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Regional and National Capacity Building to Respond to Biological Risks

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Introduction

Communicable diseases remain a major public health burden in countries causing not only illness but also incapacitation and death in humans and animals. Responding to and effectively manage the outbreaks to limit its impact on at-risk populations require a tremendous resource that most countries cannot afford yet are expected to deliver. Therefore, many developing and transitional countries lack efficient capability to respond properly and effectively to the outbreaks of these diseases.

Moreover, poor hygienic and biosafety conditions in hospitals and laboratories as well as lack of knowledge of safe handling and transport of infectious materials has become a major source of dissemination of infectious materials into the personnel and environment and consequently endangering life of the people.

On the other hand there is an increasing concern about the possible misuse of dual use pathogens and toxins as a means of causing harm or death in a population. This by itself need special attention and effective planning to reduce such threats which if not managed properly, may end up with huge disasters to the communities.

In brief, dangerous pathogens may cause risk to public health security through:

- Natural outbreaks of infectious diseases
- Poor laboratory and clinical conditions/practices
- Careless handling of infectious materials containing dangerous pathogens and
- Deliberate misuse of such materials to cause harm, disease, incapacity or death among populations

Outbreak of Infectious Diseases

Infectious diseases are still the most common killers of children and young adults in marginalized and developing countries in sub-Saharan Africa, South East Asia and Latin America. They are estimated to account for upto 45% of mortality in least developed countries. In every single hour alone, 1,500 people die from an infectious disease, over half of them being children under five years of age. Of the rest, most are working-age adults, many of them breadwinners and parents. Both are the vital age groups that these countries cannot afford to lose.

Viral Haemorrhagic Fevers (VHFs) are the best examples that pose even bigger threat to public health in these countries due to:

- High pathogenicity of causative agents which in poor sanitary conditions and health services cause severe illness, incapacitation and death in the population.
- Transmission through different vectors predominantly living in the environment which facilitate the spread of such diseases.
- These diseases are also the initial source of biological risks which can be used as effective tools for bioterrorism and add additional stress on healthcare delivery, cause major economic impact and even lead to political instability in countries that are poorly prepared to face these health threats [1].

Biosafety and Biosecurity

Contributing risks to the spread of natural outbreak of diseases in these countries are the poor hygienic and safety conditions found in hospitals and laboratories and the lack of knowledge of safe handling of the infectious materials. Staff, patients, family members and even the environment are inadvertently exposed endangering life of others unnecessarily. The lack of basic knowledge of the fundamental elements of safety, could lead to the hospital or laboratory facility becoming the source of an outbreak rather than the place for cure leading to the public's mistrust of the healthcare system and eroding public confidence in the health authorities.

A complete system of laboratory biosafety involves many different aspects, including proper laboratory procedures, sound guidelines for transfer of pathogenic microorganisms between facilities, regulations governing the correct use of certain equipment, and standards for building laboratories where personnel will work with highly infectious and/or pathogenic diseases. In other words there is a need for a comprehensive new biosafety programme which includes, regulations and guidelines applicable to all microbiological and biomedical laboratories, national standards for biosafety practices, training programmes, biological risk assessment, monitoring and evaluation and networking of laboratories and experts [2].

Preparedness For Deliberate Outbreaks

The use of biological agents and toxins as weapons has always been an attracting issue in terrorism. Although development and production of such weapons have been prohibited by the Biological Weapons Convention, the world has in many occasions witnessed their development, stockpile transfer and use.

Therefore, preparedness for deliberate releases of biological agents and toxins should be considered as a major public health risk based on standard risk-analysis principles, starting with risk and threat assessment in order to determine the relative priority that should be accorded to such releases in comparison with other dangers to public health in the country concerned. Considerations for deliberate releases should be incorporated into existing public health infrastructures, rather than developing separate infrastructures.

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Preparedness for deliberate releases of biological agents can be increased in most countries by strengthening national capacities in public health infrastructure, and particularly surveillance and response.

International Health Regulations (IHR 2005)

The International Health Regulation (2005) provides a global framework to address these needs through a collective approach to the prevention, preparedness and response to any public health emergency of international concern whatever their origin or source. The scope of the 2005's IHR (Article 2) is to prevent, protect against, control and provide a public health response to the international spread of disease in ways that are commensurating with and restricted to public health risks, and which avoid unnecessary interference with international traffic and trade.

The IHR (2005) require countries to strengthen capacities to detect, assess, confirm report, control and respond to events of international public health concern.

Art 5 of the IHR requires that "Each State Party shall develop, strengthen and maintain as soon as possible but not later than five years from entry into force of these regulations for State Party, the capacity to detect, assess, notify and report events in accordance with these regulations, as specified in Annex 1". 8 Core capacities across various hazards have been defined through a consultative process which include, national legislation, policy and financing, coordination and NFP communications, surveillance, response, preparedness, risk communication, human resources and laboratory.

Capacity Building Through National Biorisk Management Programme

To respond to biological risks including natural, accidental and deliberate outbreak of diseases, a strong national health prevention and preparedness capacities and effective regional and global coordination mechanisms are essential to effectively respond to these public health emergencies.

To achieve such important goal, a National Biorisk Management Programme needs to be established in developing and transitional countries to build or strengthen national capacity within their territory and prepare them to respond adequately to the threats caused by these risks.

The main objectives of such programme should include to:

- Establish a multi-stakeholder National committee to review, implement and monitor the programme
- Raise awareness within the countries on how to prepare and respond to threats posed by outbreaks of infectious disease caused by dangerous pathogens
- Provide continuing training courses for public health and health care workers on biological risk management, prevention of misuse of science and best practice principles to prevent accidental or deliberate release of dangerous pathogens to the environment
- Employ all national capacities (experts, institutions, laboratories, public and private sectors) to respond and contain the events in a harmonized and coordinated manner
- Establish technical and special network of laboratories and experts working in biological risk, reduction practices and management as a global resource [3].

Operational Plan

- Establish awareness and preparedness meetings, workshops and training courses at the regional and national level. The target audience of such training will be:

1. Public health authorities and policymakers
2. Healthcare managers and workers
3. Laboratory management and staff in the developing and transitional countries.

- Establish a strategic awareness and preparedness training curriculum and related training materials
- Development of national guidelines, procedures and related check list for national authorities to establish a system to monitor, assess and certify biosafety and biosecurity principles and practices.
- Set up a train the trainers programme to train competent experts and establish a national and regional network of trainers
- Support exercises to maintain preparedness to respond to pandemic and epidemics (outbreaks: natural, accidental or deliberate)
- Support laboratory networks of highly dangerous pathogens
- Establish an evaluation and monitoring system for laboratory biosafety and biosecurity

All these elements need to be discussed in more detail to develop and implement a comprehensive National Biological Risk Management Programme [4].

References

1. International Health Regulations 2005
2. WHO laboratory Biosafety Manual 2004 (LBM3)
3. Laboratory Biosecurity Guidance edition 1 2006 (LBG1)
4. WHO Public Health Response to Biological and Chemical weapons 2004