mosquito bites.
- Clothing
- Wear long-sleeved shirts and long pants.
- Treat your clothing and gear with permethrin or buy pre-treated items.
- Insect repellent

Preventive measure:

- At Home
- Stay in places with air conditioning and window and door screens to keep mosquitoes outside.
- Take steps to control mosquitoes inside and outside your home.
- Mosquito netting can be used to cover babies younger than 2 months old in carriers, strollers, or cribs.
- Sleep under a mosquito bed net if air conditioned or screened rooms are not available or if sleeping outdoors.
- Sexual transmission
- Prevent sexual transmission of Zika by using condoms or not having sex.

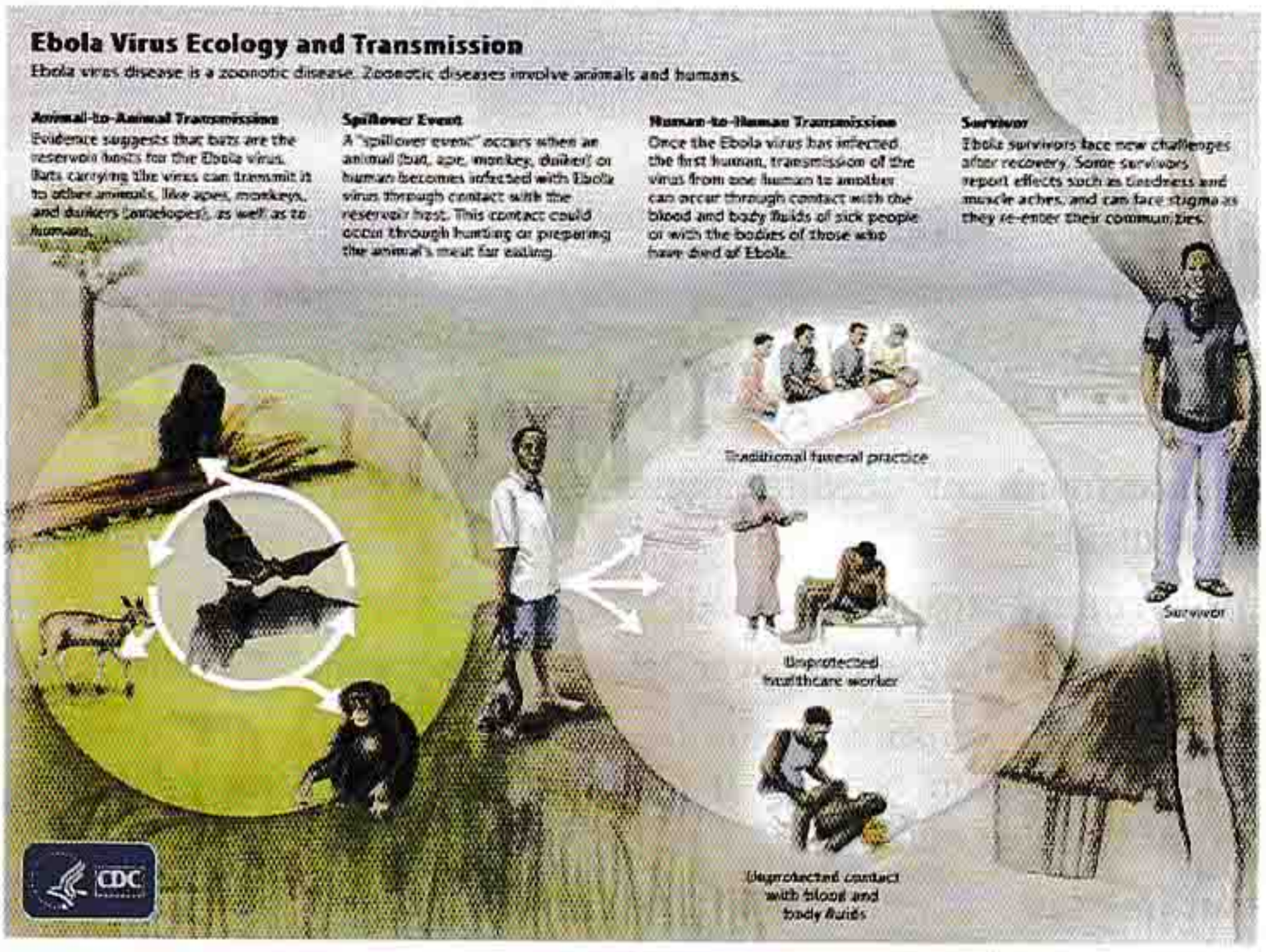
EBOLA

Ebola virus was first discovered in 1976 near the Ebola River in what is now the Democratic Republic of Congo. Five known Ebola virus species, four of which can cause disease in people:

- Ebola virus (Zaire ebolavirus)
- Sudan virus (Sudan ebolavirus)
- Taï Forest virus (Taï Forest ebolavirus, formerly Côte d'Ivoire ebolavirus)
- Bundibugyo virus (Bundibugyo ebolavirus)
- Reston virus (Reston ebolavirus), known to cause disease in nonhuman primates and pigs, but not in people

Symptoms of Ebola include

- Fever
- Severe headache
- Muscle pain
- Weakness
- Fatigue
- Diarrhea
- Vomiting
- Abdominal (stomach) pain
- Unexplained hemorrhage (bleeding or bruising) Symptoms may appear anywhere from 2 to 21 days after exposure to Ebola, but the average is 8 to 10 days.



