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Communicable disease alert and response for mass gatherings

Key considerations

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EPIDEMIC AND PANDEMIC
ALERT AND RESPONSE

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Contents

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Glossary, acronyms and abbreviations

The glossary contains the definitions of various terms used in this document. Terms are listed alphabetically, with the exception of two central key definitions ("Mass gathering" and "Event"), which are defined immediately below.

Key definitions

Mass gathering (or mass gathering event)
A gathering of persons usually defined as "more than a specified number of persons (which may be as few as 1000 persons although much of the available literature describes gatherings exceeding 25 000 persons[1]) at a specific location for a specific purpose (a social function, large public event or sports competition) for a defined period of time". In the context of this document, an organised or unplanned event can be classified as a mass gathering if the number of people attending is sufficient to strain the planning and response resources of the community, state or nation hosting the event.

Event

The word "event" can have two types of meaning dependent on context.

An "event" could mean a type of **mass gathering**, such as:

- An **organized occasion** such as a social function, sports competition, or political, religious or cultural gathering
- **A series of individual competitions** within the sports world conducted together under one ruling body, such as the Olympic Games, IHF World Championships, or Pan American Games
- An **individual sports contest**, such as a race, or another contest that is a part of a larger sports occasion such as the Olympic Games.

Alternatively, "event" can mean **a manifestation of disease or an occurrence that creates a potential for disease** (as defined by the International Health Regulations (IHR 2005)).

In this document, "event" will generally be used to indicate an outbreak (as in the IHR 2005), and "mass gatherings" (MG) will be used to indicate large manifestations or organised occasions.

Other definitions relevant for MG

After action report (AAR) – The document describing the response to an incident and findings related to performance of the health system response during an incident.

Avian influenza (or avian flu/bird flu) – A highly contagious viral disease, with up to 100% mortality in domestic fowl, caused by influenza A virus subtypes H5 and H7. All types of birds are susceptible to the virus, but outbreaks occur most often in chickens and turkeys. The infection may be carried by migratory wild birds, which can carry the virus but show no signs of disease. Humans are only rarely affected.

Bioterrorism, deliberate event – The intentional use of micro-organisms, toxins, genetic material or substances derived from living organisms to produce death or disease in humans, animals, or plants.

Case – A person in the population identified as having a particular disease, health disorder, or condition under surveillance or investigation.

Case definition – The criteria that describe a case (i.e. patient) under surveillance or investigation.
The IHR (2005) contain case definitions for four diseases, cases of which must be notified to WHO. These are: smallpox; poliomyelitis due to wild–type poliovirus; human influenza caused by a new subtype; and severe acute respiratory syndrome (SARS). Other events are also notifiable to WHO under specific circumstances.

CBRN (chemical, biological or radionuclear) event – The intentional use of microorganisms, toxins, genetic material, radioactive material or chemical substances to produce death or disease in humans, animals, or plants.

Cohort – a group of individuals with a common defining characteristic (e.g. exposure to a disease). The term does not imply spatial grouping.

Cohorting – grouping individuals into a cohort.

Contagious (disease) – A disease that is easily spread from one person to another by contact with the infectious agent. Contact may be through body fluids, droplets (liquid particles made by coughing or sneezing), contaminated objects such as food utensils, airborne inhalation, vector–borne contact, or ingestion of water or food. The IHR (2005) define "disease" very broadly, as "an illness or medical condition, irrespective of origin or source, that presents or could present significant harm to humans"; this term hence covers diseases of biological, chemical or radio–nuclear origin.

Crisis – an unstable or crucial time or state of affairs in which a decisive change is impending, especially one where a highly undesirable outcome is distinctly possible.

Disaster – A serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses that exceed the ability of the affected community or society to cope using its own resources.

Disaster risk reduction – The planning, approaches and measures undertaken and instituted in order to minimize vulnerabilities and disaster risks throughout a society, in order to avoid (disaster prevention) or limit (mitigation and preparedness) the adverse impacts of hazards, within the broad context of sustainable development.

Dispensing – preparing and distributing medicines.

Early warning systems – these include three primary elements:

1. Forecasting impending events
2. Processing and dissemination of warnings to political authorities and populations
3. Undertaking appropriate and timely action.

Emergency – A sudden occurrence demanding immediate action, which may arise as a result of epidemics, natural or technological catastrophes, civil strife, or other human–generated causes.

Emergency management – A range of measures to manage risks to communities and the environment that are caused by emergencies.

Emergency operations centre – The facility from which a jurisdiction or agency coordinates its response to major emergencies/disasters.

Epidemiologist – A professional skilled in disease investigation. Epidemiologists design and conduct epidemiological studies, analyze data to detect patterns and trends in disease, establish and maintain surveillance systems, monitor health status, and evaluate the performance and cost-effectiveness of public health programme.

Epidemiology – The study of the distribution and determinants of disease & other adverse health factors in human populations, and analysis by time, place and person.

Event management group (EMG) – In the context of WHO**,** a group led by and composed of experts in event management from WHO member states, regional office(s), and WHO headquarters.

Event management system (EMS) – In the context of WHO, the central electronic repository for IHR event-related information, including events that fall under the jurisdiction of the International Health Regulations (2005) (or "IHR (2005)" – for more information, see below).

Event manager – In the context of WHO, the authority designated by the EPR Director or ARO Coordinator who has overall responsibility for ensuring the required event management functions are carried out.

Event medical care – The provision of preventive measures, definitive primary care, or hospital referral to persons attending or participating in mass gathering events.

Exercise (e.g. emergency planning exercise) – A scripted, scenario-based activity designed to evaluate a system's capacity to achieve overall and individual functional objectives, and to demonstrate its competencies for relevant response and recovery tasks. The purpose of exercise evaluation is to determine a valid indication of future system performance under certain conditions, and to identify potential system improvements.

Hazard – A potentially damaging physical event or phenomenon and/or human activity which may cause loss of life or injury, property damage, social and economic disruption, and/or environmental degradation.

Health alerts – Urgent messages from a public health agency to health officials that require immediate action or attention.

Herd immunity – The resistance of a group of people to invasion and spread of an infectious agent, based on the resistance to infection of a high proportion of individual members of the group. The resistance is a product of the number susceptible and the probability that those who are susceptible will come into contact with an infected person.

Incident – a situation occurring during a planned event that requires a response by the relevant authorities. Incidents may result in injury, illness, death, or the need for law enforcement or other response agency action.

Incident command system – The direction and control scheme used by first response and other agencies to manage emergencies.

International Health Regulations 2005 ("IHR (2005)" or "Regulations") – The international legal agreement, binding upon 194 states parties throughout the world, to prevent, control and respond to international spread of disease.

Isolation – A state of separation between persons or groups deliberately imposed in order to prevent the spread of disease (usually applied to those who have developed the disease).

Joint information centre – A central point of contact for all news media near the scene of a large-scale disaster.

Mitigation – Structural and non-structural measures undertaken to limit the adverse impacts of natural, human-generated or technological hazards.

National IHR focal point (NFP) – The national centre or agency, designated by each state party to the IHR (2005), that must be accessible at all times for communications with WHO IHR contact points concerning the Regulations.

Nongovernmental organization (NGO) – An entity with an association that is based on interests of its members, individuals or institutions and that is not created by a government, but which may work co-operatively with governments.

Outbreak – Used synonymously with "epidemic", usually to indicate localized as opposed to generalized epidemics.

Pandemic – A worldwide outbreak of a disease in humans in numbers clearly in excess of normal.

Preparedness (e.g. for outbreak, crisis, disaster) – Arrangements to ensure that, should a situation occur, all necessary resources (e.g. financial, human, technical), expertise and services that may be required to cope with the effects of that situation can be mobilized rapidly and deployed (includes the issuing of effective early warnings and the temporary removal of people and property from threatened locations).

Prevention – Activities to provide outright avoidance of the adverse impact of hazards and the means to minimize related environmental, technological and biological disasters.

Prophylactic – A medical procedure or practice that prevents or protects against a disease or condition (e.g. vaccines, drugs).

Public health security – The activities required, both proactive and reactive, to minimize vulnerability to one or more cases of communicable disease endangering the collective health of populations.

Quarantine – The compulsory physical separation, including restriction of movement, of populations or groups of healthy people who have been exposed to a contagious disease. This may include efforts to segregate these persons within specified geographic areas.

Recovery – The coordinated process of supporting disaster–affected communities in reconstructing their physical infrastructure, and restoration of emotional, social, economic and physical well-being.

Resilience – The capacity to recover successfully from loss and damage.

Response – Actions taken before, during and immediately after the occurrence of a disaster, to ensure that the effects of that disaster are minimized and people are given immediate relief and support.

Risk – The probability of harmful consequences or expected losses (deaths, injuries, damage to property and livelihoods, disruption of economic activity and environmental damage, etc.) resulting from interactions between natural or human-induced hazards and vulnerable conditions. Risk = hazard x vulnerability)

Risk assessment – The process used to determine risk management priorities by evaluating and comparing given levels of risk to pre-determined standards, target risk levels, or other criteria.

Risk communication – The interactive exchange of information and opinions concerning hazards and risks and risk-related factors.

Risk management – A systematic approach to identifying, addressing and reducing risks of all kinds associated with hazards and human activities. Risk management is divided into risk assessment, risk communications and risk preparedness/response.

Risk preparedness – Planning, organising and implementing activities to prepare for or mitigate a risk.

Risk response – Directing and managing the activities involved in responding to a risk.

Sentinel surveillance – A surveillance system in which a pre-arranged sample of reporting sources agrees to report all cases of one or more notifiable conditions.

Strategic national stockpile – A national cache of drugs, vaccines, and supplies (e.g. stockpiles of anthrax vaccine in the USA) that can be deployed to areas struck by disasters, including bioterrorism.

Surge capacity – Ability of institutions such as clinics, hospitals, or public health laboratories to respond to increased demand for their services during a public health emergency.

Surveillance – The systematic ongoing collection, collation, and analysis of data, and the timely dissemination of information to those who need to know it in order for action to be taken.

Syndromic surveillance – The use of health–related data based on clinical observations rather than laboratory confirmation of diagnoses. Such data can be used to signal sufficient probability of a case or outbreak to warrant further public health response.

Vulnerability – The degree to which a community is susceptible to hazards. This is the result of physical, social, economic and environmental factors.

Weapons of mass destruction (WMD) – Generally refers to chemical, nuclear, or biological agents or explosive devices that could be employed against civilian populations, and which are capable of causing mass casualties.

WHO IHR contact point (CP) – The unit within each of the six WHO Regional Offices that is accessible at all times for IHR–related communications with National IHR focal points. The IHR contact point contact information, including email, telephone and fax details, for each WHO IHR CP has been

provided to all of the states parties to the IHR (2005), and is available from WHO and on the WHO IHR event information site.

Zoonoses – Diseases that are transferable from animals to humans.

Acronyms and abbreviations used in this document

A&E	Hospital Accident & Emergency department (emergency room)
AAR	After Action Report
ARO	Alert and Response Operations (WHO)
BT	Bioterrorism
BSL	Biosafety Level
CBR	Chemical, Biological and/or Radiological
CBRN	Chemical, Biological, Radiological and Nuclear. This term is most consistently used in the context of deliberate release of such agents
CBRNE	As above, including E for explosives (and incendiary devices)
CD	Communicable Disease
CDD	Communicable Diseases Director
CDC	Centres for Disease Control and Prevention, USA
CDDCONOPS	Communicable Disease Director Concept of Operations
CP	Contact Point
DE	Deliberate Event
DPHO	District Public Health Officer
EC	European Commission
EDL	Essential Drug List
EH	Environmental Health
EIS	Epidemic Intelligence Service (CDC)
EOC	Emergency Operations Centre
EMeS	Emergency Medical Services
EMG	Event Management Group
EMS	Event Management System or Emergency Medical Services
EPIET	European Project on Intervention Epidemiology Training – a project co-financed by the European Commission
EPR	Epidemic Preparedness and Response (a WHO department)
ER	Emergency Room
EU	European Union
FD	Fire Department
FIMS	Field Investigation Management System
GOARN	Global Outbreak Alert and Response Network
HAN	Health Alert Network
HAV	Hepatitis A Virus
HAZMAT	Hazardous Material
HBV	Hepatitis B Virus
HCW	Healthcare Worker
HIV	Human Immunodeficiency Virus
HQ	Headquarters
IAA	Interagency Agreement
IC	Infection Control
ICom	Incident Commander

ICS	Incident Command System
ID	Infectious Diseases
IHR	International Health Regulations (2005)
ILI	Influenza-like Illness
IOC	International Olympic Committee
JOC	Joint Operation Centre
MCE	Mass Casualty Event
MCI	Mass Casualty Incident
MG	Mass Gathering
MMR	Mumps, Measles, Rubella (vaccine)
MoD	Ministry of Defence
MoH	Ministry of Health
MOU	Memorandum of Understanding
MSF	Médecins Sans Frontières (Doctors Without Borders, an NGO)
NATO	North Atlantic Treaty Organization
NGO	Non-Governmental Organization
NFP	National Focal Point
OG	Olympic Games
PH	Public Health
PCR	Polymerase Chain Reaction – refers to a molecular biology test used in identifying biological agents
PHO	Public Health Officer or Public Health Official
PPE	Personal Protective Equipment
PSS	Psychological Support Services
RBC	Radiological, Biological and Chemical
RT-PCR	Real Time-PCR – refers to an enhanced diagnostic method for biological agents
SARS	Severe Acute Respiratory Syndrome
SLE	Security and Law Enforcement
SNS	Strategic National Stockpile
SOP	Standard Operating Procedure
SP	State Party (to the IHR)
TA	Technical Assistance
UC	Unified Command
UN	United Nations
UK	United Kingdom
USA	United States of America
WHO	World Health Organisation
WMD	Weapons of Mass Destruction
WR	WHO Representative (in a country)
WRO	Office of the WHO Representative

1. Introduction

Mass gatherings (MGs) are events attended by a sufficient number of people to strain the planning and response resources of a community, state or nation. The decision to host an MG will usually be made well in advance by the key agencies involved, in order to make effective prior planning possible. Such planning is of paramount importance, and addressing the need to prevent and respond to communicable disease (CD) ranks among its most important aspects. Planning and preparing public health systems and services for managing an MG is a complex procedure: advanced risk assessment and system enhancement are critical to identifying potential public health risks, both natural and manmade, and to preventing, minimizing and responding to public health emergencies.

Even when a host community's existing health and other support services are adequate to deal with the regular disease burden affecting its own population (including occasional outbreaks), the influx of large numbers of people caused by MGs, together with the infrastructural changes needed to support them, can place a severe strain on such services, compromising their ability to detect a developing problem and carry out an effective response. If the gathering draws visitors from different nations, regions and cultures, the potential for increased risk of importation of infectious diseases creates additional challenges – as do many of the issues inherent in dealing with a suddenly increased, and vastly more culturally and linguistically diverse, population.

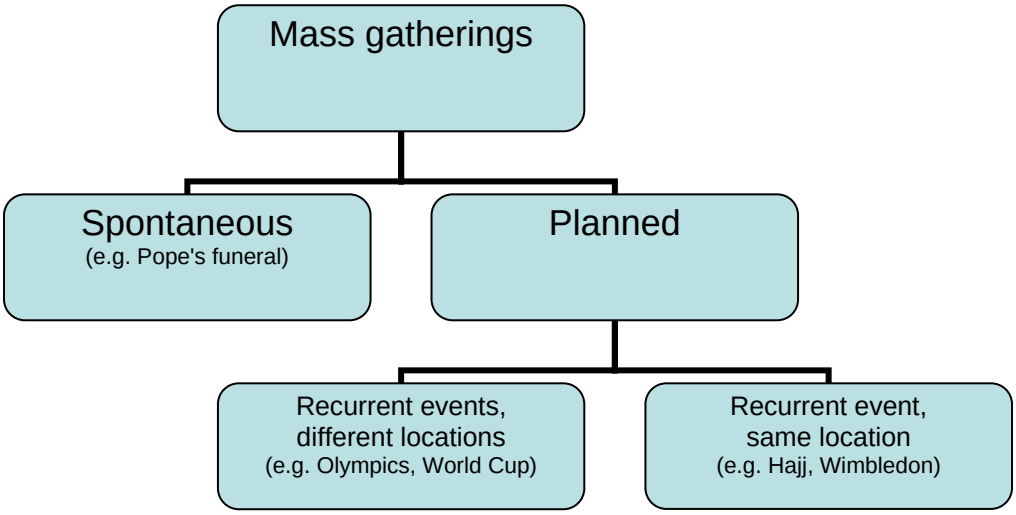
The Epidemic and Pandemic Alert and Response department (EPR) of the World Health Organization (WHO) has supported several MGs in the past, and regularly receives numerous requests for technical support from countries organizing large MGs (such as the Olympic Games, the Hajj, World Youth Days, and so on). In order to streamline these requests, as well as to provide guidance to all those involved in the health aspects of planning for MGs (not just those directly employed in the health services), EPR undertook the development of this document. The document was conceived as a tool to guide those responsible for the health needs of individuals attending an MG, and to help them plan their actions. Its focus is outbreak alert and response, but there are many other programmes and agencies, within and outside public health, that may be impacted by the factors associated with MGs. The principles and practices outlined in the document may also provide valuable initial guidance to those involved in planning other aspects of the management of MGs.

Development of the guidelines

Initial development of this document occurred during the second half of 2007. A detailed draft was produced early in 2008, and a small working group (Dr Maurizio Barbeschi, Ms Julie Graham, Dr Tim Healing and Dr Michel Hopmeier) met in Oxford, UK in March 2008 to develop the concept further. The newly expanded version of the document required broader input from a wide variety of specialists: as a result, an international editorial board was established, and a major technical workshop, aimed at reviewing the subject matter as well as the existing document, was planned. The members of the editorial board (listed in the Acknowledgements) were chosen in order to cover the range of specializations included in the guideline, and because of their experience of planning for and participating in health control in MGs. They included experts in such diverse areas as bio-surveillance, preparedness and response; mass gatherings; communicable diseases; public health; medicine; epidemiology; and pharmacology.

A technical workshop was held at WHO HQ in Geneva in May 2008 to discuss the subject. Over fifty participants (listed in the Acknowledgements) attended, from over thirty countries, and the Workshop was chaired by Dr Agis Tsouros (WHO/EURO), leader of WHO support to the 2004 Athens Olympics.

The workshop report includes several examples from previous MGs as practical illustrations of the technical advice compiled in this document. The editorial board met before the workshop to discuss the draft document and identify goals for the main meeting. Members of the board were active participants in the meeting (acting as facilitators for the various technical sections), and after the meeting the board met again to review outcomes and finalize the development of the Guidelines. It was agreed that the guidance document ought to be relevant to different types of MGs, as summarized in the diagram below:



The document will be reviewed by the editorial board after **five years**, in June 2013, taking into account any feedback that has been received in the interim. The structure and content of the document will be reassessed at that time, and any modifications required will be carried out by the editorial board in consultation with other relevant experts. A revised version of the document will then be issued.

