BIOTERRORISM:

A Primary health care Perspective

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Objectives

- Define Bioterrorism
- Recognize its historical background
- Appraise classification of Bioterrorism
- Discuss the public emergency response

➨ DEFINITION:

Bioterrorism, bioweapons, or bio warfare is a term used to describe Bioterrorism is the intentional release or threat of release of biologic agents (i.e. viruses, bacteria, fungi or their toxins) in order to cause disease or death among human population or food crops and livestock to terrorize a civilian population or manipulate the government

- This can be performed by an individual having vested interests or for retaliation, but it can also be sponsored by some government as part of a political agenda, can spread it via air, water, soil, and food, and they can take few hours to several days to cause the effect

- anthrax is a very commonly used agent for bioterrorism, an Emerging Threat terrorism is the easiest because the agents are available easily, do not cause sound or blast (unless it involves chemicals), can cause harm across borders, and are widespread mostly as it can wipe out entire population

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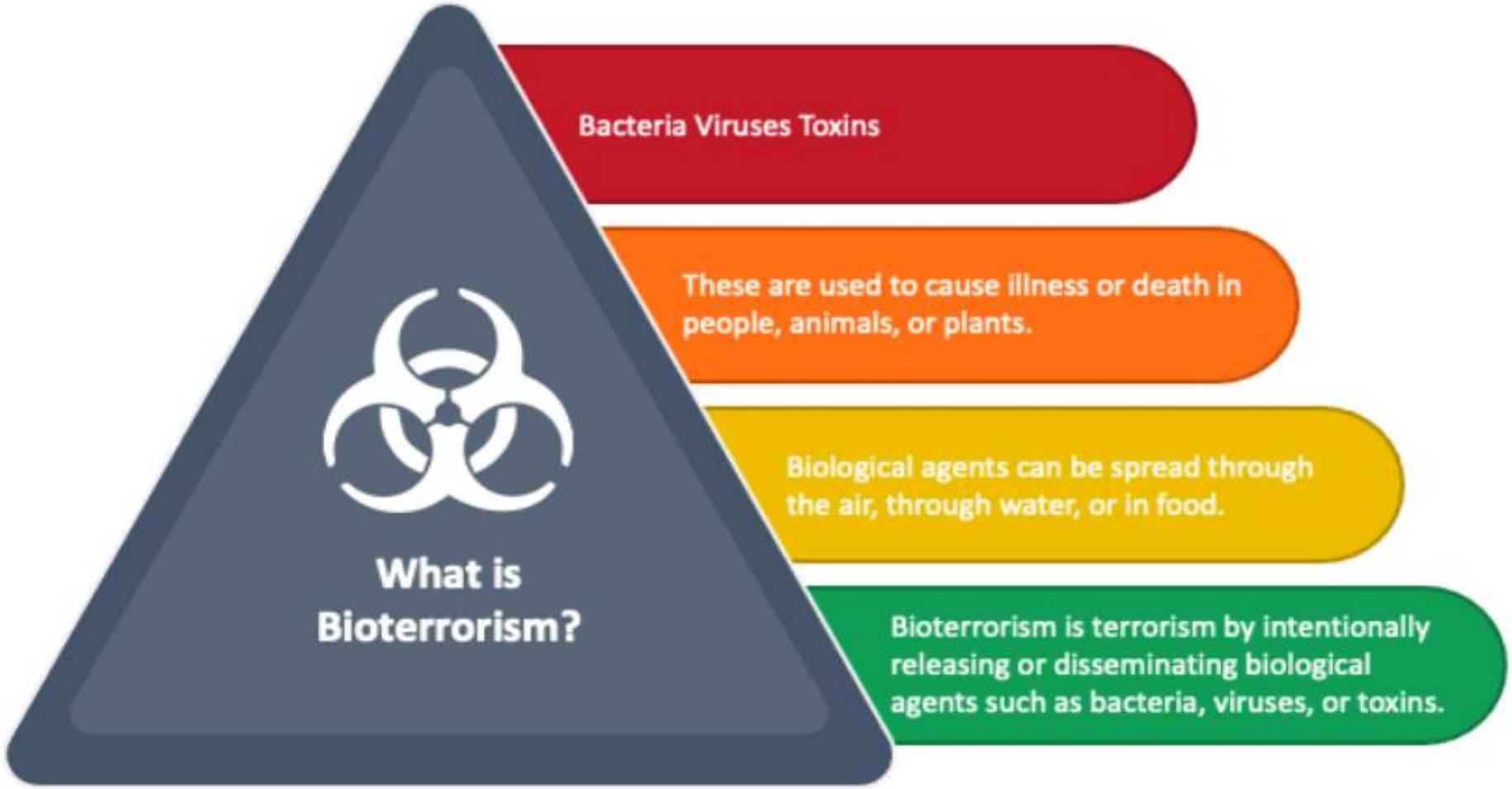
What is Bioterrorism?