Transmission

- When an infection occurs in humans, the virus can be spread to others through direct contact (through broken skin or mucous membranes in, for example, the eyes, nose, or mouth) with
- blood or body fluids (including but not limited to urine, saliva, sweat, feces, vomit, breast milk, and semen)
- objects (like needles and syringes)
- infected fruit bats or primates (apes and monkeys)
- possibly from contact with semen from a man

Diagnosis

Timeline of Infection	Diagnostic tests available
Within a few days after symptoms begin	• Antigen-capture enzyme-linked immunosorbent assay (ELISA) testing • IgM ELISA • Polymerase chain reaction (PCR) • Virus isolation
Later in disease course or after recovery	• IgM and IgG antibodies
Retrospectively in deceased patients	• Immunohistochemistry testing • PCR • Virus isolation

Treatment

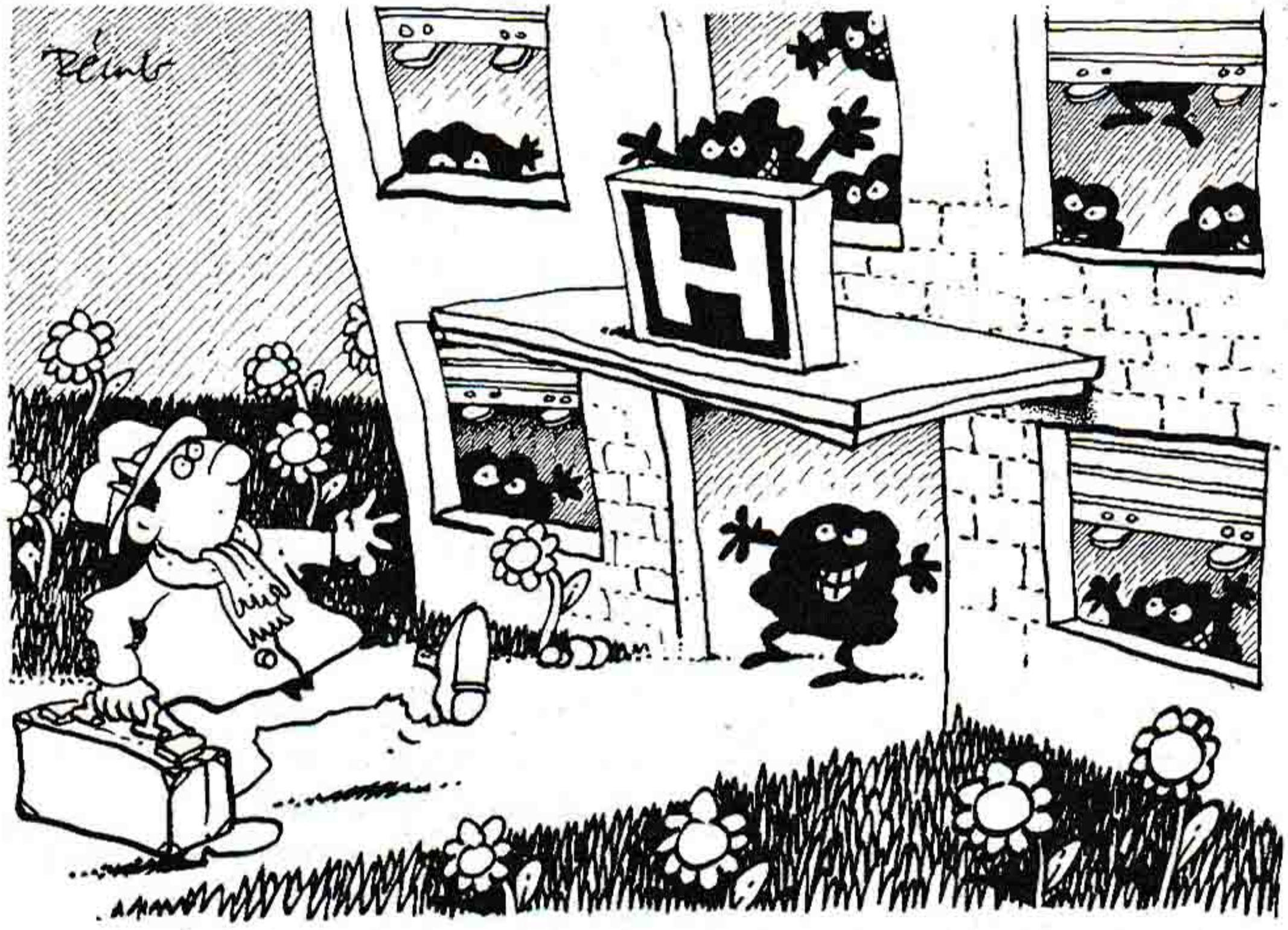
No FDA-approved vaccine or medicine (e.g., antiviral drug) is available for Ebola.

- Symptoms of Ebola and complications are treated as they appear. The following basic interventions, when used early, can significantly improve the chances of survival:
- Providing intravenous fluids (IV) and balancing electrolytes (body salts).
- Maintaining oxygen status and blood pressure.
- Treating other infections if they occur.

Prognosis:

- Recovery from Ebola depends on good supportive clinical care and the patient's immune response. People who recover from Ebola infection develop antibodies that last for at least 10 years.

Infection Prevention & Control (IPC)

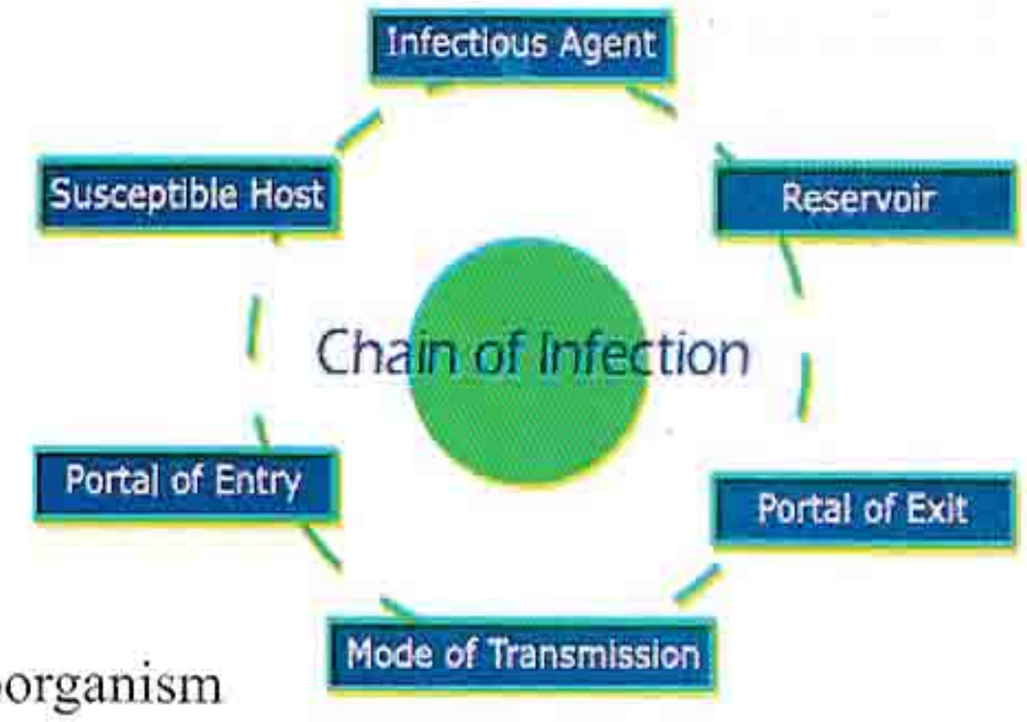


It may seem a strange principle
to enunciate as the very first requirement of a hospital
that it do the sick no harm.