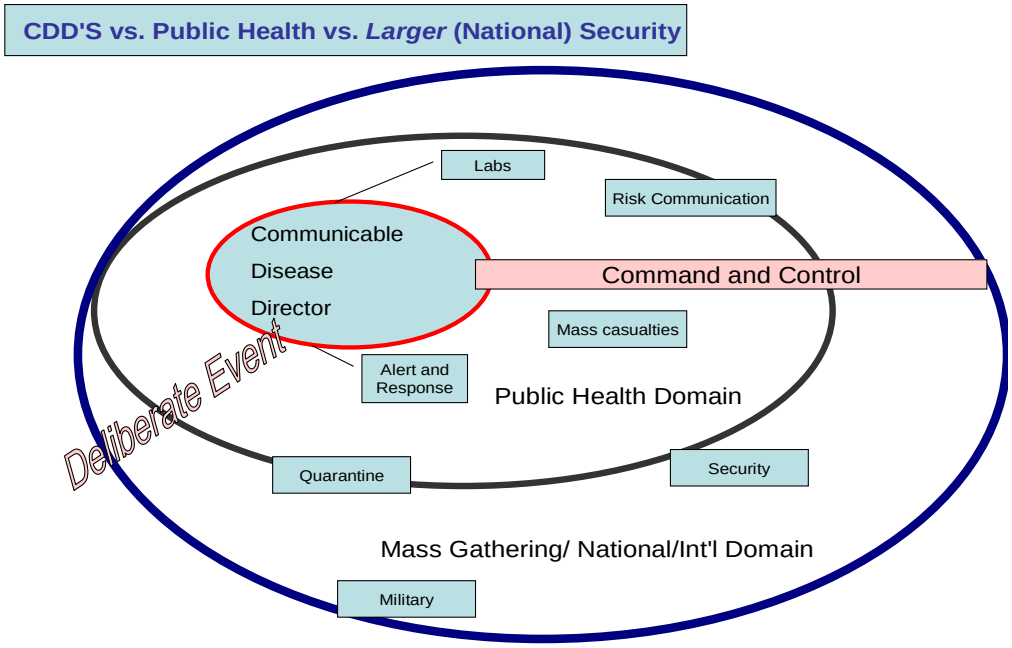
2. About this document

2.1 Aim

This document presents the key issues to be considered in the process of setting up and implementing communicable disease alert, response and operation plans for mass gatherings. It sets out methods for assessing the needs of the MG, determining the ability of existing systems to meet those needs, and modifying and strengthening those systems where required. It provides advice about prevention, detection and management of outbreaks of communicable disease, as well as the integration of the planning process into the full range of public health activities that need to be undertaken during MGs. It addresses the many different types of MG, and deals with scenarios in which varying capacities of services are available to meet resultant public health demands.

This document has been developed primarily for communicable disease directors (CDDs) and other public health professionals who are responsible for the management of communicable disease alert and response, as well as key policy makers, planners and executive personnel. In addition to those in the health sector, there are many outside authorities involved in contributing to healthy outcomes at MGs, who will also find this document useful (see Figure 1, below). It is further anticipated that it will be a valuable resource for event promoters and managers, emergency service personnel, government bodies, and any organisations or individuals who contribute to the organisation of mass gatherings. Wide distribution should be encouraged, providing it is understood that while many factors influence the wellbeing of those attending MGs, the detailed contents of this document are directed principally at managing the **communicable disease** issues that influence health and safety at an MG.

Figure 1. Areas of responsibility: communicable disease directors (CDDs) vs. public health vs. larger (national) security



2.2 Applicability and scope

This document describes issues specifically relevant to those planning the public health alert and response for communicable disease during an MG. However, there are many other programmes and agencies, within and outside public health, likely to be affected by the unique factors associated with an MG. Mass gatherings impact other response-related systems and agencies, like health care and environmental health systems, isolation and quarantine protocols, communications networks, and so on. These topics are touched upon in this document, and additional resources are suggested that should be relevant to them. Associated topics with a broader public health perspective, such as command and control hierarchies, security, and risk communications, are also covered.

The main topics are introduced in this section of the document, and their importance is outlined. They are then dealt with in more detail in subsequent chapters.

This document is designed to:

- Provide a framework for a hosting government or organization to assess its current public health capacities with respect to a mass gathering, and to determine whether enhancements of communicable disease and public health services are required
- Provide considerations to be taken into account when establishing plans and structures for managing incidents that may threaten health security
- Encourage CDDs and key policy- and decision-makers to consult with other agencies and organizations throughout the planning process for MGs
- Provide information relating to the roles of host governments, the WHO and other national and international bodies
- Ensure that the activities of those planning for mass gatherings are based on and meet the requirements of the IHR (2005) for enhancing global health security and preventing and responding to international spread of disease – which apply to many public health issues in the context of mass gatherings
- Provide planning resources to assist nations in improving health protection, preparedness planning, prevention, prompt detection, characterisation, and containment and control of health threats.

This document addresses a wide array of key considerations, irrespective of the size, nature and complexity of the mass gatherings in question. Therefore, depending on these factors, certain sections may have greater or lesser applicability. This document does not provide prescriptive recommendations for MGs, because of their diverse nature the different issues they pose, as well as the varying capacities of different services available to meet the increased public health needs they impose. Instead, it gives an overview of the topics to take into consideration, together with a wide range of resources that can provide the practical details needed to adapt systems for mass gatherings.

Member states intending to host mass gatherings should consult the IHR (2005), and must ensure that their planning activities align with the revised regulations.

This document draws on experiences from past MGs that suggest certain common critical factors and preconditions for success, as well as strategic, organizational, and tactical “lessons learned” that can be applied to future gatherings.

2.3 Context: integrated planning and response considerations

In most contexts, preparation for mass gatherings will probably require substantial investment and capacity building in the form of infrastructure development; institutional adaptation; extensive training; the advance testing of plans, procedures, systems and personnel; and the development of standard operating procedures (SOPs) for a range of potential threats.

The extent to which public health and other sectors may need to be altered or developed depends largely on the number of MG participants, the perceived risk or threat, and the resources available to support the needs of the participants and the identified health concerns. A reasonably accurate assessment of the number of participants is therefore an essential prerequisite to effective planning.

The potentially catastrophic consequences of an intentional act of bioterrorism means that this topic cannot be ignored and must be included in planning: some political pressure is to be expected to prepare for such risks. However, this topic should not dominate the process, in light of all of the other public health aspects of mass gatherings that need to be addressed in order to prepare for events that are statistically far more likely than bioterrorism.

Health services are generally designed to meet routine priorities and demands, and their built-in redundancies are usually fairly limited. Very large mass gatherings, whether international (such as the Olympic Games, the Hajj or the World Youth Day) or national, may require major strengthening of existing services and potentially the introduction of new or enhanced methods for managing disease and other public health risks (e.g. epidemiological and environmental health surveillance methods, SOPs, and establishment of a public health response command and coordination structure within and between public health sectors).

This document focuses in particular on the communicable disease aspects of mass gatherings, but these must be addressed within the context of overall public health preparedness. Those responsible for planning communicable disease control for the MG (especially CDDs) should engage with other public health partners early in the planning process. They must take into account the broader implications of their plans and potential overlapping of responsibility with other areas and authorities, and must likewise ensure that other relevant agencies involved in the planning process are aware of communicable disease issues and their implications.

It is also vital that agencies outside the realm of public health that are involved in the operation and management of an MG – such as healthcare, security and communications – know how to interface with public health services and resources. Early involvement of the CDD within the broader planning process will ensure that other participating disciplines understand the concerns and issues related to the public health and safety of participants, attendees and adjacent populations, and will help ensure that public health considerations are factored into the *entire* planning process instead of being brought in as an afterthought. Entering late into the planning process can prevent decisions from being made that might otherwise eliminate or reduce the impact of communicable diseases on MGs.

Local or national agencies responsible for managing communicable diseases that may occur during an MG need to assess the implications of the proposed MG in terms of infection and transmission risks, and to formulate plans to meet the needs identified during the risk assessment process. These plans should be in accordance with the IHR (2005) framework of legal rights and obligations, which are applicable to virtually all states. External agencies (e.g. WHO) are available to help host nations with these assessment and planning processes. As an example, the increased requirement for food resulting from the influx of people during an MG, with the attendant risks of food-borne disease, can impact many parts of the

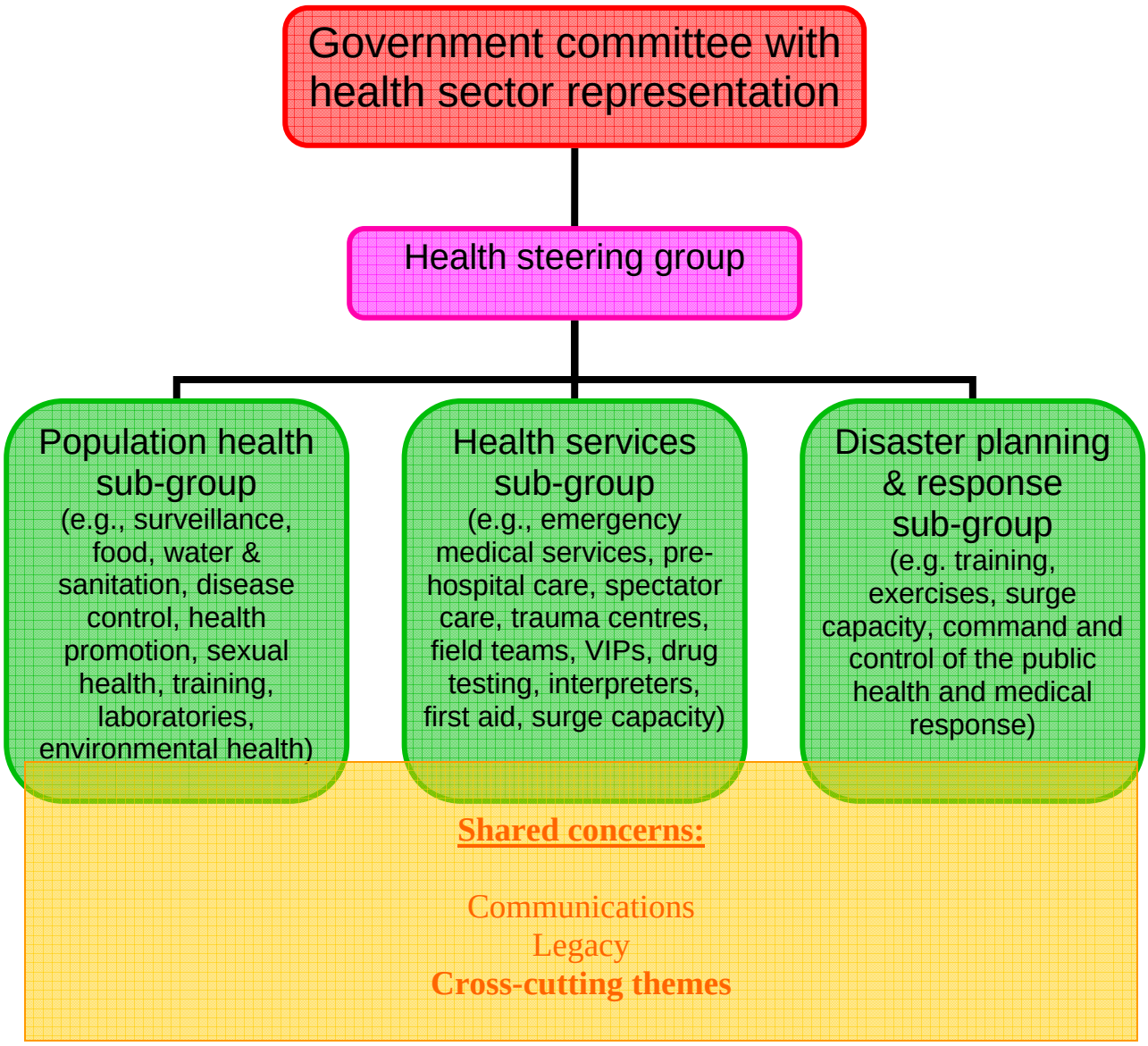
communicable disease control system and other agencies. These parts include environmental health (assessment and monitoring of food outlets); laboratories (food testing, analysis of samples from patients); surveillance systems (detection of health problems); primary, secondary and possibly tertiary care (treatment of patients); and the legal system (licensing of food outlets, prosecution of offenders).

Planning must begin well before the MG begins and, depending on the nation, will probably involve a range of government and non-government agencies at local, regional and national levels. Planning for a mass gathering should be undertaken within a recognized framework appropriate for the host country. An outline framework is suggested in Figure 2, below. The purpose of this framework is to ensure a common vision, consistent leadership, strategic direction, and technical coordination for policies, capacity building, and operations. In general, such a framework should include:

- Integration of health-related planning with the overall planning structures for the gathering
- Formation of a high-level planning committee or steering group that includes representation from the MG organizers, public health planners, security organizations, health care organizations, media and communications experts, and other local key stakeholders
- Development of several issue-specific planning committees that report to the high-level committee. Communicable disease prevention and control should be one such issue
- Cross-representation between the groups planning the health care response and those responsible for emergency preparedness and disaster planning
- Clear delineation of roles and responsibilities for persons to lead, and groups to contribute to plans, for each of the above issues
- Clear delineation of the command, control, coordination and communication structures necessary for managing the planning, operational, and evaluation phases of the MG.

It should be recognized that no one organization, or individual, is likely to be able to manage or influence all of the issues that will need to be addressed, and that responsibilities of different parts of the health system will overlap. Consequently, excellent communications and coordination mechanisms are needed to ensure that all stakeholders understand their respective responsibilities, and that appropriate command and control arrangements are in place to manage situations as they arise.

Figure 2: Outline framework for planning the communicable disease response for a mass gathering



This document considers the preparations for mass gatherings broadly along three themes: risk analysis, surveillance and response (see Figure 3, below).

Figure 3: Themes for preparedness for mass gatherings: risk assessment, surveillance and response

Risk assessment	What might happen?
Surveillance	How will we know when it happens?
Response	What will we do when it happens?

N.B. This document looks at communicable disease in a broad context, and the principles discussed should be applicable across many scenarios. However, it is inevitable that special considerations will apply to situations involving a possible deliberate use of pathogens to cause harm rather than a "natural" event. These considerations are described in the relevant sections of this document.

2.4 Legacy

A major potential benefit to the community or nation hosting the MG is that application of the processes described in this document can leave a lasting legacy in terms of improvements to health care systems and other social structures. Prioritizing resources in order to maximize the legacy of the MG for the future of the public health system should therefore be a key objective for organizers.

While some investments, activities and improvements may be beneficial only for the duration of the MG, many will provide a permanent benefit for the host country's public health infrastructure. As many investments will be costly, it is vital in assessing their value that decision makers understand the lasting benefits they will have. As an example, the public health efforts for the Athens 2004 Olympics left a legacy that has been valuable in subsequent efforts to handle emergencies, including using the coordinating centre for avian influenza incidents, heat waves, and situations involving mass casualties.

2.5 Overview of risk assessment

2.5.1 Risk assessment at MG: strategic and case-based

Risk assessment is a continuous process that should occur throughout the period leading up to the MG and during the MG itself. It should include ongoing assessment of how the public health system, the health care system and the broader community will cope or are coping with increases in communicable diseases or disease risk related to the MG. Risk assessment for communicable diseases should be both strategic and case-based; each approach is described below.

Strategic risk assessment helps public health planners, and others, identify health risks and determine realistic goals for reducing exposures, in order to reduce or eliminate public health threats. Mass gatherings may cause an increase in the level of existing risks, or they may pose entirely new risks. The

first step in planning the alert and response operations that may be required during MGs is the identification of these risks.

The risk from communicable diseases in (a) the host nation, (b) nations bordering the host nation, and (c) home nations of participants should be identified and assessed in relation to how the MG will affect the probability of these diseases occurring and spreading. Communicable disease risk assessment must also include the output of national and/or international security threat assessments conducted for the mass gathering. Public health needs will be determined on the basis of the results of the strategic risk assessment for the MG. If the strategic risk assessment is properly done, and the information put to good use, it can support the development of a strong legacy after the MG.

In addition to strategic risk assessment, **case-based rapid risk assessment** will be required during mass gatherings, if a significant health event is detected, from the initial alert throughout the duration of response. If an outbreak occurs, and once its aetiology is known, further refinement of the risk assessment may be required.

The exact process of risk assessment and risk management is determined by the context of the MG. Attention to the following factors has been proven valuable in assessing risks/outbreaks during previous MG:

- Identified communicable disease risks
- Historical case data
    - Routine: year-round
    - Routine: seasonal
- Risk of importation of infectious agents
- Historical outbreak data
- Medical intelligence, international data reviews
- Relevant animal data (epizootics with human cases)
- Evaluation of event for communicable disease risk factors
- Identification of population and environmental risk factors at the MG (e.g. good access or otherwise to health services, population movement, displacement or overcrowding, vaccination coverage, food and water quality, and vectors)
- Identification of bioterrorism risks, if any (coordinate with law, security and/or military)
- Prioritization of healthcare needs based on information from venue/community needs assessments
- Provision of decision-makers with objective information to guide prevention, alert and response to disease.

WHO assesses the risks posed by communicable diseases events against five benchmarks:

1. Outbreak with an unexpectedly high mortality or morbidity
2. Outbreak with potential international repercussions
3. Potential or actual international disease spread
4. Interference with international travel or trade
5. Outbreak in which international assistance is likely to be needed for disease control.

2.6 Role of health promotion and prevention

Health promotion – and particularly the social mobilization aspect of health promotion – has an important role to play in communicable disease control, by involving the public, public health authorities and health care practitioners in the decisions and actions necessary to improve health outcomes. The inclusion of these and other stakeholders allows for multiple levels of society to be involved in preparing for and responding to communicable diseases, and the same is true for CD events that occur during mass gatherings. In order for social mobilisation to be most effective, however, these same stakeholders must be involved in the risk assessment and risk communication processes.

Some public health risks will be easily identified in the risk assessment process prior to the event. Proactive event organizers working in collaboration with public health authorities have the potential to implement interventions and communications tools that will have positive health outcomes. Training and education can be directed at conveyance, transportation, food preparation, and accommodation providers. Special precautions may be needed to reduce the likelihood for transmission of communicable diseases. For specific diseases, additional isolation requirements may be required.

Considerations for heath promotion and prevention activities

1. Identify, through risk assessment and historic surveillance, the most probable public health and communicable disease threats
2. Develop appropriate health promotion and prevention education messages and tools
3. Work with event organizers to promote and make available health information in event information packages for participants or visitors
4. Identify recommended, but not prescriptive, travel health recommendations – including for immunizations, safe practices (regarding sex, sharing water bottles, etc.), hand washing, cough etiquette, etc.
5. Offer practical advice on how to access medical assessment or services in the event of illness, and specific directions for doing so (e.g. call first before visiting hospitals, etc.)
6. Establish, and advertise the availability of, a toll-free health information line with interpretation capacity
7. Consider utilizing mobile public health intervention/response teams throughout the duration of the event (similar to the US National Disaster Medical System initiative for the Salt Lake City Winter Olympics in 2002)
8. Produce educational tools in multiple languages as required
9. Utilize multiple approaches for risk communication, including use of the Internet – and link online risk communication information to the main event website.

2.7 International health regulations (2005), or IHR (2005)

Also known as IHR (2005), the International health regulations 2005 are legally binding worldwide. Their scope is quite broad, including international public health risks/events which may be biological, chemical or radio-nuclear in origin, and which may be naturally-occurring, accidental, or deliberately caused. The IHR (2005) provide many rights and obligations for States that are potentially relevant in the context of mass gatherings. These include:

- Obligations for notification or reporting to WHO of key outbreaks and other public health events
- Obligations to verify these events upon request from WHO

- Rules on application of health measures to international travellers, trade and transportation
- Obligations for maintenance or development of core public health capacities for domestic surveillance, assessment and response concerning public health risks and events.

The IHR (2005) also mandate a key role for WHO in the surveillance and management of public health events with potential international consequences[2].

[2] For the full texts of the IHR (2005) in the six official language versions and related materials, see <http://www.who.int/csr/ihr/wha_58_3/en/>

3. Risk assessment and management

3.1. The need for risk assessment

Thorough risk assessment allows planners to reduce the risk of communicable disease outbreaks associated with an MG. A risk assessment involves the identification of communicable diseases that could pose a risk to the gathering, assessment of their likelihood of occurring, and assessment of the impact they could have on MG participants and the host community. Once these risks have been assessed, plans for risk management and risk communication should be developed.

3.2. Risks and risk assessment

Risk is mainly a function of two variables: the probability of an event occurring, and the effects of that event. In an MG the risks may be amplified by a range of factors, including the high visibility of the event, the fact that it occurs over a defined time and at defined locations, the wide range of visitors, participants (e.g. athletes) and VIPs, and the fact that routine surveillance systems and clinical and public health services will be stretched by large numbers of attendees involved in extraordinary activities.

Hazard identification, in this context, is the process of identifying known or potential communicable disease agents, their presence in a host nation or border nations, or their potential or actual presence as imports.

Vulnerability analysis, in this context, is the process of reviewing threats as they relate to risk factors and vulnerable populations associated with the MG (e.g. through analysis of population demographics, crowding, environmental factors, weather, etc.).

Risk assessment in preparation for a mass gathering includes the evaluation of the potential public health impacts of the MG – e.g., potential for infection, disease, death, and chronic illness or injury – and is an essential part of planning. It will indicate both **what** and **how much** intervention is needed, and will help in prioritizing various aspects of planning. It is an iterative process that continues from before the beginning of an event until after its end.