History of Bioterrorism:

- Contamination of water supply with the fungus Claviceps purpurea (rye ergot) by the Assyrians had been reported
- The hurling of the dead bodies of plague victims over the walls of the city of Kaffa by the Tatar army in 1346
- the spreading of smallpox via contaminated blankets by the British to the Native American population loyal to the French in 1767
- It is usually believed that the plague epidemic in Europe was caused by some sailor who carried the disease from the enemy country
- In the United States (US) was the intentional contamination of restaurant salad bars with Salmonella by a religious cult in Oregon in 1984
- Halabja chemical attack in 1988
- In September 2001, the American public was exposed to anthrax spores as a bioweapon delivered through the US postal system, 22 people affected , with 5 deaths
- The Khan Shaykhun chemical attack took place on 2017 on the town of Khan Shaykhun in the Idlib Governorate of Syria

Table 7.2 List of biodiseases around the world.

Diseases	Year	Origin/ country	Reported causalities	Source
Black death pandemic	13—15th century	Europe	25 million reported deaths	Shinwari et al. (2014)
Smallpox virus	1600s	North America	400,000 causalities	Riedel (2004)
Severe acute respiratory syndrome (SARS)	2002—03	Hong Kong/ China	298	Mikes (2009)
Avian influenzas	2006	Azerbaijan, Cambodia, China, Egypt, Djibouti, Indonesia, Iraq, Laos, Thailand, Turkey, Nigeria, and Vietnam	150 million affected birds resulted in 335 confirmed cases	Brooks (2007)
Equine influenza	2007			
Swine flu	2009/ 2014	Worldwide	203,000 deaths	Gholipour (2013)
Tuberculosis	2016	Worldwide	10.4 million affected people	CDC (2018)

Categories of Bioterrorism:

There are three broad categories which specify the term bioterrorism. The categories are based on the threat ranging from highest to moderate and eventually to gradual

Category A:

consists of those disease-causing agents which can be easily released and can spread from one person to another. They can become a public health problem and result in socioeconomic impact because people can become ill and do not go to jobs, schools or handle business which ultimately results in social impact. Some examples are bacteria such as Bacillus anthraces (anthrax-causing bacteria) and Yersinia pestis (plague-causing specie), viruses such as filo viruses (cause Ebola), and toxins such as Clostridium botulinus (botulism-causing toxin).

Category B:

includes those agents that are moderately easily transmitted and do not cause deaths, but some people are affected. For instance, bacteria specie such as Salmonella (food contaminant) and virus such as alpha viruses (cause encephalitis).

Category C:

includes those pathogens that are being genetically engineered to cause effect in future and they have a potential to result in high death rates. For example, HIV and Influenza viruses

Classification of agents of BT

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Forms of Bioterrorism

➨ Primary health emergency response to bioterrorist attack :

The responsibilities of public health agencies are:

- Surveillance of infectious diseases
- *Detection* and *investigation* of outbreaks
- Identification of *etiologic agents* and their *modes of transmission*
- The development of *prevention* and *control strategies*

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Completion of the following five phases of activities prior to an incident are essential for successful response to a bioterrorist attack:

a) *Preparedness phase:*

- Case definition, evaluation of the laboratory , hospital preparedness
- Conduct training of health professionals,
- Ensure that requirement of safe drinking water is met, adequate medicines, vaccine
- Security, law enforcing and other agencies so as to assess their preparedness levels to act in case of an attack,
- prepare contact details so that communications is available during an attack. With continuous review of situation
- Public should be kept aware so that voluntary reporting is encouraged

b) Early Warning Phase:

The early warning in the surveillance system includes activities like case definitions, notification, compilation and interpretation of epidemiological data. Early detection and rapid investigation by public health epidemiologist is critical in determining the scope and magnitude of the attack and to implement effective interventions

c) Notification Phase:

It is mandatory to report any unusual syndrome or usual syndromes in unusual numbers to appropriate authorities. The activities in this phase include rapid epidemiological investigations, quick laboratory support for confirmation of diagnosis, quarantine, isolation, keeping health care facilities geared for impending casualty management and evolving public health facilities for control