Florence Nightingale, Notes on Hospitals, 1863

CHAIN OF INFECTION

Infectious agent or pathogen
Reservoir
Portal of exit
Mode of transmission
Portal of entry
Susceptible host



LINK 1

Causative agent – pathogen or infectious microorganism

- Bacteria
- Viruses
- Mold
- Fungi

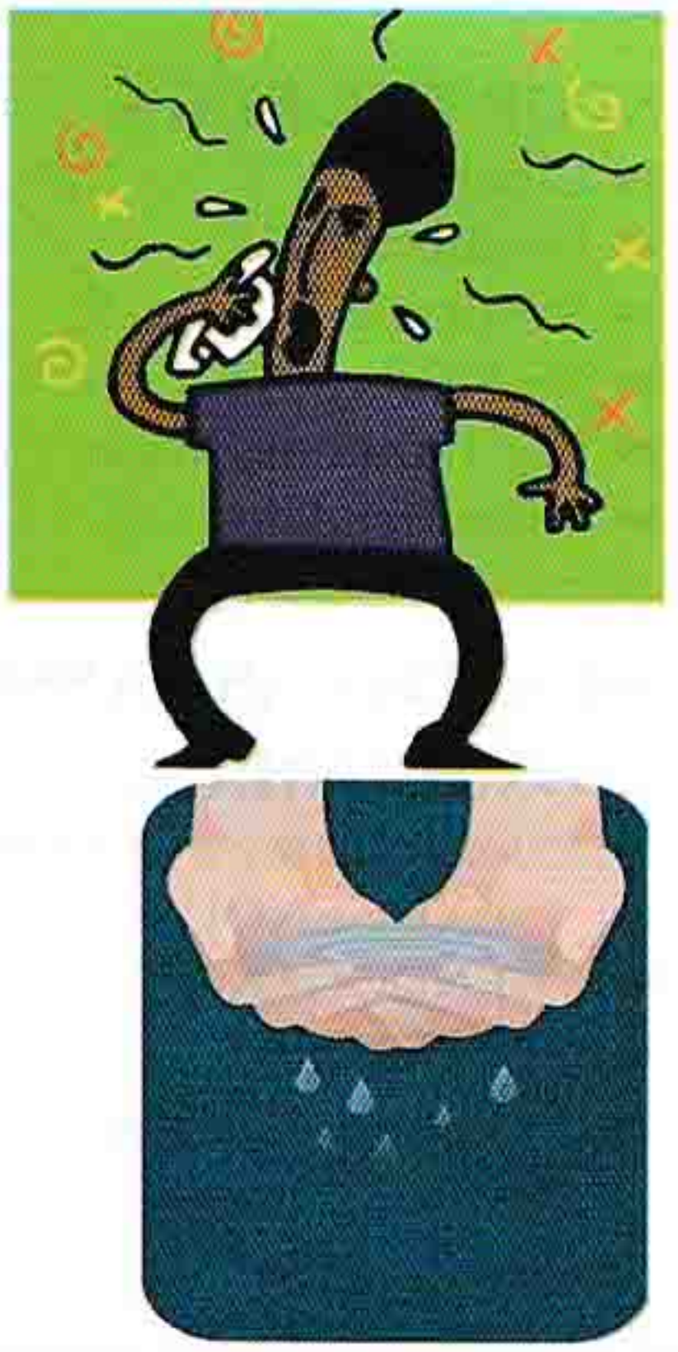
LINK 2

Reservoir – Place where pathogen lives

- Lungs
- Blood
- Digestive Tract
- ETC

LINK 3

- Portal of Exit – Any body opening on infected person
- Nose
- Mouth
- Eyes
- Cut in Skin
- Urethra/Anus



LINK 4

Mode of Transmission – How the Pathogen travels from one person to the next

- Air
- Hands
- Other Surfaces

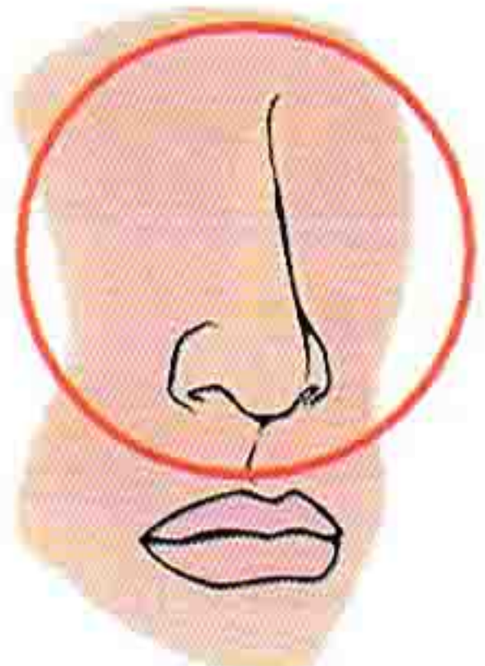
Modes of Transmission

Contact (Direct & Indirect)

- Droplet
- Airborne
- Vehicles
- Vectors

LINK 5

- Portal of Entry – Any body opening on uninfected person
- Skin and Mucous Membranes
- Respiratory Tract
- Urinary Tract
- Gastrointestinal tract
- Reproductive Tract
- Blood



The Nose

LINK 6

- Susceptible Host – an uninfected person

STOP THE BUGS

- Cleansing
- Disinfecting
- Sterilizing
- No Sharing
- Bag Hazardous Waste
- Linen Handling

HEALTH CARE ASSOCIATED INFECTION (NOSOCOMIAL)

Infections that are a result of health care delivery, not present at admission

- EXOGENOUS
- ENDOGENOUS
- IATROGENIC

Refer to Potter & Perry Table 34-2 Pg. 648 (Sites for Causes of HAI's)