As the event progresses, further refinement of the risk assessment may be required. This process of refinement is additionally valuable in assessing and monitoring the development of specific incidents (for example an outbreak of disease) as they occur, and continued assessment of risk throughout is essential in ensuring appropriate responses. Risks should be assessed in the light of a variety of factors, including numbers and types of visitors and participants. For example, different kinds of mass gatherings may attract certain types of spectators, who may require special considerations. For example:

- Certain sporting events or rock concerts may pose particular problems with drug and alcohol abuse, underage drinking and aggressive behaviour
- Religious mass gatherings may attract a significant number of ill and infirm people, which may increase the need for on-site medical care
- Events specially for or including large numbers of senior citizens may require higher levels of health services
- Political or cultural events may require special arrangements, including the provision of interpreter services, extraordinary security measures, special food services and multilingual signposting, brochures and announcements. Political events can also spark violence

- Events that draw large international crowds may lead to issues for certain individuals with such factors as climate acclimatization, leading to a variety of ailments for those not acclimatised. These may include altitude sickness, respiratory problems in polluted areas, or exposure and dehydration in conditions of extreme heat or cold.

An effective alert and response operation begins with the identification of MG-related health risks. Strategic risk assessment is used in MG to organize, structure, and compile data intended to identify existing risks, anticipate potential problems, establish priorities, and provide the basis for enacting policy and/or taking corrective measures. The process consists of the evaluation of public health impacts, and the probability of their occurring.

The following are some key risk assessment considerations when planning for MGs:

- Identifying communicable disease risks (endemic and imported, multiple sources, relevance to IHR 2005, etc.)
- Evaluating the MG for communicable disease risk factors
- Identifying population-related, visitor-related and environmental risk factors
- Identifying bioterrorism risks, if any, and coordinate surveillance and response activities with law enforcement, security and/or the military
- Evaluating, planning and prioritising healthcare needs for the mass gathering, such as: first line response (venue medical services, emergency medical technicians, emergency physicians and nurses, etc.); provision of sufficient medical facilities (hospital beds, etc.); and provision of resources (such as medicines, personnel, diagnostics, mass prophylaxis, etc.)
- Evaluating systems to address the potential negative impacts of a prolonged heightened state of alert (false alarms, fatigue, and surge capacity).

3.3. General principles of risk management

A risk assessment should follow a structured approach. Decisions on acceptable levels of risk should be determined primarily by human health considerations. Other factors (e.g. economic costs, benefits, technical feasibility and societal preferences) should also be considered, particularly when determining measures to be taken. The risk management process should be transparent, including identification and systematic documentation of all elements of the process, including decision-making. Risk assessment policy should be determined clearly in advance of the assessment: functional separation of risk assessment and risk management helps to ensure the scientific integrity of the risk assessment process and reduces any conflict of interest between risk assessment and risk management priorities. However, it is recognized that risk analysis is an iterative process, and interactions between risk managers and risk assessors are essential for practical application.

The risk estimate should, wherever possible, include a numerical expression of uncertainty, and this must be conveyed to risk managers in a readily understandable form so that the full implications of the range of uncertainty of risk events can be included in decision-making. For example, if the risk estimate that a particular event will occur is highly uncertain, risk management decisions might be more conservative than in the case of an event deemed to be very likely.

Ongoing reciprocal communication between all interested parties is an integral part of the risk management process. Risk communication is more than the dissemination of information: one major function of such communication is the incorporation into decision-making of information and opinions essential to effective risk management.

3.4 Elements of risk management

Risk assessment is part of a risk management approach. There are seven main steps to risk management, all of which are applicable to planning for an MG:

1. **Communicate and consult** with internal and external stakeholders
2. **Establish the context** of the process
3. **Identify risks**, including where, when, why and how events could prevent, degrade, delay or enhance successful management of risk
4. **Analyse risks** by identifying and evaluating existing controls and the likelihood and potential consequences of events
5. **Evaluate risks**, balancing potential benefits and adverse outcomes
6. **Treat risks**
7. **Monitor and review** the effectiveness of the risk management process.

In the context of planning for mass gatherings, some elements of the management process contain essential considerations:

Communicating and consulting

- Consultation with a range of stakeholders during the planning stages, through informal discussions and established committees, can assist in identification and management of risk
- Consultation should involve MG organisers, public health experts at national, regional and local levels, clinicians, laboratory scientists, and security specialists.

Establishing the context

This should involve a clear understanding of:

- How the mass gathering will be run
- How many people will attend and who they are likely to be
- The nature of the mass gathering (types of activities, level of audience involvement, etc.)
- The likely immunity of the attendees and participants to potential infections, and their level of knowledge about infectious diseases and immunities
- The likely crowding and ventilation at venues and accommodation-sites
- The safety of food and water available to participants
- The season and the likely weather at the time
- Access to hand-washing facilities, showers and toilets
- Access to medical services
- How the healthcare system – including the capacity of emergency medical technicians, emergency physicians and nurses, and medical facilities (drugs and diagnostic facilities) – will cope with any increases in communicable diseases related to the MG
- The impact on the capacity of the broader community should an outbreak occur that incapacitates people involved in public services, law enforcement, and public safety.

3.5. The risk management process

Risk identification

Risk identification includes consideration of:

- Experiences during previous similar MGs, both within the country and elsewhere
- The incidence of communicable diseases (especially those with potential to cause outbreaks) within the host countries and the countries from which MG participants will come
- The threat of terrorism
- Factors at the gathering that may facilitate the spread of communicable disease, such as crowding, lack of sufficient access to hygiene facilities, and/or the presence of disease vectors
- The consequences that a communicable disease outbreak may have on participants and hosts.

Certain questions must be asked in order to identify risks. These can be broken down into a number of categories:

1) Questions to establish context

- What type of MG is it, and how many people will attend?
- What will be their likely immunity to infection?
- What will be their likely level of knowledge about prevention?
- Will there be crowding at the accommodation-sites?
- Will there be crowding at the venues?
- How will food be provided, and are there food safety concerns?
- Will the available water be safe to drink?
- What will access to hand-washing facilities, showers and toilets be like for participants?
- Will participants be able to access medical services?
- How do the security agencies rate the threat of terrorism related to the gathering?
- Will the healthcare system will be able to cope with any increases in communicable diseases related to the mass gathering?

2) Questions to identify risks

- What infections are endemic and/or epidemic in the local community?
- What infections are endemic and/or epidemic in communities from which participants will come?
- Will seasonal conditions or weather affect the incidence of these infections?
- What is the security sector's assessment of the risk to the MG from bioterrorism?
- What have been the experiences of previous such MGs in this country?
- What has been the experience of similar MGs in other areas of the world?

Risk analysis

To develop an understanding of these risks, planners should assess the risks as a function of their likelihood of occurring, their potential consequences, and the possible measures that could be taken to control them, based on an understanding of existing surveillance data from the host country and countries involved in the gathering, the literature, past experiences, and expert judgment. It may be helpful to draw up a table that presents the risk analysis using the following headings:

- Description of risk
- Likelihood
- Consequences
- Adequacy of existing controls
- Risk level
- Risk priority
- Effect of uncertainty
- Treatment.

Questions that could be asked to help analyse risk include the following:

- Will the expected conditions at the MG increase the likelihood of communicable diseases occurring – and, if so, which ones?
- What will be the consequences if these diseases occur on the health of participants and their hosts, on the general community, on health care provision, and on the mass gathering itself?
- Will existing control measures be able to cope with these consequences?

Risk evaluation

Risk evaluation is done by considering risk levels in the context of the planned MG, to help determine whether the risk requires a specific response (depending on whether risk levels are intolerable, tolerable without action, or at some point in between), the priority of that response, and whether or not further activities are required.

Questions to help evaluate risks include the following:

- What is the overall assessment of the level of risk for each disease?
- Which conditions should be given priority for prevention, surveillance and treatment?
- What if some of the assumptions in the risk assessment are wrong – what impact would there be if some of the assumptions were varied?

Risk treatment

Based on the risk evaluation, options should be determined for treating each risk. These could include initiating new surveillance programmes for early identification of disease, implementing a range of special prevention programmes to reduce the risk of food-borne, water-borne, airborne and person-to-person spread of diseases, and developing plans for immediate acquisition of additional human and material resources should a crisis occur.

Questions to be asked include the following:

- What avenues exist to promote good preventive health action before the mass gathering?
- Will it be useful to provide participants with health promotion materials advocating immunisation before the MG?
- How can risks from crowding, limited access to sanitation or infection control be addressed?
- What access will participants have to early health care intervention?
- Can participants be isolated if infectious, or quarantined if exposed to infection?

- Is the clinical care system able to prepare for worst-case scenarios?

Monitoring and review

In the period of time leading up to the MG and throughout the gathering itself, risk assessments and treatments should be reviewed regularly to determine their appropriateness.

Questions that will assist the process of monitoring and review include the following:

- How will the risks be monitored and reviewed in the lead up to an MG, during the MG, and after the MG?
- How will the public health impact of the mass gathering be evaluated and reported for the benefit of future planning?

3.6. WHO risk assessment during an outbreak

WHO may be asked to provide assistance to countries affected by outbreaks during an MG. WHO assesses the risks posed by communicable diseases events against the following five benchmarks:

1. There is an unexpectedly high mortality or morbidity
2. There are potential international repercussions
3. There is the potential for international disease spread
4. There is interference with international travel or trade
5. International assistance is likely to be needed for disease control.

The following actions may be considered by WHO after completing the initial risk assessment of a (verified) outbreak:

- **Ignore:** the event is not, and will not be, of international public health importance
- **Monitor:** the event is currently of no international public health importance, but it requires continuous assessment
- **Disseminate information** on:
    - The secure WHO IHR event information website – with urgent event-related information for IHR (2005) states parties (SPs) and relevant international organizations, including the information necessary for them to respond to a public health risk
    - WHO websites (e.g. *Disease Outbreak News*) – if the event is of interest/relevance to the general public and there is no conflict with confidentiality issues
    - GOARN web site – if network partners need to know to prepare for a response
    - Offer assistance to affected SPs
    - Collaborate or coordinate assistance to SPs, as appropriate
- **Advise that an event be considered by WHO for further review,** as one which has the potential to constitute a public health emergency of international concern, as determined by the WHO Director-General according to the IHR (2005).

3.7. Examples of risk assessments

3.7.1. Risk of measles at the Sydney 2000 Olympic Games

During the 2000 Sydney Olympic Games, planners assessed various hazards, including that of the spread of measles. Though uncommon in Australia, measles was endemic in many developing countries, and some of the people coming to the Olympics were travelling from these countries. However, the vulnerability of the Australian population to measles was determined to be relatively low, for three main reasons. Firstly, the Australian government had conducted a school-based immunization programme in 1998; secondly, many of the people gathering for the Olympics were from relatively wealthy countries where measles was not a major health issue; and thirdly, many of these people were in an age group that was likely already to have developed immunity. The risk of a measles outbreak at the Sydney Olympics was therefore assessed as being elevated, but at a moderate level.

To manage this risk, planners attempted to increase immunisation levels among participants in the Games, and initiated enhanced surveillance through emergency departments, Olympic-specific clinics, and laboratories, with the aim of identifying suspected cases early so that control measures could be implemented rapidly. No outbreak of measles occurred during the Sydney 2000 Olympic and Paralympics Games.

3.7.2. Serogroup A meningococcal disease at the Hajj

The Hajj, an annual religious celebration, attracts millions of pilgrims. During the 1980s, a number of large outbreaks of serogroup A meningococcal disease were identified among Hajj pilgrims. Planners assessed the risk of outbreaks in subsequent Hajj gatherings to be substantial, since few pilgrims would have immunity to this disease, and most would remain vulnerable during the crowded conditions associated with the Hajj.

Planners managed the risk of serogroup A meningococcal disease by requiring all pilgrims to subsequent Hajj celebrations to receive vaccination against meningococcal disease, and for pilgrims from sub-Saharan Africa to take clearance antibiotics. Large outbreaks of serogroup A meningococcal disease were averted, although serogroup W135 meningococcal disease did emerge in subsequent years.

3.8. The risk of a deliberate event during an MG (bioterrorism, CBRN)

Whilst the consequences of an intentional act of bioterrorism would be of the utmost importance, the risk of such an event ranks low amongst the many other risks to health at an MG. The potentially catastrophic consequences of such acts means that they cannot be ignored, and they must be included in planning; however, in light of all of the other public health aspects of mass gatherings, and the range of other threats that are statistically more likely, they should not be allowed to dominate the process.

The role of the host nation in planning for a deliberate act will vary depending on whether the MG is of long or short duration, and on whether planning is for an incident where the agent used is fast-acting. With MGs of a relatively short duration, it is unlikely that the sequelae of a bioterrorism attack using an infectious agent would manifest extensively before the attendees departed. Under this scenario, symptoms would develop within a disseminated exposed population, possibly in many different locations around the world, the impact on the host nation being confined largely to its own population. If the event is of long duration, or if a fast-acting toxin or an organism such as *Bacillus anthracis* were used, the effects of the attack would appear before the attendees could disperse, and would necessitate a full-scale response by the host nation.

Key problems intrinsic to such events include the following:

- High political visibility and political pressure
- Intangible nature of infections
- Place of exposure is not necessarily the place where the actual outbreak occurs
- Possible wide dispersal of those affected during the incubation period
- Warnings and hoaxes requiring appropriate political and medical responses
- Matrices of threats must be defined according to the specific nature of the bioterrorism incident
- An 'adapted' version of the communication strategy for the MGs is required for such incidents
- Multi-agency planning and response is necessitated for such incidents.

4. Surveillance and alert systems

4.1. Communicable disease surveillance

4.1.1 Introduction

Communicable diseases have not been a significant cause of health events during recent major international sporting MGs. For example, during the 1996 Atlanta Olympic Games and 2000 Sydney Olympic Games, infectious diseases accounted for less than 1% of health care visits. Despite this, the nature of mass gatherings can pose ideal circumstances for the spread of infectious diseases, and infectious disease outbreaks of varying seriousness of impact have occurred during previous mass gathering events (e.g. recurrent outbreaks of meningitis and other communicable diseases at the Hajj pilgrimage and the norovirus outbreak during the 2006 Football World Cup). Because a significant infectious disease outbreak may cause major problems at an MG, improved communicable disease detection may be required. To accomplish this, enhanced epidemiological surveillance and response preparedness is an essential part of the preparation for an MG.

Surveillance can also be enhanced to facilitate early warning of non-communicable disease threats, such as injuries and the covert use of chemical or radiological agents. The visibility of MGs increases the chance that anyone seeking to draw attention to a cause, or wishing to cause harm to a population, may take them as opportunities to do so. The elevated risk of intentional use of biological (or chemical or radiological) agents, therefore, increases the need to improve the health surveillance systems that may provide the first evidence of a developing problem.

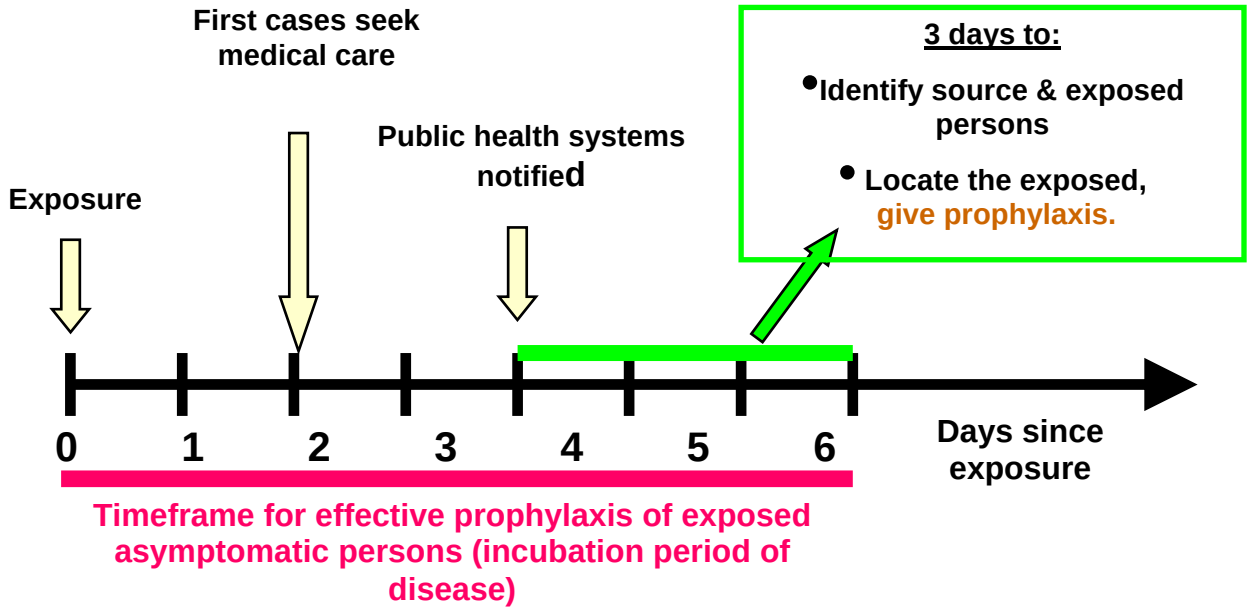
Most MGs place particular burdens on surveillance systems. This can be for several reasons:

- Temporary increases in population caused by MGs may increase the volume of reports that have to be handled, with implications for staffing and data handling systems at local, regional and/or national levels
- MGs may necessitate decreasing the timeframe for reporting and analyzing data and disseminating information
- Many of those attending an MG may be from areas where diseases are prevalent that are not normally found in the host country. Systems need to be able to detect and report these in addition to the disease spectrum they normally cover
- It may be necessary to reprioritize some reporting practices to cover diseases that are of particular importance during MGs
- MGs may have long-term consequences for the spectrum of diseases in the host country, or for levels of particular endemic diseases
- Political pressures and the need for heightened sensitivity may require the temporary implementation of novel surveillance methods with questionable information quality, but which are generally timelier (i.e. syndromic surveillance, environmental monitoring)
- Rumour control and public reassurance in the case of non-events may be required on a timely basis during the MG
- There may be a need for enhanced surveillance, including new and/or different technology and surveillance methods and procedures (i.e. syndromic surveillance).

The primary task of public health surveillance systems for communicable disease during mass gatherings is to reduce the time to detection of illness, so that public health interventions (e.g. post-exposure

prophylaxis) can be employed to prevent further illness, or to reduce morbidity and mortality (see Figure 4, below).

Figure 4. Early detection – reducing morbidity/mortality for exposed asymptomatic individuals



4.1.2 Diseases to include in enhanced surveillance

Surveillance programmes should be enhanced for the detection of those endemic diseases that are most likely to affect the MG, and for non-endemic diseases (i.e. diseases with the potential for importation or which present specific public health threats). A thorough risk assessment will allow for prioritization of surveillance efforts. Experience from previous MGs suggests that the following should be included in the enhanced surveillance programme:

- Diseases that:
    - Are highly infectious, and therefore have outbreak potential (e.g. food-borne illnesses, measles, out-of-season influenza, meningococcal disease)
    - Have a short incubation period (and are therefore likely to present while the MG is still occurring)
    - Are difficult to treat or manage (e.g. XDR-TB)
    - Have modes of transmission likely to be enhanced in a mass gathering situation (e.g. meningitis, gastrointestinal and respiratory diseases)
    - May cause severe illness and require investigation and/or the application of control measures (such as quarantine), even for a single case
    - Are known to be of particular risk for use as bioterrorism agents
- Imported diseases not normally seen in the host country (especially drug-resistant organisms and unusual serotypes)

- Health outcomes potentially associated with chemical or radiological exposures
- Exposures that are likely to have human health consequences.

In addition, IHR (2005) notifications or other reporting may be required for:

- Particular health events, irrespective of their origin or source, including those caused by biological agents (infectious and non-infectious) or chemical or radionuclear agents
- Events involving transmission or potential transmission of illness through persons, vectors, cargo or goods (including food products), and environmental dispersion
- Events where the underlying agent, disease or mode of transmission is new, newly-discovered, or unknown at the time of notification.

When considering establishing or enhancing surveillance for an MG, key public health concerns can be considered in terms of communicable diseases which require investigation and interventions, and those for which there are prevention or control activities. Public health surveillance can be reinforced to ensure the rapid detection of:

- Outbreaks that might require epidemiological investigation and intervention (e.g. food-borne outbreaks)
- Diseases that might require prevention or control measures (e.g. meningococcal meningitis)
- Clustering of disease events that might justify collective prevention measures, such as heat-related illness (HRI).