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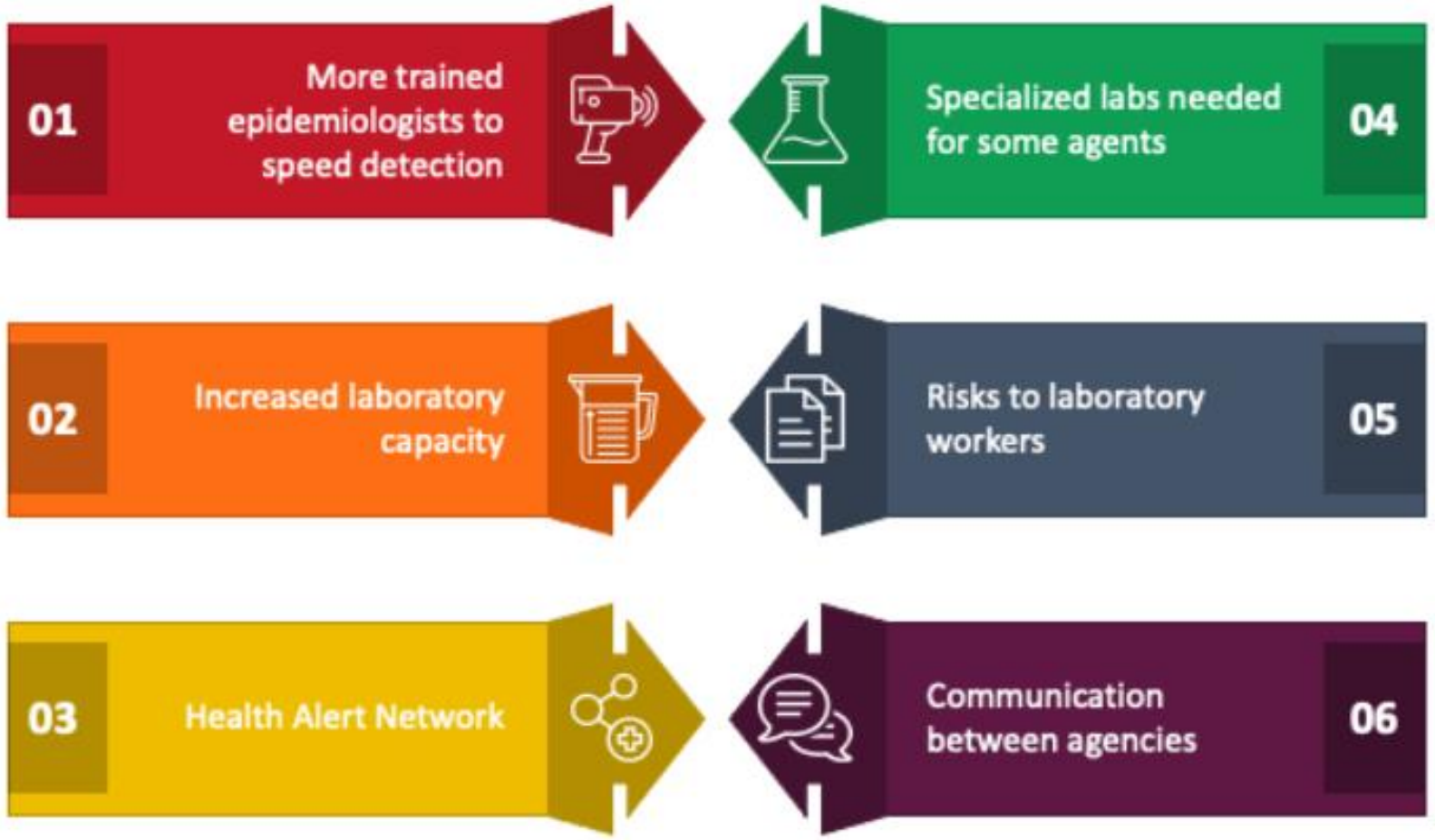
What we Need to Prepare for Bioterrorism



d) Response Phase:

In this phase the activities include rapid epidemiological investigation, quick laboratory support, mass casualty management and initiation of preventive, curative and specific control measures for containing the further spread of the disease . In order to achieve them, following steps can be followed:

- *Assess the situation:* Initiate the response by assessing the situation in terms of time, place and person distribution of those affected, routes of transmission, its impact on critical infrastructure and health facilities, the agencies and organizations involved in responding to the event, communicate to the public health responders, local, state and national level emergency operation centers for event management etc.

- *Contact key health personnel:* Contact and coordinate with personnel within the health department that have emergency response roles and responsibilities. Record all contacts and follow-up actions.

- *Develop action plan:* Develop initial health response objectives that are specific, measurable and achievable. Establish an action plan based on the assessment of the situation. Assign responsibilities and record all actions.

- *Implementation of the action plan*: The assigned health team investigate the outbreak /increase in the disease incidence, collect samples and send it to the identified state/national laboratory for testing. Hospitals are alerted for receiving the patients and their treatment. If necessary tented hospitals are set up. Methods to control the disease and quarantine measures are instituted. Once the disease is identified, treatment protocols are sent to all concerned by the fastest possible means. IPC , An impact assessment team assesses the impact of the attacks

e) Recovery Phase:

The setbacks suffered as a result of the bioterrorist attack are restored and lessons learnt in this phase are incorporated in the future preparedness plans. The damage done to the public health facilities and the essential items utilized during the response phase are replenished.