Common Health-Care Associated Infections

- Urinary Tract Infection
- Surgical/Traumatic Wound Infection
- Respiratory Tract
- Bloodstream

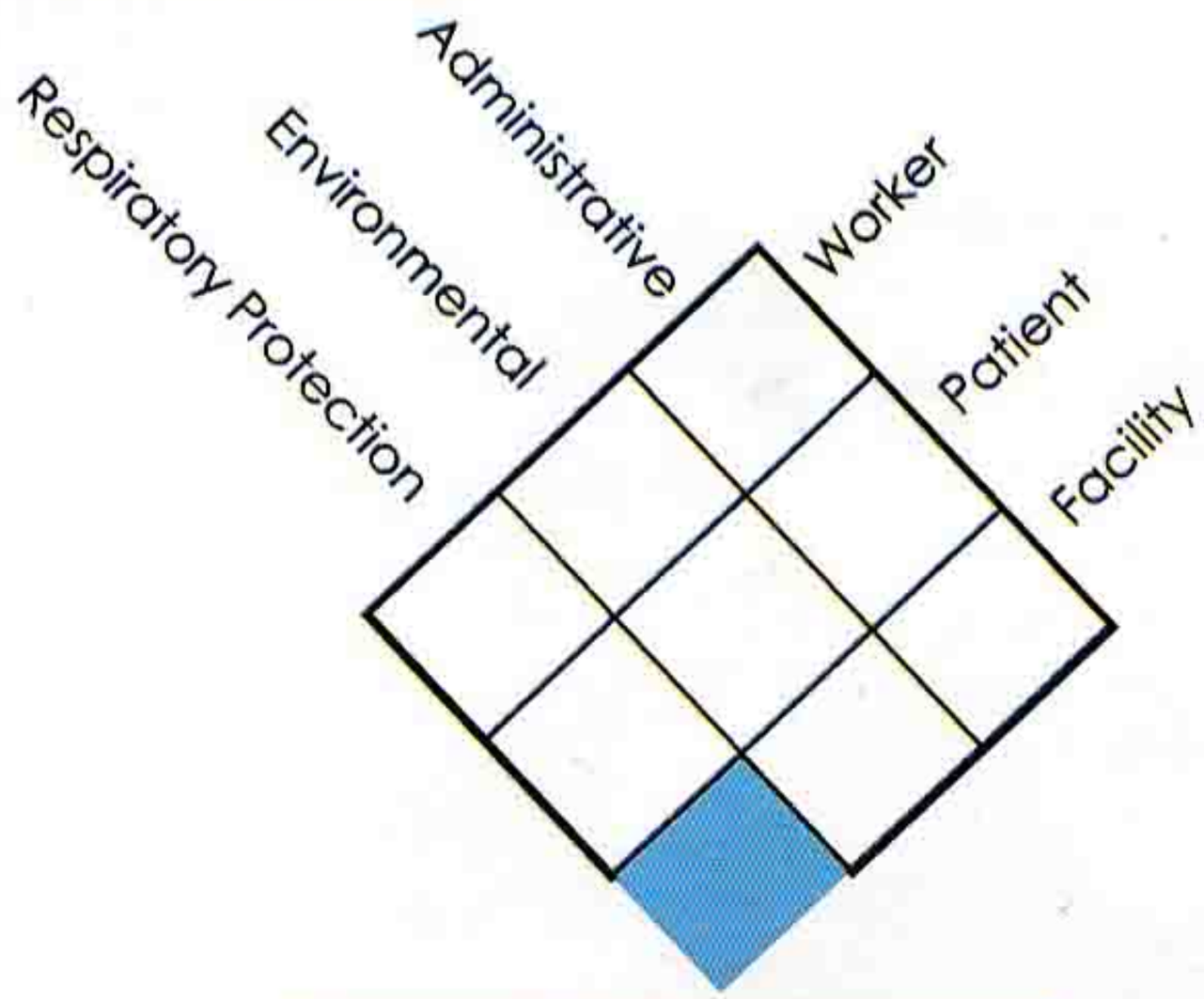
Drug Resistant Organism Infections & Colonizations

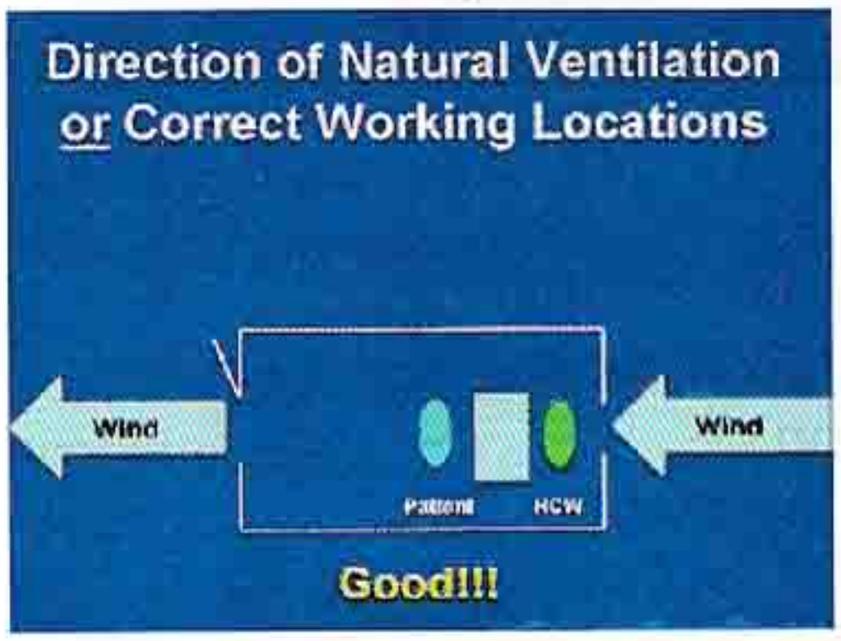
- Methicillin-Resistant Staphylocuccus aureus (MRSA)
- Vancomycin-Resistant Enterococcus (VRE)
- Extended-Spectrum Beta Lactamase (ESBL)
- Multi-drug Resistant Tuberculosis

Hierarchy of Infection Control

- Administrative controls to reduce risk of exposure, infection and disease thru policy and practice;
- Environmental (engineering) controls to reduce concentration of infectious bacilli in air in areas where air contamination is likely; and
- Personal protection to protect personnel who work in hospital.