The duration of the event may dictate the types of disease that should receive surveillance priority during the planning stage. For example, if the event duration is only a few days, then diseases with a longer incubation period may receive a lower priority than those (such as food-borne disease) with a short incubation. This is not to say that other diseases should be neglected. A problem due to a disease, such as legionellosis, that resulted from an incident at an event may be detected initially by the surveillance system of the host nation, allowing a warning to be distributed internationally to detect other cases that may have left the country.

For planning and implementation purposes, MG event surveillance can be divided into three phases, as laid out below.

4.1.3 Pre-MG surveillance

Pre-MG surveillance is the use of surveillance to determine baselines or to gain a general understanding of the public health conditions in the community hosting the event, and is based on routine surveillance approaches. However, any new or enhanced surveillance systems required for the event should be implemented well in advance, in order to:

(1) Determine baselines
(2) Measure the effectiveness of the systems and methods employed to collect, analyse and interpret data
(3) Identify all relevant stakeholders and ensure they are properly trained.

Whilst national surveillance activities should be included in this process, it is especially important to establish pre-MG surveillance at the site of the MG, as well as in the surrounding area likely to be

affected by the event (e.g. through housing or transporting visitors, etc.), in order to establish the area baseline.

Any new systems should be in place for a sufficient length of time prior to the MG to allow baselines to be determined, to assess the effectiveness of collection, analysis and interpretation of the data, and to allow the persons involved to become comfortable with the system.

Key questions that must be asked by host countries in establishing pre-MG surveillance are as follows:

- Is there a system in place for early recognition and reporting by clinicians and organizations? If so, can this system be enhanced to provide the needed surveillance data for the MG? In general, building on existing systems provides a greater benefit for host countries than developing new or 'drop-in' systems that will not be used after the MG. If there is no systematic collection of CD data in the host country, the MG may be an important opportunity to establish a surveillance network that can serve as a legacy for the country
- Do reporting requirements and case definitions exist?
- Do clinicians require additional training or sensitization for identifying priority diseases and reinforcing timely reporting practices? Is there appropriate feedback of surveillance information to the healthcare community? MGs may be an important opportunity to establish or enhance links with the healthcare community in order to improve ongoing surveillance
- Is the reportable disease surveillance system flexible enough to include newly-presented diseases?
- Can the time taken to report and investigate priority diseases be decreased?
- Will syndromic surveillance (surveillance for trends in disease syndromes using pre-diagnostic health indicator data) be a necessary and feasible approach to augmenting routine surveillance methods? The following approaches should be considered:

    - Use of electronic data from emergency departments, acute care clinics and/or first aid stations (e.g. chief complaint data, discharge diagnoses)
    - Manual collection of data from emergency departments, acute care clinics and/or first aid stations
    - Use of electronic data from ambulance services or emergency medical services
    - Use of data from telephone calls to automated poison control centres, nursing hotlines or other healthcare calls
    - Use of electronic data from over-the-counter pharmaceutical or prescription orders

- Can the evaluation of novel surveillance methods be factored into their implementation?
- Will monitoring target populations (e.g. food service handlers, MG employees) be a necessary and/or feasible approach to augmenting routine surveillance?
- Is there access to suitable laboratory facilities to confirm or exclude diagnoses? Does laboratory capacity or expertise need to be enhanced to allow for detection of agents that may be a concern during the MG? For example, existing capacity for testing for dengue may be limited, but it may be essential to be able to differentiate dengue from other severe diseases that necessitate a public health intervention, such as meningitis. Is the MG an opportunity to enhance laboratory capacity, or is there a need to develop protocols for rapid specimen transport to a laboratory with increased testing ability?
- Do methods and systems exist for evaluation, screening and verification of threats to public health, including "rumour clearing"? Are these well-developed, and are the information sharing networks in place to allow for rapid dissemination of necessary information if an event occurs?

- Do methods and resources exist for outbreak management? Is there need for a plan for ensuring support for outbreak management, including obtaining supplies, pharmaceuticals (medications and/or vaccines), and human resources?
- Are systems in place for obtaining data from those dealing with visitors to the country (e.g. such agencies as customs, immigration services and border police)? Do new systems need to be established to monitor and collect health data at ports of entry?
- Are there systems in place to collect, collate, analyze, evaluate and report medical intelligence and disease surveillance data, which integrate the detection capability for "suspicious" incidents? Such systems must include epidemiological expertise for collation and interpretation of reports and initiation of further investigations, and a system for timely reporting to the proper authorities. For example, does the host country have access to the Global Public Health Intelligence Network (GPHIN) or other international intelligence reports?
- Have the competent authorities/structures and corresponding roles and responsibilities been identified at national, regional and local levels, and is there integration with and between national public health structures to ensure that reports initiate appropriate and timely responses?
- Do plans need to be developed to include provisions for fast deployment of investigation and response teams? Have the key personnel on these teams been identified and trained?
- Are there guidelines for investigation and case reporting, including criteria on diseases recognized as potential bioterrorism agents and others? Have personnel who will be carrying out these investigations been trained and exercised on use of the guidelines?
- Do methods and resources exist for tracing and interviewing contacts and managing related data? Are IT systems in the host country sufficiently robust to support rapid contact tracing and case management? Is there a plan for surge capacity to assist with data entry and analysis needs?
- Are procedures established to enable contact tracing among visitors and those returning to other countries? Have key contacts with the organizing committee for the MG been established to ensure information can be obtained rapidly? The organizers of MGs often have access to many participants, and can provide them with detailed health information prior to the MG, as well as helping facilitate contact tracing should an event occur
- Do operational links exist with authorities and structures competent for epidemiological surveillance, such as the animal, plant and food authorities? Are they used?
- Are operational links established with relevant national and international bodies, such as the WHO and other international public health organizations?
- Have operational links been made with law enforcement structures and authorities? When will intervention be mandatory? MGs are often an important reason for establishing links with law enforcement and developing clear protocols for responding to events that have both public health and law enforcement components.

4.1.4 MG-based surveillance

Enhanced surveillance is needed in order rapidly to identify events of public health concern that occur during the MG, to communicate information about them, and to respond to them. This type of surveillance must occur at the site of the MG as well as at local hospitals and other health care delivery establishments in the areas surrounding the MG venue.

It is not sufficient to depend solely on data obtained from larger health care facilities, because patients may present to smaller facilities or local health practitioners complaining of low grade symptoms, and then fail to pursue additional medical treatment – choosing instead to return to the ongoing activities of the MG, or to leave the venue altogether and return home or go elsewhere.

Key questions to consider during the mass gathering are as follows:

- Is data being received in a timely way, and are daily reports available and properly disseminated?
- Has a cycle of communications with key groups been established? Often a daily conference call or e-mail report with key surveillance partners will allow for early reporting of rumours or events
- Is the public health surveillance integrated with other intelligence and surveillance systems at some level so that a complete picture can be formed of health threats or events? During some MGs, public health participates in the centralized command structure, and public health information is shared broadly
- Are laboratory tests being completed and reported efficiently? Is there a need to monitor supplies of reagents?
- Is communication with surveillance partners adequate? There may be a need to call or visit key clinics or venues to ensure surveillance is ongoing, particularly if there is a surge in illness that may take time and resources away from surveillance activities. It is often very helpful to have public health personnel on-site at venues, to be the 'eyes and ears' in the field, as well as to initiate public health interventions (e.g. contact tracing, vaccination) rapidly when required
- Have the triggers for public health action been developed and disseminated, so that key personnel know when to act?
- Are the surge resources identified, and prepared to be called upon should an event occur?
- Have key spokespeople been identified, and are they ready should an event occur?
- Has a plan been developed to ensure that surveillance around an event can be augmented without compromising the entire MG surveillance system? Often an event such as an outbreak will require additional surveillance activities to ensure all cases and contacts are identified, and to characterize the outbreak. There should be sufficient capacity for this to take place while MG surveillance continues.

4.1.5 Post-MG surveillance

Post-MG surveillance is the use of routine and enhanced surveillance (both at and around the venue and nationwide) for a period of time following the MG, in order to ensure the detection of diseases with longer incubation periods that may be related to the event.

A key objective for post-event surveillance is to define the exposed population in as much detail as possible, in order to ensure that the most effective public health and medical response measures are put in place. The risk assessment process will help the host country identify and prioritize the communicable disease threats that need to be under surveillance. In addition, an MG will often give host countries an opportunity to build or establish surveillance systems they may not have had before: thought should be given to the public health surveillance legacy that the MG could leave once over.

Key questions to consider for post-MG surveillance include the following:

- Has a period of time for ongoing surveillance been identified, based on the risk assessment for diseases with longer incubation periods?
- Has a plan been developed for winding down enhanced surveillance after the MG in a controlled and logical fashion, so that events can still be detected as the winding down is taking place?
- Is there a plan in place for maintaining surge capacity for responding to events after the MG is over?
- Have key contacts been made with international organizations such as WHO, to ensure rapid dissemination of information to affected countries should an event occur after the MG?
- Is there a plan to maintain communications and connections with surveillance partners that are established for the MG?

4.1.6 Post-incident surveillance

It is important to note that once an incident has occurred, the surveillance of that incident needs to expand to include incident-specific post-incident surveillance in addition to ongoing surveillance for other incidents. For this to occur, systems and resources for these activities must be prepared during the pre-MG planning so that incidents cause minimum disruption to ongoing MG surveillance procedures. Additional resources will probably be required to manage incident-specific surveillance needs in addition to ongoing routine surveillance. The occurrence of one infection incident, or of an outbreak, does not mean there will not be others, and does not reduce the need to maintain other MG surveillance activities. Appropriate command and control systems should be in place.

4.1.7 Additional factors

In addition to the above, other considerations may need to be taken into account in order to meet the needs of an MG. These include the following:

- Establishing or strengthening links between the CD surveillance system and other agencies that may have relevant data (e.g. military, environment, civil defence, defence, animal health, environmental health, etc.)
- Inclusion of relevant information from non-health sectors (e.g. police, tourist offices, hotels, banks, pharmacies, etc.)
- Developing standard operating procedures (SOPs) for rapid establishment of active surveillance if an incident occurs
- Simplification of case data
- Any changes that may be needed to reporting procedures
- Any factors affecting the host nation's reporting under the IHR (2005), such as relevant domestic and international detection and reporting requirements for the host nation, as well as the surveillance, inspection and medical examination rights and obligations of other states that may be receiving international travellers or transport from the host nation
- Surveillance in countries where systems are less well developed
- Value of a symptomatic approach to rapid surveillance (for more information on this, see the examples drawn from the experience of the Athens Olympics mentioned elsewhere in this document)
- Identification and training of surge capacity teams for surveillance and epidemiological investigation.

4.1.8 Integration and coordination

Integration and coordination of surveillance systems during an MG is critical to ensuring comprehensive and coherent results. Integration and coordination can include the following elements:

- Developing a plan that describes the methods and outputs of each routine and enhanced surveillance system used during the MG, and their points of contact
- Defining key stakeholders and reporting requirements for all surveillance systems
- Considering implementation of an epidemiologic and surveillance coordination team, with representation from each key surveillance system
- Developing a strategy to communicate timely, comprehensive and coherent surveillance results
- Establishing or strengthening links between infectious disease authorities, environmental health bodies and other agencies that may have relevant information (e.g. military, civil defence, animal health, etc.)
- Developing relationships with, or including information from, the non-health sectors (e.g. police, tourist offices, hotels, banks, pharmacies)
- Developing standard operating procedures (SOPs) for rapid implementation and coordination of active surveillance if an event of public health concern occurs
- Identification and training of surge capacity teams for surveillance and epidemiological investigation.

4.1.9 Timeliness of reporting

Surveillance is only useful if the results can be acted on in a timely manner. The system must therefore allow clinicians, or other individuals with relevant information, to report problems at any time (day or night and throughout the whole week, including weekends) and to ensure that these items of information are integrated into the surveillance process, communicated, and acted on if required.

As a part of this process, the communicable diseases director (CDD) should determine whether the methods used in the existing surveillance and alert systems, and the nature of the system itself, are capable of fulfilling the requirements imposed by the MG – and if not, what changes are needed. If there is more than one surveillance system in place (for example, if there are separate clinical and environmental health systems), then integration of the activities of the different systems (or at the very least close liaison between them) is essential in order for comprehensive and coherent results to be produced. Such integration can be a useful legacy of an event. Consideration should be given to implementation of enhanced surveillance systems or methods to augment existing capacity by incorporating new data sources, and/or expanding the range and type of data collected.

In addition to their role in detecting communicable diseases, public health surveillance systems can also act as early warning systems for non-communicable disease threats, such as chemical events resulting from industrial accidents, the covert use of chemical or radiological agents, and environmental hazards such as heat-related illness.

4.1.10 Points of entry

When planning for mass gatherings that attract international visitors, points of entry for international travel may require specific surveillance (associated with facilities for isolation, quarantine etc.). In

addition, the IHR have requirements for certain capacities and facilities at points of entry, and provisions on health measures to be applied in those contexts.

4.1.11 Syndromic surveillance

In this context, "syndromic surveillance" is a system of surveillance based on broad clinical disease categories (e.g. "bloody diarrhoea", "fever", "acute flaccid paralysis" as a proxy for polio, and so on) rather than on diagnoses confirmed by laboratory analysis. It is important to note that "syndrome" in this context does **NOT** mean a clinical syndrome, and does not carry the same meaning as is routinely used in healthcare – that is to say, a set of characteristic signs and symptoms used diagnostically in the absence of a definitive test (for example, to define autism or AIDS).

The aim of syndromic surveillance is to detect disease events earlier than would be possible by exclusive monitoring of cases confirmed by laboratory tests. Timeliness and sensitivity are its key attributes.

Syndromic surveillance makes it possible to determine rapidly that a problem may be developing, and to identify the broad nature of the problem, but it cannot define the problem precisely, and its results can be misleading. This is because the "syndrome" may actually result from a number of different disease agents, especially when the early symptoms of different diseases occurring simultaneously are rather similar. The results of syndromic surveillance must therefore be treated with care, and considered only as a trigger to more detailed examination of the potential problem. The syndromes included must cover the symptoms of the range of diseases that are expected to occur during the MG.

Syndromic surveillance is also useful for establishing the absence of a problem. If no increases are seen in the relevant categories, then it is possible to say on the basis of such surveillance that there is no existing problem – even in the absence of precise, laboratory-based diagnoses. For example, syndromic surveillance it has been used (e.g. in the US) to document the *absence* of bioterrorism events.

Statistical analysis of short-term syndromic data involves detecting possible aberrations from what is considered "normal", in the context of limited baseline data and case definitions that are highly sensitive but that have low specificity. The balance is between having too low a trigger threshold (which causes too much time to be spent following up false positives) versus too high (which causes missed or delayed detection of true events). Ideally, a syndromic surveillance system should have the flexibility to alter these thresholds, in order to adapt to changing needs and public health risks.

In the context of mass gatherings, syndromic surveillance can be targeted to detect conditions of public health concern which:

- Have outbreak potential
- Are non-communicable, but require urgent public health response
- Require more timely detection to facilitate control
- Are of intense public/media interest (for example those diseases that are on the WHO list of possible agents of biological warfare or terrorism, or the US Center for Disease Control (CDC) Category A list of bioterrorism agents, such as anthrax, botulism, plague and smallpox).

Table 1 : Syndromic surveillance: syndromes, syndrome definitions and possible diagnoses

Syndrome	Definition	Diagnoses of interest
1. Gastrointestinal	**One of:** diarrhoea; loose stools; dysentery;	Food-related illness,

Syndrome	Definition	Diagnoses of interest
illness (bloody stool)	gastroenteritis with vomiting; abdominal pain; +/- fever **Plus:** blood in stool	including: salmonella VTEC; shigella; yersinia; campylobacter
2. Gastrointestinal illness (non-bloody/watery)	**One of:** diarrhoea; loose stools; gastroenteritis with vomiting; abdominal pain; +/- fever **Plus:** a gastrointestinal cause of the symptom **Without:** blood in stool	Food-related illness, including the above and Norwalk-like viruses
3. Acute febrile illness with rash	**One of:** dermatitis; exanthema **Plus:** fever (temperature > 38.0°C), documented or by self-report **Or:** clinical diagnosis of measles; rubella; fifth disease; chickenpox; smallpox	Measles; rubella; chicken pox; smallpox; Parvovirus B19 (Fifth disease); meningitis; VHF
4. Meningitis/ encephalitis	**One of:** meningitis; encephalitis **Or:** **One of:** encephalopathy; altered mental state; confusion; delirium; change in level of consciousness; disorientation; elevated WBC or protein in CSF **Includes:** headache with fever; seizure with fever **Plus:** no underlying cause for the symptoms recorded unless accompanied by fever	Meningococcal meningitis; viral meningitis; anthrax; other viral encephalitidies (i.e. West Nile Virus); drug overdose
5. Respiratory distress without fever	**One of:** shortness of breath; wheezing; cough; stridor **Without:** fever	Asthma; COPD; CHF
6. Acute respiratory infection with fever	**One of:** cough; sore throat pharyngitis; bronchitis; pneumonitis; wheezing; bronchopneumonia; bronchiolitis; haemoptysis; shortness of breath; chest X-ray showing an infiltrate or mediastinal abnormality **Plus:** fever (temperature > 38.0°C), documented or by self-report	Influenza; pneumonic plague; Legionella; inhalational anthrax
7. Temperature-related illness	**Dehydration:** due to heat **Heat cramps:** muscle pains or spasms (usually abdomen, arms or legs) **Heat exhaustion:** includes heavy sweating; paleness; muscle cramps; tiredness; weakness; dizziness; headache; nausea or vomiting; fainting Skin may be cool and moist; pulse rate will be fast and weak; and breathing will be fast and shallow. **Heat stroke:** includes extremely high body temperature (above 40°C, orally); red, hot, and dry skin (no sweating); rapid, strong pulse; throbbing headache; dizziness; nausea;	Heat cramps; heat exhaustion; heat stroke Hypothermia; trench foot

Syndrome	Definition	Diagnoses of interest
	confusion; unconsciousness **Cold**: Hypothermia; trench foot	
8. Suspected acute viral hepatitis	**One of:** hepatitis; jaundice; icterus with elevated bilirubin **Plus:** not chronic or due to drugs/alcohol	Acute hepatitis A, B, E
9. Botulism-like syndrome (cranial nerve impairment and weakness)	**One of:** cranial nerve palsy or impairment; ptosis; blurred vision; diplopia; dysphonia; dysarthria; dysphagia; descending paralysis **Plus:** not chronic or due to known history of disease such as cancer, multiple sclerosis, stroke **Or:** diagnosis or suspicion of botulism	Botulinum toxin
10. Unexplained death	Any unexplained death	VHF; inhalational anthrax; malaria

4.1.12 Indicators that an outbreak/incident is possibly a deliberate event

The information in this section can be considered in relation to Annex 2 of the International Heath Regulation (2005) reporting mechanisms, if appropriate.

The signs of a deliberate attack will depend on the type of agent and the method of its release. An aerosol release of a micro-organism would not ordinarily result in immediate symptoms in attendees, participants or staff at an MG. The interval between time of exposure and development of symptoms will generally be several days (or at least one or two) for a biological agent; only if the release was accompanied by an explosive device or other evidence of release would the authorities be immediately aware that an attack was occurring, and in such a case the initial reaction would most likely be likely to focus on the explosion and its immediate effects, rather than on the presence of a possible biological agent. The first indication of a problem could be the inexplicable and rapid onset of symptoms such as respiratory distress, and the incapacitation of attendees, participants or staff. The early response would have to take into account the possibility of the accidental release of a toxic agent (for example, an industrial chemical) if the observed event appeared to be of rapid onset within a small geographical area. Alternatively, if a biological agent had been administered in food or beverages, the first symptoms would probably be more typical of rapid-onset food poisoning.

An attack might be indicated by a cluster of two or more cases, related in time and space, of the following syndromes (single cases of severe illness in a previously well person may also be considered):

- **Neurological:** meningitis, encephalitis, encephalopathy or neurological disturbance
- **Respiratory**: pneumonia, infiltrates, pneumonitis, Acute Respiratory Distress Syndrome (ARDS)
- Acute fulminating septicaemia or shock
- Fulminant hepatitis or hepatic failure.