Public advisories are issued regarding restoration of normalcy. The assigned health team , compile and analyze data to identify the deficiencies experienced in the implementation of the response measures.

The necessary modifications are then incorporated in the contingency plan for future

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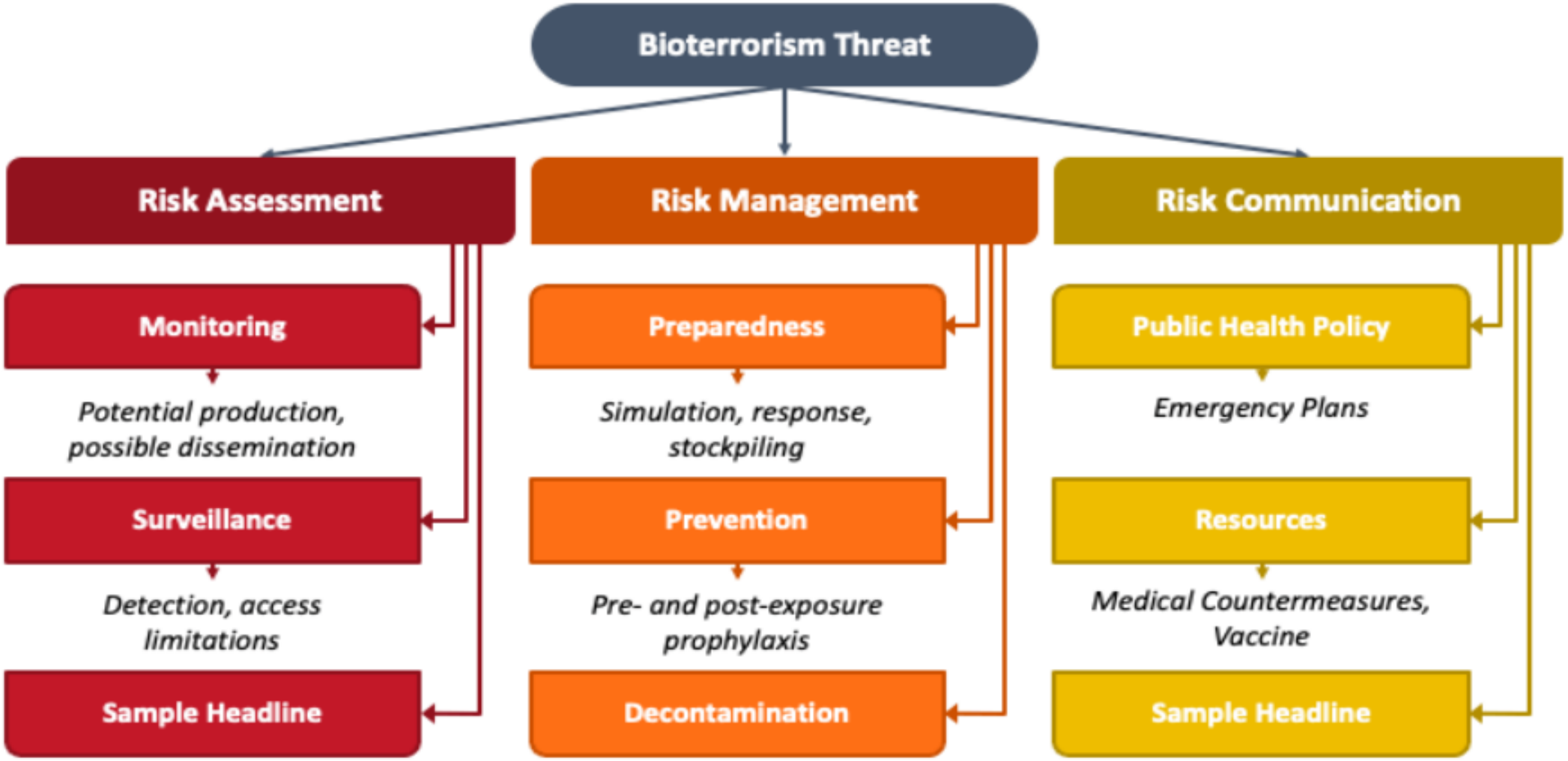
Pillars of Bioterrorism Response



Take home Messages:

- Bioterrorism remains a legitimate threat both from domestic and international terrorist groups.
- From a public health perspective, timely surveillance, awareness of syndromes resulting from bioterrorism, epidemiologic investigation capacity, laboratory diagnostic capacity
- the ability to rapidly communicate critical information on a need to know basis to manage public communication through the media are vital.
- Ensuring adequate supply of drugs, laboratory reagents, antitoxins and vaccines is essential.
- Formulating and putting into practice protocols at all levels of health care will go a long way in minimizing mortality and morbidity in case of a bioterrorist attack.

THANK YOU