Hierarchy of Infection Controls





Personal Protective Equipment

- Gowns
- Respiratory Masks
- Eye Protection
- Gloves
- Bagging Trash & Linen
- Transporting Patients

Fate of Droplets

Organisms Liberated

Talking	0-200
Coughing	0-3500
Sneezing	4500-1,000,000

Droplets can remain suspended in the air for hours.

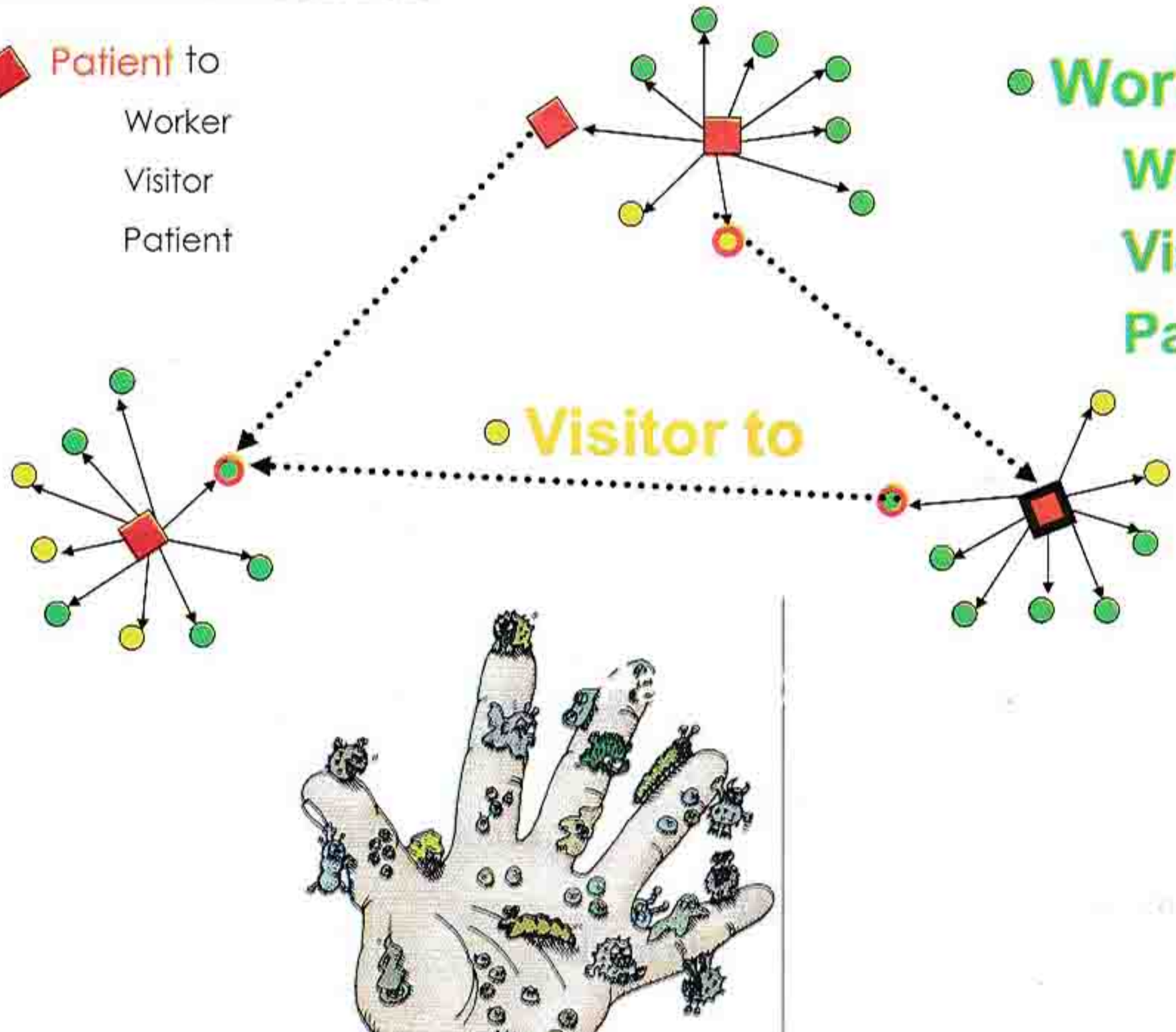
Cough Etiquette

LINEN HANDLING

- Bag at the point of use
- Minimum agitation
- Do not sort or pre-rinse in resident care areas
- Use PPE when sorting
- No damp linen left overnight
- Hot water above 160°for 25 minutes

What is Infection Control?

- Patient to
  - Worker
  - Visitor
  - Patient
- Worker to
  - Worker
  - Visitor
  - Patient
- Visitor to
  - Patient