Additional indicators pointing to a possible deliberate cause could also be the following:

- Recognition of infectious diseases that are not endemic to that area (although care should be taken here if attendees at the event are from countries with a different disease spectrum to the host nation)

- Numbers of patients with a similar syndrome having unusual characteristics or high morbidity or mortality
- Multiple patients with infectious diseases that may be endemic to an area, but which rarely infect humans
- An increase in a common infectious disease syndrome above expected numbers, or in unusual age groups
- Cases of severe illness with no obvious explanation
- Cluster presentations of acute febrile respiratory illnesses, acute febrile illnesses associated with cutaneous lesions, gastroenteritis, and/or progressive respiratory paralysis
- Occurrences of multiple drug-resistant infectious diseases
- Increased animal deaths (domestic, livestock or wild) occurring simultaneously with human illnesses.

Alert signals

These alert signals should be integrated into routine surveillance and alert systems. When the following conditions arise, a possible deliberate event is indicated.

- Overt terrorism threats
- All rumours and reports of smallpox-like illness or cases with test results confirming a potential bioterrorism-related agent (e.g., pulmonary anthrax, tularaemia, or plague)
- Previously well persons presenting with, or dying from, severe unexplained diseases or syndromes
- Higher morbidity or mortality than expected for a common disease or syndrome
- Cases of known aetiology occurring in an unusual setting, population or season, or with an atypical clinical presentation, or with unusual or atypical strain
- Indistinguishable molecular and genetic characteristics of agents detected in temporally or spatially distinct sources
- Presence of a large epidemic or multiple simultaneous outbreaks in discrete populations
- Deaths or illness among animals with the potential for zoonotic disease transmission to humans
- Illness affecting a key sector of the community (e.g. political, financial) or a mass gathering event
- Failure of a common disease to respond to usual therapy/prophylaxis
- Unusually short median/mean incubation period for a known disease
- Higher rates of person-to-person transmission than previously observed
- Higher attack and case fatality rates than previously observed
- Differential attack rates or clustering likely to indicate potential unusual exposures
- An unusual increase in the number of people seeking health care, especially if presenting with fever, respiratory, neurological or gastrointestinal syndromes
- Confirmed atypical, genetically engineered, or antiquated strain of an agent
- Laboratory-confirmed case/cluster of specific bioterrorism agent (in a case/cases with no known risk factors for a natural infection).

4.2. Public health intelligence

Public health intelligence helps with the understanding of factors that may affect the health of visitors to a mass gathering, and the analysis and sharing of public health intelligence is vital to health security at an MG. The information included under the umbrella term “public health intelligence” is not necessarily limited to specific health data, nor are its sources confined to health-related agencies. Many nations have

experience in requesting, and receiving information concerning, international crime and persons of concern through a wide variety of cooperative information-sharing networks. Other cooperative information-sharing networks can provide valuable information on issues such as health status and endemic or emerging disease.

Many events appeal to specific nationalities or segments of a population. For example, some sporting events will draw overwhelmingly from certain countries and demographics (for example, the football World Cup draws heavily on European males), while others may appeal to very different groups (such as pop concerts that appeal to the young, or political rallies that draw more mature populations). This knowledge can be vital in the planning and preparation for an event. Once the general nationalities and demographics of the attendees are predicted, an effort can be made to identify the types of information that will be required, and its possible sources. Information will need to be obtained primarily from the countries from which the attendees are coming, but will also need to be sought from countries in which they may stop or pass through on their way to the event. For example, some areas of the world only have limited numbers of air and sea ports through which they can be accessed, so knowledge of those intermediate stops will provide insight into potential exposures that may have occurred en route. Useful information can also be obtained from international bodies such as Interpol.

With the data sources identified, information should be obtained that allows for prediction of – and hence preparedness for – various occurrences. This might include information on the following:

- Existing or recent public health events in the countries of interest, including:
    - Outbreaks of infectious disease
    - Unusual patterns of illness
    - High incidents of chronic disease (to provide insight into special pharmaceuticals that might need to be stocked)
- Specific incidences of specialized drug abuse
- General state of health of the population of each relevant country
- Climate and geography of countries of interest, including – for example – the following considerations:
    - If the event venue is at a high altitude, and many attendees come from less elevated regions, this could pose a significant health issue
    - If the source and destination countries have vastly different climates, then attendees may not be aware of necessary basic precautions, such as avoiding dehydration in dry climates, or avoiding heat stroke in hot ones
- Knowledge of the likelihood of a large number of health professionals attending (for example, at an international medical conference) can assist considerably if it is incorporated as part of the communications plan
- The likely incidence of vaccination in the incoming population, and for what diseases
- The likelihood of accidental importation of zoonotic or insect-borne diseases
- Indications that organizations or entities outside the host country are intending to attack the MG
- Concern on the part of national security and law enforcement bodies that this or another MG will be attacked
- Concern regarding the theft or acquisition of biological and/or other agents that could affect human health, especially if the amount acquired could affect large groups of people

- The need to establish key contacts in source nations, both as sources of immediate information and for consultation in the event of an incident. These might include contacts in ministries of health, toxicology and poison centres, diagnostic laboratories, and public health agencies.

A system should be in place to monitor issues of interest in source nations constantly, so that in the event that new and relevant information becomes known, it can be factored quickly into plans and accounted for in responses (for example, an outbreak of meningitis in a Muslim country a few days after the Hajj starts, indicating the possibility of a later outbreak at the Hajj).

It is also important that public health personnel do not consider it inappropriate to converse with those in law enforcement and national security communities. In order to prepare in advance for the possible terrorist introduction of biological and other agents that could affect health, it is necessary to obtain information on the intent to use such agents – information only available from national security agencies.

That said, in order to avoid unnecessary and inefficient clearance problems, planners should simultaneously use UN resources and contacts to the greatest extent possible. The collection and analysis of this information should begin at least six months before the event, and should continue for at least 90 days afterwards in order to ensure that any long-term or lingering affects can be properly understood, analyzed and factored into future plans as appropriate.

4.3. Laboratories

4.3.1 Introduction

Laboratory diagnostic services are integral to outbreak alert and response operations during MGs. While laboratory capabilities vary from nation to nation, key national laboratory capacities that have been identified as critical during previous mass gatherings include the ability to:

- Isolate and identify those pathogens identified as being of particular importance
- Employ high standards of internal and external quality control
- Understand the importance of laboratory reporting as it relates to effective surveillance
- Report test results to the public health surveillance system
- Provide for safe and reliable transport and storage of samples.

National laboratories should be identified to provide the required scientific background/experience and infrastructure in order definitively to identify and verify selected pathogens and link effectively with international reference laboratories. Similarly, local laboratories should be able to identify pathogens accurately, and to expand their activities to cover increased demand if required.

In the absence of a suitable laboratory in the country hosting the MG, either capacity must be developed before the event, or a suitable international laboratory must be identified that can provide the relevant services. Mobile laboratories could be of use, but these vary widely in terms of capacity and capability, and are of no value if local staff lack the training to use them properly and alternative staff are not available. A survey of all laboratory assets in and near the host nation must be conducted in advance of the MG. In the case of mobile laboratories, consideration must be given to how and when they might be moved near to the MG.

Additionally, the ability to transport specimens quickly to laboratories outside of the host country must be in place well in advance. Systems to transport specimens internally and to external reference laboratories

must be established. Such transport systems are complex, usually require a functioning cold chain, and are governed by a wide range of international regulations.

4.3.2 Microbiological laboratories

Microbiology laboratory services are typically divided into several specializations:

- **Hospital laboratories providing diagnostic services.** These are usually further subdivided into the microbiological specialisations (bacteriology, virology, protozoology, mycology, and so on). These laboratories play an important role, not only in the diagnosis of disease, but in the surveillance of communicable disease. These laboratories can either provide confirmation of clinical judgment, or in some cases the first indication of an outbreak of communicable disease (for example food poisoning) or a bioterrorist attack
- In many countries, public health laboratories routinely analyse biological, food and water samples, and other environmental samples, for the presence of pathogenic micro-organisms. They may also provide support to departments of communicable disease control and environmental health, by performing testing during outbreak investigations and other crises.

4.3.3 Other laboratories

In hospitals (and sometimes in larger clinics), in addition to the microbiology laboratories, clinical laboratories monitor and support the treatment process (haematology and biochemistry laboratories, etc.). These types of diagnostic laboratory are essential to the monitoring of patients, and to ensuring the effectiveness of treatment. Whilst not directly involved with the diagnosis of communicable disease, they are an integral part of the treatment of such diseases, and hence of control. It is essential to ensure that links between these laboratories and diagnostic microbiology laboratories are good, and that the SOPs of these laboratories are modified where necessary in order to meet the needs of an MG.

Other laboratories that may be of importance include:

- Food control laboratories
- Chemistry laboratories
- Poisons laboratories
- Forensic laboratories
- Radiological laboratories
- Universities and research centres
- Private sector labs
- Others (military, customs, regional, and so on).

4.3.4 Laboratory capacity

The capacity of existing laboratory services to cope with the additional demands of a mass gathering may be inadequate. Ideally, the capacity of these laboratories, both in terms of equipment and in terms of staff numbers and training, should be expanded (which will provide a useful legacy to the country following the MG). If assessment shows that the routine diagnostic laboratories lack the capacity to increase their throughput of specimens sufficiently to meet demands of a major outbreak or a bioterrorism event, then there are two possible options:

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(1) Increase their capacity. This could provide a useful legacy, but it can be expensive, and the increased capacity could exceed routine needs
(2) Identify appropriate alternative laboratories that could provide emergency capacity – such as those at universities and research centres, suitable private sector laboratories, and the laboratories of agencies such as the military medical services. It is important that such needs are identified early so that the appropriate laboratories are included in the planning process.

Surveys of the capacity of national and regional microbiological laboratory services should be undertaken to determine whether they can cope adequately with the following considerations:

- Undertaking accurate and consistent isolation and identification of those pathogens that are routinely tested for
- Accurately and consistently isolating and identifying pathogens that may be imported from the source countries of MG attendees, or accessing external laboratories to undertake such activities rapidly on their behalf
- Undertaking effective internal quality control
- Operating effective external quality control procedures for rapid identification of unknown pathogens in clinical and environmental samples. This includes ensuring that the following activities are properly carried out:

    - **Clinical syndrome description:** protocols for further examination (such as the search for pathogens and antibodies in body fluids such as blood, serum, plasma, liquor, stool, *lavage* fluids, material from biopsies, or urine) must be agreed throughout the health services and the laboratory network (should a laboratory network exist)
    - Ensuring that pathogens are handled in laboratories with an adequate level of bio-safety
    - Ensuring the safe transport of specimens to and from the laboratories, and their safe storage.

- Ensuring rapid confirmation of identification of pathogens in clinical and environmental samples. For this, the following considerations must be taken into account:

    - Appropriate reference laboratories must be identified in advance. For high-threat and very high-threat pathogens, patient material or the isolated pathogen is sent to the reference laboratory, in order to determine the genotype and to establish proper storage of the viable isolated strain (strain collection)
    - If external laboratories are to be used, arrangements must be made to ensure that specimens can be handled at short notice
    - Arrangements must be made to ensure the safe transport of specimens to the laboratories and their safe storage on arrival

- Linking with international reference laboratories for quality control, support to diagnostic services where national capacity is lacking, and secondary confirmation of high-threat pathogens
- Operating a safe and reliable system for internal transport and external shipment of clinical specimens for testing, and of isolates for quality control (taking into account IATA regulations, biosafety, protocols for transport of dangerous goods, etc.)
- Being aware of the need for surveillance and ensuring that the laboratories have the capacity to report to the surveillance system
- Coping with the increased numbers of specimens and demand for other laboratory services that may result from the MG, particularly if an outbreak caused by a pathogenic micro-organism occurs (a particular concern if it is caused by a rare or an unknown pathogen)

- Instituting or maintaining SOPs that are up-to-date for the entire laboratory network (should a laboratory network exist in the host nation). These should cover all aspects of the management of samples, proper matching of results with individuals, handling of medical privacy issues, handling and storage of mass numbers of samples, and verification/validation procedures
- Keeping adequate supplies of equipment, reagents and disposables for routine diagnosis and for the additional needs imposed by the MG (for example, for the diagnosis of novel infections). Defective equipment should be repaired
- Clearly specifying training needs and the systems necessary to meet them, either in-country or at laboratories elsewhere, and putting them in place
- Establishing structures for communicating with laboratories and clinicians, and ensuring that laboratories report diagnosed cases to the relevant authorities
- Establishing procedures for rapid preparation and distribution of guidelines for diagnosis of cases and isolation of pathogens. These should be distributed to laboratories and clinicians during an outbreak or epidemic.

Laboratory services relevant to infectious diseases and public health may be hosted by other agencies (e.g. those concerned with agriculture, veterinary issues and the environment; the ministry of the interior; borders/customs authorities; and so on).

5. Outbreak alert and response

This section presents some of the primary considerations for preparing for quick detection, verification and response to an MG-related outbreak of disease.

The task of identifying and managing a potential or actual outbreak of communicable disease during a mass gathering can be complicated by a number of unique factors that must be considered when preparing a plan. While many of the same techniques that are used during the management of a conventional public health or communicable disease incident would still apply, there are several factors (such as a large concentrations of visitors who may speak other languages, greater than usual movement of people, the interaction of large numbers of people in confined areas, and higher levels of chaos and confusion than normal) that contribute to making the process more difficult. Existing local infrastructure is crucial to the ability to respond. The need for external resources for surge capacity will depend on the size and socio-economic status of the country.

5.1. Outbreak management – event management system

To mount an effective response to an outbreak, the establishment and utilization of an event management system is critical to public health and other response agencies. An event management system functions to:

- Establish structures, tools and procedures to manage events that threaten public health
- Identify and clarify roles and responsibilities, and provide guidance for alert and response activities
- Facilitate standardised data management, risk assessment and response.

The event management system should address the policies and priorities that support communicable disease management and control in relation to the event, and is an essential element in achieving the objectives defined by the communicable disease director (CDD). An important part of the planning process is to anticipate/predict what will happen following implementation of the system. Once prepared, the event management system will probably need approval from the agencies (government and others) involved. Following approval, the system should be evaluated and tested to ensure its usefulness to those same agencies. In addition to the agreed objectives, the event management system may also include relevant policy documents and priorities, and task assignment lists and attached references (e.g. a communications plan, maps, human resource deployment plans, inventories of materials, organization charts, and distribution lists).

Where possible, spectators and participants should be informed prior to the event, through advertisements or in leaflets accompanying tickets, of any special conditions or arrangements relevant to their participation. These might include considerations related to public transport, traffic and parking, clothing, food and drink, sunscreen, shelter, alcohol restrictions, or particular travel health precautions that should be considered prior to attendance.

5.2. Coordination and communication

National plans should assure a coordinated health and medical response with prompt, reliable and standardised communication channels to and from public health authorities, healthcare facilities and other relevant agencies, through the integration of the medical and public health response into the overall incident management system, under a unified command system. Such a system will facilitate

communication both among different health care facilities and between health care facilities, public health programmes and other emergency response agencies.

National plans should also establish procedures for requesting assistance from other countries, and for patient movements of people and resources between countries if necessary, with estimates of the numbers likely to be involved according to different scenarios. Large numbers of persons may disperse from an MG should a communicable disease event occur.

Prompt communication of surveillance data and other information from hospitals and other health care facilities is necessary during a large-scale outbreak, bioterrorism event, or other health emergency (for more information, please see the section of this document dealing with surveillance). Key issues of coordination related to health care facilities include the following:

- Ensuring the ability promptly to report numbers of diagnosed and suspect cases, and related patient information, to the designated public heath authority/authorities
- Maintaining systems for providing additional information to the designated health authority as needed (i.e. identifying patients associated with the MG, the language they speak, and their nationality, where possible)
- Maintaining mechanisms for rapid enhancement of surveillance in a bioterrorism event (e.g. the presence of epidemiologists who could be dispatched to healthcare facilities to conduct surveillance and case investigations)
- Using hospital incident management systems to assure coordinated and effective management and communication during health emergencies at the facility level, and to interface effectively with the community emergency response.

5.3. Case management as a component of outbreak management

5.3.1 Issues to consider

The most important factor to consider when planning outbreak management during an MG is the increased complexity of performing any of the tasks associated with case management due to the extraordinary diversity and disorder associated with an MG.

Issues to consider when creating a case management process during a mass gathering will include the following:

- Capability of dealing with multiple languages, cultures and religions. Ensuring that foreign language interpreters are available, as well as experts and/or knowledgeable consultants in the relevant cultures, may minimize problems
- Coordination with owners and managers of hotels, hostels, boarding houses and camping grounds, to allow for easier tracing and identification of cases
- Establishing contact with embassies of the various foreign nationals, if applicable, to allow for proper coordination and assistance if needed
- Establishing a clear understanding of the legal and judicial framework that governs the roles and authorities of the various involved groups
- Coordinating with credentialing authorities to access systems and records detailing movements through and between various controlled and isolated venues. This can be used to trace movements and contacts

- Coordination with security, intelligence and law enforcement authorities to help locate and identify key or index cases and their contacts, as well to provide coordination and detention for isolation and quarantine where this is necessary to protect public health.

5.3.2 Triage and management of large numbers of cases

Plans should be established to manage a large number of cases. This could be through the health system in emergency rooms near venues, at other locations to which patients are directed, or at the site of a possible or real exposure.

Standardised triaging and triage procedures are essential when attempting to provide adequate care to large numbers of people, irrespective of location. Triage procedures are closely connected to emergency medical (ambulance) services that provide the next link in the chain, giving cases the necessary care. Plans for ambulance utilisation will be closely linked to plans for triage; these ought to be seen as a block of activities for which the same developments and collaboration procedures are needed. While emergency medicine has developed well-defined procedures for large-scale accidents and exposures causing acute illness, the management procedures for large numbers of people exposed to biological agents are in many instances less well-developed. Procedures will be different in different member states, depending on the local traditions and health systems that are present. Best practices suggest that border areas should develop plans for collaborative cross-border management of major events, including between hospitals.

When planning for possible triage and management of large numbers of cases, the following points should be considered:

- Field triage procedures are established among appropriate national experts, including emergency medicine specialists
- Opportunities exist for the training of all staff in these methods
- These procedures are developed for a wide range of risks (e.g. accidental, CBRN events, etc.)
- Hospitals have developed collaboration with neighbouring health authorities
- It should be asked whether issues other than those of public health need to be integrated into procedures in case of an incident (for example, the inclusion of police sampling teams in response procedures, and so on)
- Health care personnel understand that with large numbers of patients and limited resources, an altered standard of care will be necessary on-scene, en route, and at health care delivery facilities.

5.4 Infection control

Infection control (IC) procedures at hospitals and other medical facilities will need to be evaluated and may need to be enhanced. The international experience of the SARS outbreak, and the output of emergency response exercises designed to prepare for a possible outbreak of a novel influenza virus transmissible among humans (influenza pandemic), have demonstrated widespread need for improvements to organizational awareness and adherence to IC procedures. Hospital crisis management plans need to be evaluated and exercised, and SOPs for patient management and isolation precautions should be reviewed and revised, or established where necessary, at all levels of the healthcare system.

Large-scale isolation of patients may be required following an outbreak of infectious disease. It will be important in such scenarios to protect uninfected patients and contacts housed in common settings,

whether patients were deliberately exposed or not. Special training and preparedness for the MG, up to and including the creation or designation of special facilities and provision of personnel with specialized training, may be necessary in order to make this possible.

Increased numbers of people seeking medical care during an MG may result in breakdowns in infection control procedures and capacities, especially when personnel resources are stretched. Demographic factors such as language and culture also impact infection control at medical facilities when visitors seek and/or receive care. A vital part of control of disease outbreaks is the provision of information about the outbreak and disease avoidance procedures to those who are uninfected or asymptomatic, and the problems of language and culture must be taken into account when planning this part of the process.

5.5. Medical services and communicable disease control

Planning for communicable disease emergencies during an MG must involve all aspects of the medical system and must be integrated into the overall health emergency response plan. Such planning typically involves multiple agencies, including: public health; emergency medical services; health care facilities and other medical system assets (e.g. medical equipment and pharmaceutical suppliers, home health agencies, and schools of medicine and nursing); security and law enforcement; and emergency management agencies. Key elements include: provision of medical care on-site at the MG venues as well as at hospitals and clinics; patient transport; surge capacity plans; preparation of responses to mass casualties, natural disasters and terrorism; and communications. A system should be in place to coordinate available medical assets and facilitate communication and outbreak response activities through a unified incident management structure.