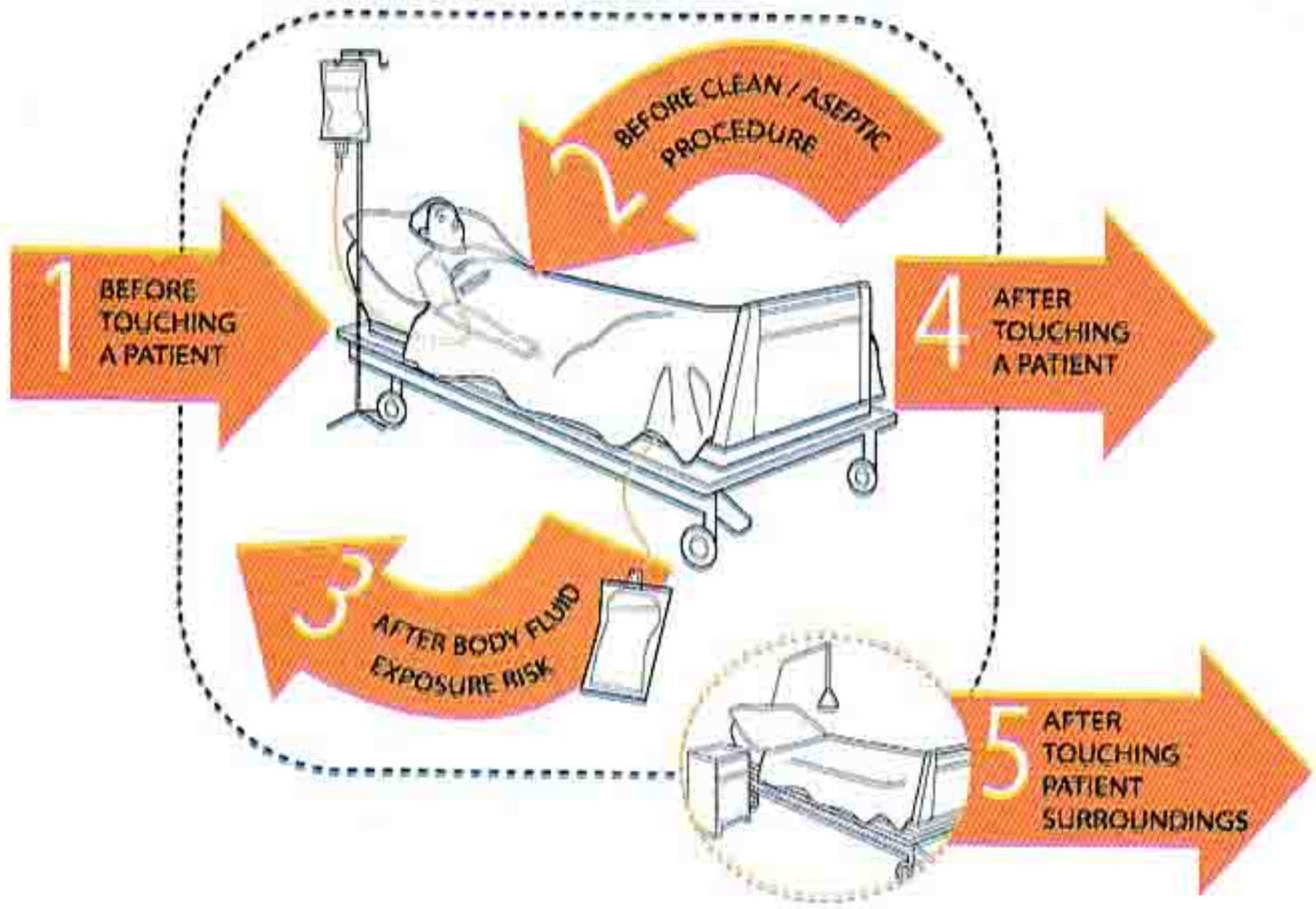


HAND HYGIENE:

When to Wash

- When coming on duty
- Before and after direct resident contact
- Before and after performing any invasive procedure
- Before and after entering isolation precaution settings
- Before and after assisting with personal care
- Before and after handling peripheral vascular catheters and other invasive devices
- Before and after inserting indwelling catheters
- Before and after changing a dressing
- Upon and after coming in contact with a resident's intact skin
- After blowing or wiping nose
- After handling soiled linen
- After handling soiled equipment or utensils
- After removing gloves or aprons
- After completing duty

"My 5 Moments for Hand Hygiene"



Sax H, Allegranzi B, Uçkay I, Larson E, Boyce J, Pittet D. J Hosp Infect 2007;67:9-21

HAND HYGIENE: Use Soap and Water

- When hands are visibly soiled
- Before and after eating or handling food
- Before and after assisting a resident with meals
- After personal use of the toilet
- After contact with a resident with infectious diarrhea
- After performing your personal hygiene

HAND HYGIENE: How to wash

- Wet hands first with clean, running warm water
- Apply the amount of product recommended by the manufacturer to hands
- Rub hands together vigorously for a t least 15 seconds covering all surfaces of the hands and fingers
- Rinse hands with water
- Dry with disposable paper towel
- Turn off the faucet with disposable paper towel.

STANDARD PRECAUTIONS

✓ Use with everybody
✓ Wear gloves
✓ Handle used equipment with care
✓ Dispose of needles properly
✓ Wear face mask & eye protection when necessary

Principle of infection prevention

At least 35-50% of all healthcare-associated infections are associated with only 5 patient care practices:

- Use and care of urinary catheters
- Use and care of vascular access lines
- Therapy and support of pulmonary functions
- Surveillance of surgical procedures
- Hand hygiene and standard precautions

Prevention of Catheter-Associated Urinary Tract Infection (CA-UTI)

Two main principles

Avoid unnecessary catheterization

Limit the duration of catheterization

Catheter insertion and maintenance

- Practice hand hygiene
- before insertion of the catheter
- before and after any manipulation of the catheter site

http://www.who.int/gpsc/tools/en/

Sources of the catheter associated bloodstream infection

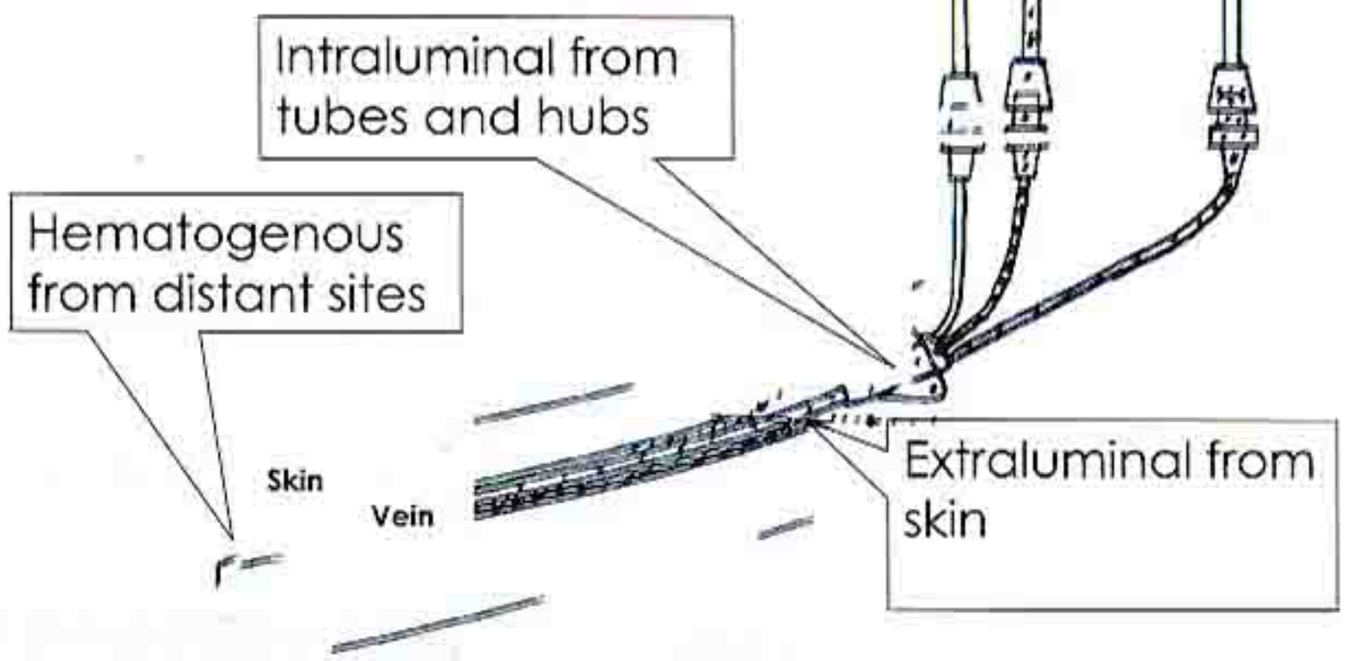
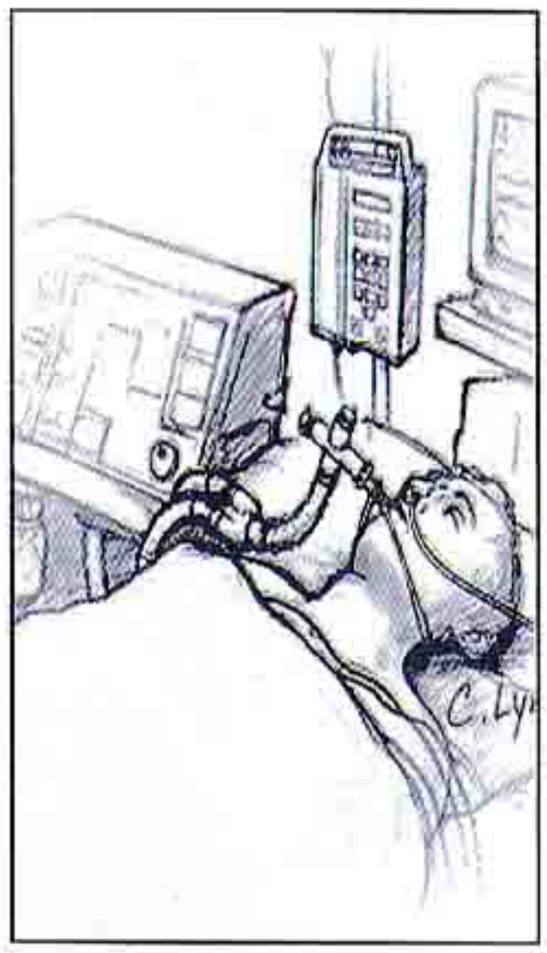


Figure. Source of intravascular catheter-related infections.

Risk factors for Ventilator-Associated Pneumonia (VAP)

Patient	Devices
Age	Invasive ventilation
Burns	Duration of invasive ventilation
Coma	Reintubation
Lung disease	Medication
Immunosuppression	Prior antiobiotic treatment
Malnutrition	Sedation
Blunt trauma	



General precautions

- Staff education, hand hygiene, isolation precautions (I)
- Surveillance of infection and resistance with timely feedback (II)
- Adequate staffing levels (II)

Intubation and ventilation

- Avoid intubation and reintubation - I
- Prefer non-invasive ventilation - I
- Prefer orotracheal intubation & orogastric tubes - II
- Continous subglottic aspiration - I
- Cuff pressure > 20 cm H2O - II
- Avoid entering of contaminate consendate into tube/nebulizer - II
- Use sedation and weaning protocols to reduce duration – II
- Use daily interruption of sedation and avoid paralytic agents - II

Procedure-related risk factors

- Hair removal technique
- Preoperative infections
- Surgical scrub
- Skin preparation
- Antimicrobial prophylaxis
- Surgeon skill/technique
- Asepsis
- Operative time
- Operating room characteristics

Rrisk Communication
And
Outbreak Commucation

What is Communication?

Two-way process of reaching mutual understanding in which participants not only exchange (encode-decode) information, news, ideas and feelings but also create and share meaning.

In general communication is a means of connecting people or places

Risk Communication

"Communication intended to supply laypeople with the information they need to make informed, independent judgments about risks to health, safety, and the environment."

- Morgan, et. al. 2002

Risk Communication Terms

Risk

Defined as the chance something bad will happen, and the associated outcome of the possible event.

Risk = Likelihood x Consequence.

Risk Communication Terms

Hazards

Events or physical conditions that have the potential to cause fatalities, property damage, infrastructure damage, agricultural loss, damage to the environment, interruption of business, or other negative consequences.

- FEMA, 1997

HAZARD???
RISK????
HAZARD + RISK =

PANIC

Building Better Foundation to Communicate Risk

- Risk communication has been defined as an interactive process on exchange of information and opinion among individuals, groups, and institutions. It involves multiple messages about the nature of risk and other messages.
- Risk communication comes from an agency that is involved in and responding to a public health emergency. As the health crisis unfolds, the agency informs the public and other audiences about the response measures being taken.

The reasons we do risk communication for:

- So that people will prepare themselves emotionally and logistically
- So that people will support prevention and control activities at their homes, schools, business and other institutional levels
- So that (if a pandemic begins) people who had the time to get used to the idea are likely to understand their risks; take active roles to protect themselves and practice correct health behaviours following official advice

Building Better Foundation to Communicate Risk

Some emotional factors we deal with:

❖ Communication in crisis is different as all affected people:
✓ take in information differently,
✓ process information differently and
✓ act on information differently

The Risk Communication Planning Implications at the Fields

There are no easy recipes! However, experts who have participated in debates have the following principles for guiding risk communication strategies and planning.