Key questions that should be considered by communicable disease directors include the following:

- In an MG, how would coordination between the usual health care system, special medical resources associated with the event (e.g. special health care services that are part of a national or Olympic delegation) and public health be accomplished?
- During a large-scale outbreak, how do you ensure adequate resources to meet increased demands for disease surveillance, investigation and control activities, and the health and medical response?
- How do you ensure a standardised approach to prioritization of available health and medical system resources?
- How do you develop or enhance systems for sharing information and otherwise communicating between medical and public health services (e.g. electronic information sharing)?

Some of the key considerations that must be taken into account when planning for the health and medical system response to communicable disease outbreaks include the following:

- Duration of the event
- Weather and environmental conditions (e.g. water and air quality)
- Nature of the event (e.g. medical services needed for a rugby match will differ from those required at the Paralympics or at a film festival)
- The number of participants and visitors and their health profiles, including organizers, VIPs, journalists, security personnel and volunteers
- The health status and needs of the community hosting the event
- The number of venues that require medical “coverage” or health care services on-site
- Preparedness for dealing with emergencies or mass casualty incidents (MCIs) involving multicultural, multilingual crowds unfamiliar with the area

- The need for special equipment and medical supplies (e.g. personal protective equipment (PPE), respirators, oxygen, tubing and parts, antibiotics and other medications)
- Decontamination procedures and capacity
- The need for accreditation/security for health responders (access to venues)
- The need to train medical personnel at all levels of the health care system, including emergency medical services and hospitals, to be involved in the response
- Ensuring access to information related to specific threat assessments by law-enforcement agencies
- The possibility a range of novel infections in visitors from other regions
- The need to adapt to varying medical practices and standards:

    - Patients' medical records may be unavailable, or unfamiliar and difficult to understand
    - Medication provided to visitors in their home country may be dispensed under different names, different dosages and based on varying standards.

Medical services that should participate in planning for the MG include the following:

- Emergency medical services
- Accident and emergency departments
- Patient transportation agencies such as ambulance and paramedical services
- Hospitals:

    - Adult and paediatric medical services
    - Critical care/intensive care services
    - Psychiatric services
    - Obstetrics services
    - Surgical services and facilities
    - Emergency medicine and medical subspecialties

- Mortuary facilities
- Nursing services
- Infection control organizations
- On-site and/or community-based medical centres
- Blood transfusion services
- Emergency bed services and relief organizations (i.e. Red Cross/Red Crescent)
- Supplies: equipment, pharmaceutical
- Decontamination teams
- Volunteer organizations

5.6. Standard operating procedures (SOPs) for medical services

SOPs for a variety of circumstances can promote efficient and consistent functioning by the various medical services involved in a health emergency response. It is important to review existing SOPs in the context of a potential large scale health emergency associated with the MG, to determine if revisions or new SOPs are required, and to create a process for development and review by appropriate experts.

In a major CD event affecting an MG, the vast majority of patients are likely to be treated in the hospital setting. General planning priorities for hospitals include the following:

- Ensuring hospital security and protection of personnel and patients not associated with the MG from the effects of the incident, and recognizing potential for a secondary incident
- Assuring safety of health care workers, patients, and other staff through training in infection control and management of CBRN incidents, establishing the necessary administrative and environmental measures to implement infection control plans in optimal fashion, and providing adequate amounts of PPE along with training in its proper use
- Providing the highest level of healthcare commensurate with saving the maximum number of lives while protecting the health and safety of the public, disaster responders, and recovery workers
- Implementing standardised guidelines for prioritization and for use of limited medical resources (altered standards of care) in occasions when demand exceeds supply of life-sustaining resources
- Having systems in place to assure prompt and reliable communication channels with public health and emergency management authorities, and to enable frequent communication with hospital staff
- Ensuring the proper tracking and identification of patients during initial treatment, hospitalization, inter-facility transfer and/or final disposition
- Assuring continuation of necessary care for routine patients who are not part of a mass casualty event
- Coordinating with governmental agencies (law enforcement) to understand the special procedures necessary during responses to intentional events (e.g. preservation of evidence, maintaining chains of custody, information sharing, etc.)
- Facilitating recovery of individuals, families, staff and the functional integrity of hospitals.

5.7. Health care system response and surge capacity

National guidelines for triage, and alterations in standards of medical care and use of limited medical resources (particularly life-sustaining resources) when demand exceeds supply, should be available to assure standardised prioritization. Plans should provide for medical management of a large number of patients (and persons who are not ill or exposed but may seek care) that could exceed the capacity of the local health care system. Alternate sites for provision of medical care should be identified for use when the numbers of persons seeking medical care exceeds the capacity of the existing health care system.

Standardised triage procedures are essential to assuring optimal use of limited medical resources at all levels of the health care and medical emergency response systems, including events with large numbers of people evaluated in field or pre-hospital settings, as well as in hospitals and critical care units. All medical staff who are first responders require training in the use of triage procedures.

Key questions and issues that should be considered when planning for health care system responses should include the following:

- Are there any routine communication pathways between the medical services and public health?
- Who has responsibility for medical services? There might be complications if the provision of health care services is predominantly in the private sector
- How are medical services delivered inside the MG vs. outside the MG?
- Medical staff at venues may be contractors or private companies, with the added complications that this brings
- The ownership of the ambulance service and medical services might be different, in which case these systems will need to be approached individually
- Providers of first aid might also be independent, in which case they will also have to be independently approached
- Is there any link in routine work between medical services and public health?
- What is the role of rapid communication (e.g. the health care community knowing when to alert PH)? This will require training of the health care staff *a priori* by public health staff in the nature of their new priorities
- Is there communication in place between various medical services (hospitals, ambulances, on-site medical staff) that enables an efficient response?
- What are the funding arrangements for medical services?
- What are the emergency arrangements if normal medical facilities are overwhelmed?

5.8. Deliberate events (bioterrorism, CBRN)

5.8.1 Introduction

The high profile of many mass gatherings, together with the long lead time involved in preparation for many MG, means that they are attractive to those who wish to make political statements or to highlight a particular causes. The large numbers of people attending MGs, and the extensive crowding and the strains on the infrastructure they impose, mean that MGs are particularly vulnerable to bioterrorist attack.

When clinical or public health surveillance detects cases or clusters of unusual symptoms or diseases, epidemiology should offer the possibility of tracking back to the incident site and identifying the population most at risk. In addition, the use of forensic epidemiology may help to identify the source, and possibly to prevent further events. In this respect, incident response plans for the event should ensure that:

- Proactive steps are taken ahead of the MG to alert public health and environmental surveillance services, and primary, secondary and tertiary medical care services, to be extra-vigilant for the occurrence of atypical symptoms or patients or clusters of unusual illnesses, and to ensure that clear and effective reporting procedures are in place to alert central authorities
- Working procedures and protocols are in place, and exercised, to provide medical support for rising numbers of patients with chronic or life-threatening conditions presenting to primary, secondary and tertiary medical care facilities. This may require the activation of additional medical facilities
- Procedures have been identified for providing at-risk but asymptomatic populations with prophylaxis where available, and for dispensing prophylactic materials (i.e. post-exposure prophylaxis or mass treatment in dedicated centres or through medical facilities)
- There are bulk stockpiles of antidotes.

5.8.2 Investigation of deliberate events during MGs

The basis of preparation for a deliberate event consists of standard techniques for investigation of communicable diseases (clinical, epidemiology, and lab-supported techniques, as well as environmental health approaches where appropriate); but the change in context (political pressure, security considerations etc.) may require adaptation in terms of confidentiality and event risk assessment (for example, in a multi-centred attack that will not correspond to natural epidemiological patters). Forensic epidemiology and law enforcement/security considerations may become of international relevance when the patients travel back to their home countries.

5.8.3 Deliberate event: national planning and resource acquisition

Issues to consider in national planning for an MG should include the following:

- National plans include guidelines and procedures to be used for decontamination of people, material and the environment in cases of bioterrorism
- Validation of chosen methods of decontamination
- Testing timeliness and other aspects of preparedness through regular exercises
- Aggregating information on the capacity for decontamination at national level
- Ensuring there is clarity among all health systems as to the relevant authorities/structures during the various stages of an incident
- Ensuring that health system functions, including public health, are integrated in case of an incident.

5.8.4 Planning for patient handling in a deliberate event

Incident response planning for the reception of casualties at medical facilities must include the possibility of two categories of self-presenting patients:

1. Symptomatic, potentially infectious and/or contaminated victims who flee the incident, or who become aware that they may be at risk whilst present at or passing through the incident, and who self-present at a medical facility
2. "Worried well" members of the public who self-present at medical facilities for treatment and/or reassurance.

Different types of bioterrorism events will have different implications for patient handling. However, to meet all eventualities, procedures should be in place and exercised to ensure that medical facility staff and managers are prepared for a wide variety of biological events.

Considerations related to handling of patients in deliberate event taking place at an MG include the following:

- Ensuring that medical facilities are pre-warned of the incident and the possible arrival of victims, and informed about whether they may be contaminated and/or infectious
- Ensuring the relevant authorities can secure medical facilities so that they are not compromised by contaminated/infectious self-presenters, including ensuring security of multi-function areas such as Accident & Emergency departments, and making sure that victims are directed to a dedicated receiving centre for decontamination prior to treatment (this receiving centre could be an *ad hoc* area set up on the edge of the medical facility)

- Ensuring that decontamination procedures are available and have been exercised for walking wounded and ambulant unaffected victims, and that the requisite PPE and procedures are available for the decontamination teams
- Ensuring that decontamination procedures are available and have been exercised for injured victims, and that the requisite PPE and procedures are available for the medical decontamination teams
- Ensuring that decontamination and post-incident medical support is available for rescue and medical staff involved in the incident zone
- Ensuring that post-decontamination medical assessment, treatment and care processes are in place for decontaminated ambulant and non-ambulant victims and patients, including advice on post-exposure symptoms to be aware of, and follow-up treatment and how to obtain it
- Ensuring that plans are in place to decontaminate or quarantine medical facilities and equipment used in the incident
- Ensuring adequate provision of temporary clothing.

5.8.5 Deliberate events: decontamination

If there is a suspicion that a deliberate biological event may have been combined with or preceded by a chemical, radiological, nuclear, or explosive event, responders, clinic and medical staff and patients may need to be decontaminated. Even if an incident seems to be limited to the release of an infectious agent, until the nature of the agent has been confirmed, the clothing of potentially infected casualties should be removed and discarded to reduce contamination significantly, before casualties are decontaminated and passed to clean areas during triage. In addition, responders should adopt sterile procedures to reduce risk to themselves and the spread of infection.

Response and medical facility staff will need appropriate PPE, which may include body coverings, gloves, aprons, boots, and head coverings appropriate for dealing with potentially infectious victims. To deal with the possibility that infected casualties may also have been exposed to chemicals or radiological materials, health workers should also have available eye protection and fit-tested respiratory protection. Workers will need to be trained in the use and care of this equipment, and sufficient equipment stocks must be readily available to meet extreme situations.

Health workers and other responders who are working in contaminated environments or handling infectious patients will need to be decontaminated before they remove their PPE, using safe change procedures. These may involve the use of chemicals (e.g. soap, water and/or chlorine for disinfection) and/or large volumes of water. Contaminated PPE must be disposed of safely, or decontaminated when possible, to prevent re-contamination of personnel. Large volumes of water will be needed for decontamination, together with the means for the containment and safe disposal of contaminated water. Wherever possible, contaminated water should be neutralized on-site. Where that is not possible, contaminated water should be transported to an appropriate treatment or storage site. Changing areas will be needed so that staff can change into and out of their everyday clothes. Arrangements to secure personal possessions and other items should be in place. Showering facilities for staff that include supplies of clean clothing may be required – and substantial stocks of replacement clothing, along with delivery procedures, may be required for casualties who have discarded their clothes during decontamination or triage. Supplies of blankets and towels may also be required. Temporary accommodation for casualties may also need to be provided in tents. Large stocks of polythene sheeting will be required for washing and decontamination facilities.

Planning for bioterrorism incidents during MG should include involvement of environmental agencies. Following a bioterrorism incident there will be a need to determine the extent of environmental contamination (land, water, wild life, etc.), and the need for remedial activities.

The equipment required for environmental decontamination will vary depending on the cause and extent of the problem. Contaminated items may need disinfection (e.g. with chlorine), incineration or burial.

In summary, assessment and planning for mass casualty decontamination needs to include provision of:

- Stocks of PPE
- Water tankers/lorries
- Sprayers
- Necessary chemicals
- Plastic sheeting
- Tents
- Drying facilities.

5.9. Country experiences of health problems during MGs

5.9.1 World Youth Day, Canada 2002

- Primary morbidity burden was heat-related illness
- Most cases were managed on-site
- A rehydration ward was established on-site (300 beds)
- The response worked because there was a surveillance system in place that detected the early onset of cases and initiated appropriate responses
- There was effective collaboration and communication with emergency medical services and volunteer medical staff onsite
- The role of the ambulance service was crucial
- Surge capacity was planned for, and standby volunteers were brought in
- A medical director for WYD was in-post 2 years ahead of the MG.

5.9.2. 2006 Athens Olympic Games

- Case management requirements inside and outside the MG venues varied substantially, and needed to be planned separately
- The interface between the two consisted of the ambulance system and pre-named hospitals
- Medical care to the "Olympic family" is complicated, and varied according to individual country's requirements and resources
- Supporting countries and organizations identified resources they could mobilize if mass casualties arose (e.g. backup hospitals in case of mass casualties). These included facilities provided by the army and also necessitated the involvement of the private sector
- A hospital to be used for quarantine was identified, but its identity was not publicly disclosed
- Logistical issues had to be resolved around who would take charge of such a scenario; in Athens there was a central coordinating body (top-down in Athens, but effective)
- There was an expectation that information would be shared with the global community
- A central information/control centre was established to coordinate health care.

5.9.3 Hajj - Saudi Arabia

- Some hospitals are set up for a couple of days only during the Hajj
- All medical care during the Hajj is courtesy of Saudi Arabia
- International travel is of high relevance
- The scale of the event increases constantly from year to year.

5.10 Mass dispensing

Past experiences of disease outbreaks and of mass gatherings have emphasised the need for public health authorities to provide affected individuals, visitors and communities with rapid, reliable access to medication both for prophylaxis and treatment. The effectiveness of this response hinges on the ability to recognize the outbreak, mobilize supplies of needed materials to affected patients/populations in a timely manner, and provide ongoing medical care for affected individuals. Comprehensive mass prophylaxis plans for large gatherings should also be made carefully in advance, in order to ensure that visitors and local populations have timely access to necessary antibiotics and/or vaccines in the event of large outbreaks.

5.10.1 Key issues

An important tool for an effective public health outbreak response during mass gatherings is mass dispensing. Epidemiological data may be used to help define the exposed population in order to target and/or prioritize administration of mass prophylaxis and other response measures. The response hinges on the ability to recognize the outbreak, identify the aetiological agent, mobilize supplies of needed materials to affected patients/populations in a timely manner, and provide ongoing medical care for affected individuals. In the 2004 Olympics, the Greek health authorities decided that the mass prophylaxis plan would be triggered if cases exceeded 300.

When designing a mass dispensing plan, key considerations include the following:

- Establishing and maintaining a stockpile (centralized or decentralized) of pharmaceuticals, vaccines and medical supplies
- Basing the content of the stockpile on a risk assessment
- It is anticipated that the event will overwhelm the regular health care or public health system very quickly
- Multiple incident locations may be involved
- There may be parallel requests for health care assets
- Large numbers of persons who are not at-risk but who are concerned may clog the medical system, interfering with response measures. These people may also demand medicines when they do not actually need them
- There may be shortfalls in local capacity to distribute or dispense health care assets
- There may be requests for international assistance
- Officials may need to determine and implement priorities for triage of health care resources very rapidly
- Local jurisdictions may request help with dispensing responsibilities
- The mass dispensing plan is one component of a larger emergency response effort

- The incident could be caused by an organism for which no chemotherapeutic prophylaxis measures or health care is available other than supportive care
- There may not be sufficient personnel available to meet the demands of the situation
- No central logistical or patient database system may be in place
- It is critical to have memoranda of understanding (MOUs) in place beforehand
- Assignment of authority for making requests needs to be sorted out beforehand, as do the facilities necessary to receive supplies.

Major challenges to drawing up a mass dispensing plan include the following:

- Accessibility, storage and transportation of vaccines (e.g. management of the cold chain)
- Expertise in mass dispensing will require training and exercises using various scenarios (for example, the rapid delivery of chemoprophylaxis or vaccines to masses of people is a huge logistical challenge that requires special preparation)
- Communicating the need and usage of mass prophylaxis accurately to very large numbers of people
- Ensuring that systems for requesting WHO assistance are well known
- Ensuring accurate inventory of what is available in-country - this is crucial, but it can be difficult when it includes inventory of private sector resources
- Identifying populations at risk
- Acquiring consent
- Establishing an adequate legal/licensing framework
- Ensuring no problems are caused by the introduction and use of counterfeit drugs
- Dealing with problems of unfamiliarity with drugs and the existence of documentation only in English – health care professionals and patients may experience language difficulties.

5.10.2 Activities that must be covered in any mass dispensing plan:

Surveillance

Surveillance activities used in MG may range from use of passive systems for detecting specific pathogenic microbes in the environment, to development of syndromic surveillance programmes for mining existing emergency medicine, primary care, or pharmaceutical databases in order rapidly to identify unusual clusters of suspicious symptoms (alert mechanisms). Determination of appropriate triggers or action levels in these surveillance systems is an ongoing challenge for medical and public health personnel (please see also the section on risk assessment).

Supply and stockpiling

Response capacity for large-scale events may be limited by the ready availability of antibiotics and/or vaccines. For this reason, in some past MG (e.g. the 2004 Athens Olympics and during the Hajj), central organising committees have created links with national stockpiles, composed of a number of ready-to-deploy "Push Packs" containing medical supplies to treat thousands of patients affected by the highest-priority disease-causing agents (as identified by the risk assessment process), as well as pre-designated pharmaceutical supply caches and production arrangements that may be used for large-scale ongoing prophylaxis and/or vaccination campaigns. In addition, some large venues/municipalities and medical facilities across the country may also consider the development of smaller stockpiles and secure supply chains for critical antibiotics and medical materials.

Distribution

In the context of a mass prophylaxis response to outbreaks during MGs, "distribution" refers to the logistics of transporting materials such as antibiotics and vaccines from stockpile locations to dispensing centres, where they are given to affected populations. These activities will be subject to high visibility during MGs, and should be practiced in advance.

Dispensing

Dispensing operations involve getting medications and vaccines to affected areas/populations. Dispensing centre functions may include mass triage, medical evaluation of symptomatic individuals, pharmacotherapeutic consultation for drug or dosage adjustment if needed, and provision of antibiotics or vaccination. Procedures should be in place for special populations, including children and pregnant women. Additional functions may include data collection and monitoring for adverse effects of treatment, patient briefings, mental health or pharmacist consultations, and emergency transportation for patients requiring medical care. Exposed persons should be given information regarding what action to take if they develop symptoms of infection, and how to minimize risk to others. Additional functions may include data collection, briefing patients, mental health or pharmacist consultations, and emergency transportation for patients requiring medical care.

Dispensing operations and the role of dispensing/vaccination centres

The rapid assessment of the at-risk population and dispensing of antibiotics and/or vaccines during an MG are cornerstones of any mass prophylaxis campaign against outbreaks of preventable disease. Without the ability to dispense large volumes of medications or vaccines to community-based individuals safely, efforts to improve surveillance, stockpiling, or distribution capacity will not translate into an improved public health response. Conversely, dispensing operations are critically dependent on these surveillance, stockpiling, and distribution functions for defining the prophylaxis mission to be accomplished, and for supplying the medical materials necessary for its successful completion.

There are two main conceptual approaches to mass prophylaxis: "push" and "pull."

- The "push" approach consists of bringing medicine directly to individuals or homes in an affected community

- The "pull" approach, in contrast, requires that individuals leave the venues, their homes or places of work in order to travel to specially designated centres where they can receive medications or vaccinations.

Each approach has strengths and weaknesses. The "push" approach may enable faster and more widespread coverage of an affected patient/population, but it has little flexibility to handle medical evaluation for contraindications or dosage adjustment, and may not be feasible for vaccination campaigns. The "pull" approach may increase efficient use of scarce health care providers and resources, enable medical evaluation of potential victims, and provide opportunities for centralized data collection and law enforcement investigation (in the setting of a known or suspected bioterrorism event), but these advantages must be weighed against the delays and logistical challenges of setting up sufficient dispensing centres to handle large numbers of patients, who may be of many different nationalities and speak many different languages.

During mass gatherings, in the case of a large-scale outbreak response, it is likely that the organisers will utilise elements of both "push" and "pull" strategies. For example, in addressing the needs of homebound or institutionalized individuals in an area, a "push" approach may be preferred to avoid complex transportation requirements in the midst of a public health crisis. Alternatively, even if a "push" approach is used to provide the majority of residents with antibiotic prophylaxis, a small number of dispensing centres may be established to handle specific venues and other sub-populations (e.g. volunteers, the "Olympic family", first responders and their families, tourists, and so on).

In planning for mass prophylaxis outreach, consideration should be given to the following:

- Identifying key non-media points of information dissemination in the venue/community (e.g. airports, tourist centres/venues, large hotels, community centres and civic clubs)
- Assisting emergency management professionals in the creation of inventory lists of non-governmental resources that may be donated or lent in the event of an attack (e.g. human resources in the form of volunteers, vehicles, and communication devices)
- Educating the public about the general features of a mass prophylaxis response to natural or intentional outbreaks of disease
- Utilizing the expertise and resources of established local organizations, such as the Red Cross/Red Crescent, etc., in setting up reception centres and supporting the response, coordination of food and shelter, and other support functions
- Establishing volunteer teams and setting up "just-in-time" training procedures to assist with mass dispensing operations.

Follow-up

Follow-up may include monitoring patients in the community for antibiotic effectiveness or vaccine immunoresponse and development of disease, identifying patients who require dose modification, monitoring for adverse effects, and arranging alternative treatment when necessary. In the case of international patients, it may involve multiple countries/facilities, and WHO assistance has been requested on previous occasions.

5.11: Infection control, isolation and quarantine

5.11.1 Introduction & key considerations

Under public health laws, detention or isolation of healthy individuals who have or may have been exposed to a communicable disease (quarantine) might be considered by health authorities in order to slow transmission. However, if a communicable disease has demonstrated the ability to spread efficiently between humans, quarantine measures are not considered greatly effective for this purpose – a conclusion reinforced by a WHO working group, which concluded that forced isolation and quarantine are ineffective and impractical.

Infection control (IC) measures are an important aspect of successful communicable disease control at individual, household, community and health care facility levels. IC procedures at hospitals and other medical facilities should include administrative/organizational, environmental, and personal protective measures. IC policies and procedures should be evaluated and may need to be revised and/or enhanced.

The 2003 SARS outbreak and recent emergency response exercises for pandemic influenza demonstrated a need for increased awareness of the importance of infection control measures in the health care system, at both the organizational/administrative and health care provider levels, including administrative support for training and assuring adherence to IC recommendations. Recommended infection control measures, including isolation precautions and personal protective equipment, should be incorporated into routine procedures for management of suspected and confirmed cases of communicable diseases as well as into hospital and clinic emergency management plans.

In considering IC strategy, communicable disease directors must ask themselves the following questions:

- How do you assure appropriate knowledge of, and compliance with, IC procedures and personal protective measures during the outbreak, at all levels of the health and medical response?
- Are procedures in place to determine when decontamination is required?
- Are appropriate legal authorities and procedures in place for isolation and quarantine measures?
- Are plans, systems and resources ready for carrying out large-scale isolation and quarantine if necessary?

Isolation of large numbers of patients may be required following an outbreak of infectious disease. Special IC training and capacity-building may be useful, including the possibility of designating special facilities and personnel with advanced training for treatment of patients requiring isolation and rigorous infection control precautions. Increases in the number of people seeking medical care during a mass gathering may result in breakdowns in IC measures, especially when personnel resources are overworked and/or are not familiar with IC recommendations and PPE use.

A vital part of controlling disease outbreaks is the provision of information about the outbreak and relevant disease avoidance procedures to those who are uninfected or asymptomatic. Problems caused by language and culture barriers must be taken into account when planning this part of the control process.

Planning for infection control activities at an MG requires an assessment of the risks for the occurrence of various potential infectious diseases. Pathogens that pose the greatest challenges are those which spread readily from person to person in large gatherings of people (e.g. respiratory tract pathogens), and those which are spread in a widely consumed vector such as food or water. Infectious agents not normally found in the host nation may be imported by attendees at the MG and, in addition, there is the risk of the

deliberate release of infectious agents for terrorist purposes. Under these circumstances, routes of transmission may not initially be apparent to investigators.

Infection control preparedness requires the following elements:

1. National guidelines on IC measures for specific biological agents, and standard and transmission-based precautions including:

    - Guidance on patient placement (including isolation and cohorting) and safe transport of patients both in the pre-hospital setting and within facilities
    - Plans for potential shortages of negative pressure/isolation rooms and PPE
    - Guidance on use of PPE for different levels of biological, chemical and radiological risks, and disinfection and/or decontamination procedures where appropriate

2. Training programmes to ensure that hospitals, ambulatory care (outpatient) facilities, health care providers and health emergency responders are familiar with IC protocols and procedures based on the national guidelines, and to promote adherence to the guidelines
3. Adequate infection control planning and capacity within health care facilities, including:

    - Reviewing and ensuring that negative-pressure rooms (if available) are functioning properly
    - Determining existing capacity for isolating patients, both in intensive care units and in other settings
    - Ensuring the existence of facility-specific isolation and infection control guidelines and strategies to ensure the safety of staff, patients and visitors
    - Educating and training for staff that covers:

        1. Monitoring to reinforce adherence to infection control measures
        2. Risks associated with different patient-care procedures
        3. The importance of prompt reporting of exposures and the symptoms of illness
        4. How, and to whom, to report exposure and illness, both within healthcare facilities and to the health authorities.

It is useful for public health authorities to have the legislative authority to screen arriving or departing international travellers for evidence of infection. Under these circumstances, individuals identified as close contacts of ill travellers who have been quarantined may be asked or ordered to isolate themselves at home or at a designated location for the expected incubation period of a communicable disease.

Alternatives to legislatory or mandatory imposed isolation and quarantine measures are often effective strategies. Social distancing measures should be considered, as should communication strategies (coordinated at all levels) that inform people of protective or self-care actions.

5.11.2 Isolation/quarantine

While isolation and quarantine are terms that are often used interchangeably, public health practice distinguishes between them. “Isolation” is applied to individuals known to be contagious; quarantine is applied to people who have been exposed to a communicable disease, but are not yet ill. Isolation or quarantine may be voluntary or compelled by law. Such measures may be considered by health authorities as public health tools for slowing transmission of communicable disease; however, recent work has shown that quarantine measures are generally not effective as a means of slowing transmission

or containing a communicable disease if that disease has demonstrated the ability to spread efficiently between humans[3], and quarantine should therefore only be used in limited circumstances.

Implementation of public health measures such as social distancing and local communication strategies (coordinated at all levels) should be considered as an alternative to, or in conjunction with, legislated isolation and quarantine measures. These serve to:

- Inform people of what to do when they have been exposed to a communicable disease
- Divert people away from the MG site
- Advise people on how to care for themselves
- Advise people how/when to seek health care services.

SOPs for isolation and quarantine should be established in advance, including protocols for obtaining any necessary legal authorization. Advance education and communication with law enforcement agencies and the judicial system is essential, and clear lines of authority within and across jurisdictions should be established. When overlapping authorities exist, additional preparatory work may be necessary to assure a harmonized response.

Under ideal conditions, the quarantining of even small numbers of individuals can be complex. Handling large numbers of people, as could occur if the spread of a serious infectious or bioterrorism agent occurred at an MG, is logistically difficult. In addition, control measures perceived as coercive or punitive may be counter-productive, causing exposed and ill persons to avoid contact with the authorities.

Issues to consider when contemplating isolation procedures include the following:

1. Setting up national guidelines for the isolation of patients considered to be a threat to public health, including the definition of cases to be isolated, and when they can be released
2. Providing negative pressure rooms at nearby/accessible health care facilities for isolation purposes
3. Establishing guidelines for the transportation of patients considered to present a health risk
4. Making available all data on national resources for isolation.

It is useful for national authorities to have the legal power to screen arriving and departing international travellers. Individuals identified as close contacts of ill travellers may be quarantined (i.e. asked/ordered to isolate themselves at home or at a designated location) for the expected incubation period of the communicable disease involved. If it is not clear what disease agent is involved, then a term of quarantine should be established that exceeds the incubation period of the most common agents likely to be involved.

Challenges:

Identifying and isolating the index case (or the theoretical index case) of a communicable disease outbreak, as well as all primary contacts, is challenging even under normal circumstances. At an MG, it is likely to be doubly difficult, due to a wide array of factors including the following:

- The high degree of mobility of those attending the event
- Increased psychological stress of patients, for reasons including the following:

  - Many patients may be foreign visitors away from their homes
  - Many of those involved may speak different languages and have different cultural values to the host nation

- The increased logistical challenges of isolating visitors staying in a variety of types of accommodation, and of tracking, and communicating with, individuals
- The fact that foreign visitors may not have travel or medical insurance. Additionally, if they belong to medical insurance schemes in their home country, it may transpire that these do not cover them in the MG host nation, or that the MG host nation does not have reciprocal agreements with patients' national governments to cover the medical expenses of foreign nationals. In the context of this problem, the following issues should be considered:

  - It is essential to decide in advance of an MG how the medical expenses of foreign nationals may be met
  - Foreign nationals themselves will need to be reassured as to who will pay
  - Consideration needs to be given to how the relatives of those quarantined can be supported (housed, fed, etc.)

- Laws governing quarantine in the host nation may vary considerably from those in the patient's home nation. The openness, transparency and clarity of communication of any public health actions taken are paramount. To improve communication, consultations should be held in advance with relevant embassies and consulates
- The medical system may already be burdened because it is dealing with existing MG issues
- A number of further issues surround the repatriation of cases:

  - When can patients travel?
  - Will commercial carriers allow them to board?
  - Will their home country allow them back in?

- The potential costs of supplying facilities that cover the possibility of long term-care and support in the host nation
- The possible international political issues that may be raised by an event at an MG, and particularly by the imposition of quarantine or isolation measures.

In preparing to deal with quarantine during an MG, preparations and considerations should be given particularly to the following:

- Ensuring that translators are available to explain what is going on to the patients – vital to avoid panic. Plan communications in multiple languages
- Having sufficient facilities available not only for quarantine, but also to house concerned family members. During an MG, transient quarters (hotels, rental quarters) will almost certainly be at a premium, so plan how to make space available
- Assuring that the health and psychosocial needs of persons under quarantine are addressed
- Assuring that the health of those quarantined is monitored, and measures are taken to prevent disease transmission to other persons under quarantine
- Ensuring that there is a sufficient budget
- Establishing *a priori* agreements with NGOs and other organizations (e.g. Red Cross) with mobile isolation facilities, and available capacity to assist in meeting the needs of large numbers of people
- Considering pre-placement of supplies for implementing temporary quarantine measures

- Having agreements in place for the transport of quarantined patients and to assist in their repatriation if needed
- Establishing or obtaining international guidelines for safe travel during or after an event
- Identifying key points of contact in the medical systems of the countries from which attendees are likely to come, and discussing issues concerning their citizens
- Being aware of up-to-date public health/quarantine laws and responsibilities:

    - Maintain communications channels with the various organizations that may be involved, such as law enforcement and judicial agencies, and with relevant foreign embassies and consulates
    - Make sure that everyone involved in the MG is aware of, and agrees to, the various plans and procedures involved in declaring and maintaining quarantine. This may include having to ensure that law enforcement or security personnel have special training, equipment and procedures that will enable them to assist medical personnel.

More specific and detailed considerations include the following:

- Integrating alerts into surveillance systems
- Establishing systems to coordinate all isolation and quarantine decisions with affected national and local health departments
- Coordinating with EMS to ensure appropriate isolation during transport
- Developing agreements with local hospitals equipped to meet the needs of contagious patients requiring quarantine or isolation
- Developing standard protocols to deal with quarantine/isolation requirements for travellers in transit
- Identifying local quarantine/isolation facilities for travellers not requiring hospitalization
- Providing financial support to meet the housing, feeding and other needs of suspected cases, their flight contacts, and dependents in need of quarantine or isolation. Quarantine or isolation should be conducted at no cost to the suspect case and/or local health jurisdiction (i.e. national government should cover the cost)
- Practicing exercises and drills of isolation/quarantine protocols with all involved stakeholders.

5.11.3 Translation and interpretation services

Those organising MGs that attract an international cross-section of participants and visitors should determine the availability of relevant interpretation/translation services early in the planning process. Even if local community service agencies and health institutions have considerable capacity to provide translators, these resources are likely to be exceeded in an outbreak. Bear in mind that medical translation is a specialised process, and that untrained translators from the community may not have an adequate vocabulary or understanding of the issues involved. Planning should therefore include consideration of methods for rapidly recruiting and training "surge capacity" translators. New technologies have provided alternative access to interpretation services, and there are language products and services delivered through telecommunications services that can be easily accessed globally. There are number of service providers that provide immediate telephone access to interpreters with language deliveries for up to 140 languages; these services can assist in supporting the immediate challenges of timely access to interpretation in emergencies, and can minimize additional infrastructure costs.

5.11.4 Issued related to points of entry

Points of entry are the first line of defence against imported diseases, but the ability of port health services to detect disease in incoming attendees is likely to be limited, especially during an MG, because of the large numbers of individuals likely to be arriving over a very short time period. The provision of basic training to customs officers and immigration officials in the detection of those who are possibly infected, together with adequate on-site medical staff, will allow the more obviously ill individuals to be detected and treated. Points of entry will need suitable health facilities and good links with ambulance services, health care facilities, diagnostic laboratories and the disease surveillance system, in accordance with the International Health Regulations (2005). Psychological support may also be needed for those who are taken ill, and for their relatives.

Facilities able to provide appropriate treatment and support must be provided. These facilities must be prepared to isolate those who are clearly ill, and to quarantine those who have been in contact with them, until diagnoses are obtained.

6. Cross-cutting considerations

6.1 Partnerships

Collaboration is necessary both in order to prepare and to respond effectively to a CD outbreak at an MG. Partnerships enable agencies to share knowledge and resources, allowing for greater preparedness.

Partnerships also help establish relationships prior to incidents. Pre-existing knowledge of the capabilities and response procedures of all relevant agencies, and familiarity with key staff in other agencies, go a long way towards ensuring that responses during an emergency are as efficient as possible. Such partnerships enable public and private sectors to develop plans to pool resources and information, coordinate response and recovery efforts, and share educational and training opportunities. Effective partnerships will foster coordination and consistency in approaches.

Successful preparation for an MG requires the participation of a variety of organisations across all sectors. Coordinated collaboration and capitalisation on complementary strengths are essential to an effective response capacity. Collaboration will help to assure that each institution can respond rapidly and effectively to an emerging situation, and to provide streamlined integration of the responses of the partner institutions into other community, regional, and national emergency plans.

- Relevant partners include agencies and organizations responsible for governmental and private health care system assets; other ministries or governmental agencies, such as agriculture, information, and transportation; law enforcement/security authorities; universities; emergency response agencies; and environmental health and food and water safety bodies
- It is critical to have clear identification of different roles and responsibilities for the provision and coordination of medical care (e.g. the incident management system, a unified command structure, etc.) within the context of overall emergency responses to an event (e.g. inter-agency, and perhaps international, responses)
- Collaboration with other medical system responders, including emergency medical services and transport, acute care medical facilities, and volunteer groups providing or augmenting medical care, is crucial
- The interface between public health and health care needs to be clarified, gaps must be identified and filled, and channels of communication must be established and/or strengthened
- Coordination with law enforcement agencies will be crucial: communication platforms, such as a central command and control setting, will be extremely beneficial, and should be established well in advance
- In certain MGs, such as the Olympics, some attending teams will bring their own medical support while others will depend wholly on the facilities of the host country. It is essential that the host nation's medical services liaise with the organizing committees of the attending nations to discover which teams have their own medical support, and to ensure that such support meets the legal requirements and professional standards of the host nation. Credentialing of foreign medical practitioners may be an issue
- Embassies are crucial partners in the event of mass casualties, and their response capacities and requirements are very varied. Contact should therefore be established well ahead of the MG
- The role of the ambulance service is crucial
- It will be necessary to win the cooperation of specific community groups (e.g. during SARS in Toronto, taxi drivers provided resource capacity for the transport of patients), as well as the support of relevant NGOs

- Plans should be put in place for the management of assistance from other countries. As part of the MG planning process, protocols should be worked out and put in place for international requests for resource support.

Country experiences

- Central control/cooperation/integration is crucial, and was shown to work well in London during the London Transport bombings of 2005 and the Polonium poisoning incident of 2006
- The Saudi experience with the Hajj provides a good example of strong federal coordination and provision of resources
- In the Athens Olympics, the media was a key partner in preparation, and there was a clear expectation that it would share useful event-related health information with the global community if necessary.

6.2 Structuring planning efforts

6.2.1 Preparedness

In preparing the alert and response plans for outbreaks in MGs, there are a number of broad and general issues that should be considered in relation to the coordination of the overall MG. The following considerations are intimately related with the outcome of the risk assessment process conducted while preparing for the MG.

6.2.2 Considerations for the planning/control committee for the MG

An internal planning committee for communicable diseases, made up of members from all relevant agencies, can give insight into detailed requirements for planning an MG, as previously mentioned. Once the key roles in the organization are identified and it has been ensured that all areas are represented, the following questions may apply:

- Who needs to be on the planning committee?
- Externally, who needs to be on the planning committee? Consider:
    - Elected officials
    - Police and other first responders
    - Hospitals/long-term care homes/home care sectors
    - ER physicians/family practitioners/infectious disease practitioners
    - Laboratories/pathologists
    - Municipal emergency management bodies
    - Communications/media
    - Mortuary services
    - Legal bodies
    - Community services (water, sewage, utilities, etc.)
    - Labour unions or bargaining agents
- Who is identified as in charge should an outbreak occur, and are the roles of various stakeholders clearly defined?
- Who makes what decisions?

- Who notifies the various stakeholders? A list outlining key stakeholders, including roles and contact information, can be helpful
- Municipalities may have emergency preparedness plans: is your MG emergency plan integrated with the emergency preparedness plan(s) of the local community/communities?
- Have you reviewed the relevant communicable disease and public health plans, and all levels of any existing government plans, to ensure your own plan takes into account what will be happening in the community?
- Who has responsibility for procurement matters, such as ordering resources and/or equipment during an emergency episode?
- Who needs to approve the emergency plan?

In the preparatory phase of an MG, it may be necessary to consider a number of alternative venues for the event. Communicable disease managers may be able to recommend/comment on appropriate venues based on public health considerations, and should consider asking the following questions:

- Will multiple venues be required to stage the MG?
- Is the MG normally conducted at a fixed facility?
- Is it planned to use a fixed facility for anything other than its normal use?
- Is the MG (or part of it) to be conducted at one or more temporary venue(s)?
- Is the MG a one-time event held at a temporary venue?
- What services/utilities are available at the venue(s)?
- What additional services and utilities will be required at the venue(s)?
- Is there a need for backup services?
- What shelter facilities are available in the following areas:
    - Transport pick-up and set down areas
    - Spectator and official viewing areas
    - Seated eating areas
    - Pedestrian thoroughfares
    - First aid and medical centres
    - Marshalling areas for competitors and officials
- What will be the duration of the event, and will it continue during the hours of darkness?
- Have the needs of individuals with disabilities been provided for?
- Does the date of the MG clash with other events to be conducted in the area?
- Will expected weather conditions require any special considerations?