Generate a discussion:

1. Accept the public as a legitimate partner for creating a baseline
2. Build Trust and Confidence
3. Give People Things to Do:

Characteristics of information during an emergency

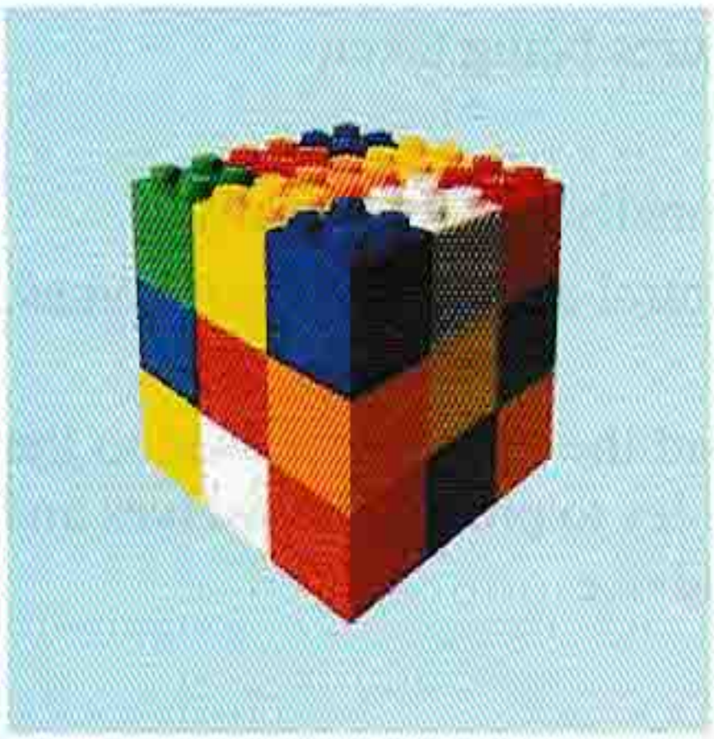
High demand for information	Urgent time frame	Requires rapid and effective dissemination

Use preferred channels of key audiences	Existing information sharing networks	New Media Non-traditional media

Rumours	Misinformation

Facts are NOT enough: Trust and perception are everything

Risk and crisis communication building blocks:



Values	Expression Of Caring
Technical Information	Credibility

Trust

in individuals and organizations is by far the greatest factor

Building Better Foundation to Communicate Risk

The Risk Communication Planning Implications at the Fields

The ways we communicate during crisis

- PRECAUTION ADVOCACY ("Watch out")- How to alert people to serious hazards
- OUTRAGE MANAGEMENT (" Calm down")- How to reassure people when they may be upset or over-reacting
- CRISIS COMMUNICATION ("We will get through this") – How to guide people through serious hazards when they are fearful (and may even be in denial).

Building Better Foundation to Communicate Risk

Take away message/key points to remember for the health manager and the health worker are Focused Areas :

- Pre-Pandemic Phase:
  - to reduce the risk of animal to animal transmission
  - Focus area: raising awareness
- Pandemic alert phase-
  - To reduce the risk of animal to human transmission-
  - Improve hygiene to limit spread of seasonal human influenza-
  - Focus area: address rumours, reinforce awareness on self-protection and prevention of spread, updating public on situation and outbreak response, and action being taken
- Pandemic phase-
  - To contain an emerging human (pandemic) virus
  - Survive a pandemic –
  - Focus area: strengthen pre-alert stage activities and address public anxiety and discomfort

Outbreak Communication Communication During Outbreak Situation

Planning and Management of Outbreak ResponseBase your strategy and message as you gather information on the following three elements:

- ❖ Person
- ❖ Place
- ❖ Time

Communication During Outbreak Situation

Planning and Management of Outbreak Response

- Once you have the person, place, and time information related to your specific outbreak investigation, you can determine the extent, risk of spread, and potential for human-to-human transmission.
- The message that you develop and deliver will depend on the immediate control measures that need to be put in place.

Planning and Management of Outbreak Response

- <u>These may include:</u>

❖ The use of personal protective equipment;

- ❖ The implementation of isolation and quarantine measures of either people or poultry;
- ❖ The use of community health interventions, such as increased surveillance, public health
- ❖ education, or putting hospitals on alert; or
- ❖ Animal health interventions such as vaccination, culling, or halting the import or export of poultry

Considering the following factors will support your actions:

- ❖ Understanding What the Public Seeks from Your Communication
- ❖ What the Public Will Ask First (What does this mean to me?)
- ❖ What the Media Will Ask First

Communication During Outbreak Situation

Considering the following factors will support your actions:

- Key Elements to Build Trust
- Communication Failures That Kill Operational Success
- Communication Steps That Boost Operational Success

Learning the Steps for Outbreak Communication During the Alert and Pandemic stage

- As a District Rapid Response Team Member you have been asked for recommendation by the DC how to communicate with the public about this situation.

- Take clue from :
  - how people deal with risk emotionally,
  - the ways we communicate risk,
  - guiding principles

Learning the Steps for Outbreak Communication During the Alert and Pandemic stage

- We are especially interested to see the use of person, time, place elements and the strategy to adopt in this situation, roles of field- based health workers and Managers, messages you want to communicate, your choice of channels and team.

Communication During Outbreak Situation

Take away message/key points to remember for the health manager and the health worker are the key planning factors :

- Person

— How many people are ill?
— How many people have been exposed?
— What are the gender, age, and occupation of those affected?
— Are people affected or only birds?
— Are the birds domestic or migratory
— Occupation of the infected or at risk people
— General reaction/emotion

Take away message/key points to remember for the health manager and the health worker are the key planning factors :

- Place

— Where is the outbreak for example name of the village/district
— Is the site of the disease is remote or have fairly easy accessibility, located near other known population centres or relevant geographic features, such as a river, in chor/hawor, jungle, hilly region
— What are the population characteristics in this area
— What public health and health care facilities are available at the place of the outbreak
— Are there some groups who may be more vulnerable or hard to reach
— Local customs and language/population characteristics/ethnicity

Building Better Foundation to Communicate Risk

Take away message/key points to remember for the health manager and the health worker are the key planning factors :

- Time:

— Determine the date and first identified case (s)
— Identify any presumed exposure (1 meter radius of infected people or in case of infected bird within 1 km radius and also the incubation period. The aim is to bring patients under treatment win 48 hrs of showing symptoms.)
— How has the disease spread over time
— Is there anything significant about the timing of the spread such as community celebrating or other gathering

Thank you

DGHS.MOH&FW
BANGLADESH

IEDCR

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World Health Organization