The following is a list of questions related to the major issues that need to be considered when preparing a CD response plan for mass gatherings:

- Is there a single coordinator and/or team, with defined roles and responsibilities, coordinating the CD preparedness and response planning for the event?
- Were all stakeholders involved in the creation of the CD preparedness and response plan?
- Is there a list of reliable sources of information related to the CD threat to the MG?
- Is there a method, including collection and analysis of open source information (such as the internet and various news outlets), for providing current, relevant and up-to-date information to the CD planning committee?
- Are there lists and analyses of available sources of essential materials and supplies to support the communicable disease plan? Does the plan for supplying essential materials take into account the

various risks and anticipated situations that could interfere with normal operations (i.e. power loss, interference with transportation systems, demands of a disease outbreak, and so on)?

- Have issues of critical support infrastructure been addressed? For example, are there backups for power, communications, food, water, etc. in the event of a crisis or disaster? Is there sufficient redundancy for critical systems?
- In the event of a disease outbreak that may affect critical staff, are backups available? If key support personnel call in sick, is there the ability (perhaps through cross-training) to provide backups that will allow proper operations to continue?
- Has consideration been given to shortages that might be caused by the event? For example, are there backup sources for food and water, housing, and vital supplies such as drugs and medical supplies?
- Are there plans to address the need for drills and exercises to validate plans as they are developed, as well as to ensure that proper training and skills have been provided?
- Is the drill/exercise schedule designed to meet the training needs associated with the MG as well as to coordinate with other aspects of the response so that all portions of the response process are tested and maintained?
- Have specific criteria and responsibilities been defined with respect to the implementation of plans? Who starts and stops different responses? Who has authority? What criteria are used to make decisions?
- Is there a single, unitary communications plan, and is the communicable disease plan coordinated with it?
- Is the health of response plan workers considered and properly protected and planned for? Are all workers aware of basic safety, and do they have the necessary training and materials to operate safely? Do they have a vaccination plan, and is it tracked and enforced?
- Is there an occupational safety and health plan? Have relevant organizations (such as local businesses, the local community and various faith-based groups) been involved and included in the plan?
- Have populations with special needs been addressed? This is particularly important during events like the Para-Olympics in which large numbers of people will fall into this category. Have the specific requirements of these people been planned for? For example, are plans in place to cater for the physically handicapped should an event occur?
- Are interpreters available to communicate with all the different language groups expected at the MG, and is published advisory material available in the relevant languages?
- Are there plans in place to address the hygiene of workers and participants at the MG? Are there sufficient hand-washing facilities, cleaning supplies, training programmes, signs, etc. encouraging everyone to participate in achieving improved health and reducing the impact of communicable disease?
- Has an education and communications plan been developed, both for participants and for workers, explaining key issues of hygiene and cleanliness, and the personal steps that should be taken to reduce spread of communicable disease?
- Is there a method in place to counteract rumours and inaccurate information?
- Is there an emergency/crisis communications plan in place? Does it include such information as key contacts, the proper "chain of command", criteria for implementation, methods of tracking, locating and contacting key personnel, etc.?
- Is the communications infrastructure sufficient to allow for remote operations of some personnel should this be required?
- Are communication materials developed to address various languages and cultures, as required?
- Is there an internal communications plan to allow exchange of information between workers, suppliers, vendors, etc.? Is it well-understood and of sufficient capacity to exchange the information required by all support staff at the MG?

6.3 Deliberate events

6.3.1 Introduction

As previously underlined, the potentially catastrophic consequences of an intentional act of bioterrorism mean that the possibility of such an act cannot be ignored and must be included in planning. However, in light of all of the other public health aspects of mass gatherings, bioterrorism should not be allowed to dominate the planning process.

The range of biological agents (and other threat agents that could affect health) that could be used deliberately is extensive (although technical factors may reduce the possible list to those generally regarded as weaponisable). It is therefore unrealistic to attempt to prepare specifically for every possible threat agent. Focus should instead be on preparing to execute a coordinated systematic response to the deliberate use of any biological agent. Moreover, planning to respond to a deliberate event should build on general health preparedness measures, because most of the public health responses required differ little from those required to deal with most naturally-occurring disease outbreaks. The salient distinction is that the likelihood of a deliberate event is not governed by natural processes. This difference is described below. Dealing with the deliberate introduction of biological agents requires consideration of other information, such as security assessments, and the cooperation of law enforcement and health authorities.

Using a risk-based approach for MG provides a balanced means of planning. Generic planning by health services could significantly reduce the effectiveness of a bioterrorism attack, especially where such planning is backed up by measures tailored to particular agents identified as plausible specific threats to the MG under consideration. Local and national planning to deal with mass casualty incidents should include scenarios involving the overt or covert use of organisms by a terrorist. Official planning and preparation should allocate resources for the training of all public health cadres, and for periodic exercises in which an attack by a biological agent is simulated. Planning, preparation and exercises designed to test the effectiveness of the system in dealing with an event that is not deliberate will be of value for operations needed to deal with deliberate events, and vice versa. These exercises should be used to test the effectiveness of the event management system's relationships between first responders in the public health system and other agencies, including police, fire and rescue services, civil authorities, security agencies (intelligence, defence, etc.) and site operators.

With respect to deliberate events during MG, activities that need to be practiced include:

- Testing multi-agency working protocols and procedures, to establish the roles of the medical and public heath services in preparing for and responding to a covert or overt bioterrorism incident
- Multi-agency command, control and coordination procedures at the strategic, tactical and operational levels in the event of a covert or overt bioterrorism incident
- Informing the local, national and international public and media
- Interacting with local and national government
- Informing and/or seeking assistance from the key international organizations, including the following:

    - WHO, for a potential international public health emergency – especially where obligations to report exist under the IHR

- The UN secretary-general (UNSG)/Organisation for the Prohibition of Chemical Weapons (OPCW), for the activation of the international forensic components of field investigations following alleged used of biological or chemical weapons
- Interpol/Europol for coordinating international law enforcement
- The FAO/OIE, to respond to potential zoonotic spread.

Collaborative arrangements involving all partners may have to be strengthened or established in order to optimize the management of risk.

In developing response strategies, all agencies involved in MGs should recognize and plan for the fact that overt, covert or threatened biological attacks present additional and challenging obstacles to providing immediate post-incident medical care and support to the victims of an event. Medical response plans must accommodate the fact that, where a biological attack is known or suspected, medical responders cannot freely enter the supposed contaminated zone to deal with the victims, or can only do so in limited numbers, with restricted capability, with the requisite personal protective equipment.

Avoidance of exposure to the active biological agent is essential in order to prevent personnel (medical and first responders) and their equipment from becoming inoperative due to exposure and contamination. Similarly medical response plans must allow for the delivery of treatment, where this is available, to victims known or suspected to have been exposed to a covert biological attack, and who subsequently run the risk of developing chronic, short-term or fatal symptoms associated with the attack agent.

Because of the incubation period for most infectious diseases (and their delayed manifestation after an attack) it is important that medical response plans cover the immediate response to an overt deliberate biological event as well as the delayed medical sequelae of a covert attack.

6.3.2 Types of bioterrorism agents

In the context of a deliberate biological event, the term "biological agent" is normally applied to pathogenic micro-organisms which replicate in the host to cause disease; these may be bacteria, Rickettsiae, viruses or fungi. Symptoms may not appear for days or weeks after infection with a live agent, but for some agents they may occur in a matter of hours, depending on the dose received and the route of infection. Interpretation of symptoms may be difficult if the route of infection is not the one normally encountered in natural outbreaks, or if more than one pathogen is involved – especially if exposure is spread over time.

Toxins produced by micro-organisms, such as the botulinum toxin produced by *Clostridium botulinum*, are sometimes considered as biological agents, but in fact are toxic chemicals which may be produced *in vitro* and disseminated in a form able to cause almost immediate disabling or lethal effects. Direct attack by toxins will not be considered here.

6.4. Training, exercises

6.4.1 Introduction

In preparing a plan for an MG it is vital to prepare, on individual and group levels, by providing the skills and knowledge necessary to carry out the plan effectively and to respond to any eventuality. Broadly speaking, this preparation can be broken up into three categories:

1. Training

The demonstration and mastering of specific skills associated with each individual task that must be performed.

2. Education

Explanation of why certain tasks must be performed, the presentation of the underlying concepts, and clarification of how tasks are integrated together.

3. Exercises

Relevant exercises can take a number of forms, including the following:

- The testing of basic plan concepts to ensure they achieve the goals intended
- The improvement of skills through drills and practice
- The validation of training and education, to ensure that all aspects of the plan are carried out effectively, and that resources can be focused on those aspects that are still not sufficiently mastered.

MG organisers and the public and private sector partners providing support to MG venues need to ensure that training opportunities, exercise requirements, and the setting of standards are connected to the collaborative planning processes in which they engage. In addition, special emphasis should be placed on observing, identifying, describing, recording, and communicating lessons learned to all partners involved in providing support to venues. Attention to these areas and commitment to ensuring that training, exercises, standards, and lessons learned remain connected to planning is necessary, in order to ensure the public health, safety, and security of those attending MGs or providing support to the venues that host them.

In order to evaluate the effectiveness of activities, the change in emergency preparedness of the agencies affected must be assessed. Emergency public health preparedness is a function of a number of variables, including the following:

- The presence of a competent workforce with a sense of its own ability to meet its responsibilities in an alert response situation
- Institutional capacity to function in an emergency situation, which is determined by the following elements:
    - The availability of appropriate numbers and types of personnel
    - The existence of well-defined plans that coordinate with other response organizations
    - A defined incident command system that complies with the larger incident management system
    - A well-planned and well-equipped location to function as a joint operations centre.

6.4.2 Training and education

Training and education differ as far as subject matter is concerned, but both are designed to impart information to their subjects. In general, training is focused on the development and transfer of specific skills and knowledge associated with performing particular and specific tasks (the “what” as opposed to

the "why"). Education, on the other hand, is usually designed to address the "why", and to provide the underlying rationale and concepts that explain why tasks are done a certain way, or why a plan addresses the issues it does.

6.4.3 Consideration of training in response planning

It is important to keep this in mind when creating the communicable disease plan for an MG, as the plan must be understood – and implemented – by the staff involved. It is not sufficient simply to define what must be done, and how: a strategy must exist to train and educate people to carry out the plan.

As response plans are written or reviewed, the following elements of the process are essential:

- Identifying training needs
- Developing and conducting trainings
- Facilitating, observing, designing, implementing, and evaluating exercises.

6.4.4 Metrics

At every step in the implementation of the CD response plan, it is necessary to be able effectively to measure the performance of those involved. This is important for two key reasons:

- Improving the plan by identifying deficiencies in it
- Improving performance by identifying where effort needs to be spent on improving capability.

Metrics are the means by which the effectiveness of the plan is measured and evaluated. They are vital not only because they need to be applied to training and education, but because they are the underlying basis of the exercises. The exercises must be measured (scored, evaluated) based on the metrics of performance, and must also address those metrics effectively.

6.4.5 Training development

A training needs assessment provides a picture of an agency's strengths and the training needs of its workforce. It should be designed to assess competencies as well as evaluate knowledge. Results from an assessment will assist agencies in determining their training needs, with the goal of improving workforce capacity to provide essential public health services for the MG.

A training plan is a guideline designed to help organizations develop, and/or to facilitate a learning experience that will delineate and/or increase the skill and knowledge levels required of staff in order to assure timely, efficient, and organized responses in a public health emergency. An operational training plan focuses on meeting the identified needs of the organization by providing access to an ongoing learning process. A training plan outlines what training will take place, who will benefit, and how, when, and where the training will be conducted.

Trainings are tailored to meet the emergency preparedness needs of each organization, and focus on increasing competency. Training topics are competency-based, customized for each jurisdiction, and built around local plans, legal responsibilities, and hazards. Training evaluation reports provide valuable feedback on the effectiveness of the sessions.

6.4.6 Exercising response plans

Command and control structures for MGs will involve many organizations and ministries. To ensure they work well, and that lines of communication between various ministries are open and functioning, components of the MG plan should be exercised prior to the event.

Exercises should be designed to assess the competency of individuals and the capacity of organizations to respond to public health emergencies. In addition to assessing the response capacity of personnel, exercises allow organizations to practice decision-making and communications skills, identify future training and planning needs, and establish policies and procedures. These can be designed as tabletop, functional, or full-scale exercises or drills.

Different types of exercise include the following:

Orientation exercises

- Informal
- No simulation
- Discussion of roles and responsibilities
- Introduction of policies, procedures, plans, responsibilities.

Drills

- Single emergency response function
- Single agency involvement
- Often a field component (e.g. fire evacuation drill).

Tabletop

- Informal discussion of simulated, scenario-based emergency
- No time pressure
- Low stress
- Useful for:
    - Evaluating plans and procedures
    - Resolving questions of coordination and responsibility.

Functional

- Tests policy and coordination of personnel
- Practices emergency response
- Stressful, realistic, scenario-based simulation
- Takes place in real time
- Emphasizes emergency functions
- Emergency operations centre is activated and tested.

Field (full-scale)

- Takes place in real time
- Employs real people and equipment
- Coordinates many agencies
- Tests several emergency functions
- Emergency operations centre is activated.

Exercises should have the capacity to address and assess:

- Notification of a public health event
- Response to a public health event
- Communications between agencies/partners
- Internal notifications
- Procuring methods for required services
- Collection, use and disclosure of information
- Effectiveness of public health measures taken
- Media relations
- Training needs
- Contingency plans
- Identification of operational issues.

6.4.7 Evaluation

After training exercises are concluded, the strengths and weaknesses identified therein should be identified in a formal written after-action report, or AAR. Included as part of an AAR is the **improvement plan**, which outlines the actions the relevant authority(s) will take to achieve the improvements suggested in the AAR. The improvement plan outlines the recommendations and actions, and the parties responsible for implementing the recommendations. Examples of possible recommendations include updates to existing plans, policies, procedures, protocols, systems, equipment, training, and facilities.

It should be ensured that planning, training, exercises, standards, and lessons learned are connected and built upon. Lessons learned during training events, exercises, and real-world experiences with MGs are valuable pieces of information, and should be recorded and shared.

6.5 Public information: media and outbreak communication

6.5.1 Introduction

Dealing with the public and media attention brought about by hosting an MG can be one of the most demanding aspects of the gathering. Effective communication addresses public concerns, educates, encourages appropriate public action, and builds trust in public health and government authorities.

Should an event occur, demands in this area change rapidly. Public health crises are characterized by rapidly evolving information, high public concern, confusion, and urgent demands for information. Successful communication can help manage these factors, and at the very least can prevent the damage that poor communication may cause.

During an MG-related health crisis, providing appropriate and timely public communication underpins the success of disease control and containment operations. Good media communication aids any outbreak alert and response process. It's principal aims should be to:

- Build, maintain or restore trust
- Improve knowledge and understanding
- Guide and encourage appropriate attitudes, decisions, actions and behaviours
- Encourage collaboration and cooperation.

As a public health crisis will involve many agencies and partners, an effective communication plan must coordinate with these parties to ensure that the provision of information to the public is both rapid and consistent.

As many public health incidents can be predicted (food-borne illness, weather-related illness, etc.), so can the resulting demands for information. Much of the work necessary to prepare information and obtain clearance approvals can – and should – therefore be done in advance, during the planning stages leading up to an MG. Effective preparation will help manage the intense and sustained communication challenges of a public health crisis that may occur during an MG. For very complex, multi-national, or otherwise challenging gatherings, communication planning should begin as soon as the site and date of the MG is decided.

Some of the key considerations on media and risk communication relevant to MGs are presented in the Annexes to this document. The WHO has produced a handbook for communication planning titled *Effective Media Communication during Public Health Emergencies: a WHO Handbook* – this provides detailed information and planning tools for public, partner and media communications.

6.5.2 Media and communications

Handling the media and the communication of health issues to the public is crucial. A dedicated press office with properly trained staff will be needed in order to do this properly, and will have to include representatives of the major agencies involved and good links with the press offices of those agencies. Senior staff of this office will need to have easy and immediate access to the highest levels of government (via the senior members of the command and control structure), in order to ensure that appropriate messages are put to the public at all times, and particularly in emergencies, when the media have a vital role to play in the maintenance of public order.

6.5.3 Risk communication and the media

Good media liaison and control is an important part of the response to mass casualty events. At most mass gatherings, the media is "on-site" by virtue of their role covering the event. If there is an emergency at the event, it will therefore have media coverage from the onset. Engaging the media as a partner in emergency planning – rather than an adjunct or an obstacle in a crisis – means maximizing the opportunities offered by their presence and potential positive contribution to crisis management. Should an event occur, the media will seek information about it. Reporters will seek access to remote sites, and will attempt to talk to emergency services personnel, survivors, and friends and relatives. Careful control of the media is required if they are not to interfere with the activities of the emergency services, or to put unnecessary burdens on the bereaved or the injured.

At the same time, though, many of those who are injured may wish to talk to the media, and those who do not know the fate of their friends or relatives may wish to use the media as a potential means of obtaining information or contact. The media also have a valuable potential role in the broadcasting of important public information relevant to control of the occurrence (e.g. information or instructions related to crowd control, location of medical centres, or reassurance of the populace).

Two other media activities can impact negatively on emergency responses, and need to be anticipated and planned for. Firstly, the media may seek access to the affected area, and may either seek to pre-empt space on transport (for example helicopters) that is more importantly needed for emergency work, or block or interfere with access to emergency sites with their own vehicles. Secondly, communications can be affected by media activity – there have been instances where use of mobile phones by the emergency services has been impeded or blocked because the media have saturated the telephone systems.

6.5.4: Risk communication with media and public groups during an outbreak

All outbreak management plans should include a communications strategy that defines important roles with respect to the media, including determination of the following responsibilities:

- Who determines what information should be collected
- Who collects and collates information
- Who selects what information should be communicated
- Who prepares messages
- Who authorises messages
- Who contacts the media.

The appointed media relations officer coordinates public information and answers directly to the emergency controller or commander. The person has the following duties:

- Identifying spokespersons on communicable disease and other public health issues during an emergency, for multiple audiences and formats (e.g. spokespersons representing different ethnic groups, media spokespersons, community meetings speakers, etc.)
- Maintaining lines of authority and responsibilities for the public information team
- Establishing contacts with key media personnel, understanding how they work, briefing these personnel on their roles, and determining how they can work together
- Liaising with the national coordination operations centre for the MG, the strategic health operations centre (SHOC) and relevant committees
- Briefing agency directors, central command, CDD and higher headquarters to update, advise on and discuss: information intended for release; incident-specific policy; relevant science and medical issues; and the overall situation
- Developing a timetable for disseminating emergency information, including advertisements for the emergency alert processes (on radio and television)
- Establishing a timetable that ensures that press conferences are regular (e.g. once or twice each day at predetermined times). Having a schedule and sticking to it allows the communications personnel, the media and officials to know what they are doing and remain on top of the situation
- Developing a recognisable logo/symbol that will alert the public that important information is to be or is being transmitted
- Presenting messages as a media package including features, background information and messages, with audio and/or video tapes when possible and appropriate
- Consulting with emergency management authorities to identify priority issues and prepare profiles of target audiences
- Scheduling the public information team so that it can maintain 24-hour-a-day operations (2-3 work shifts per day) for at least several days
- Ensure that the information needs of the media and the public are adequately monitored, through:

    - Triage of media requests and inquiries
    - Responding to media requests (e.g. through daily press conferences, website updates, etc.)
    - Production of media advisories, press releases, fact-sheets, b-roll footage, etc.
    - Monitoring media through environmental and trend analysis (e.g. clippings services, monitoring news coverage), in order to determine what messages are needed, what misinformation needs to be corrected, the nature of media concerns, and media interest during crises.

- Assessing existing telephone capacities in order to determine the need for additional lines during an emergency
- Setting up systems to respond to members of the public who request information directly from the agency, by telephone (e.g. through a hotline), in writing, or by e-mail
- Ensuring timeliness and accuracy of public website information
- Ensuring public dissemination of agency contact information
- Monitoring the public through environmental and trend analysis to determine what messages are needed, what misinformation needs to be corrected, the nature of public concerns, and public interest during crises
- Each plan also needs to ensure that the political hierarchy:

    - Is informed and regularly updated about the plan(s), the roles and competencies of different players, and the relevant points of contact

- Has identified the key members of the emergency response team
- Understands existing systems and processes for dealing with crisis events.

6.6 Security

6.6.1 Introduction and key considerations

Security and law enforcement authorities (SLE) are not usually involved in public health and communicable disease plans and operations. In the case of MGs, however, they are an integral part of the planning and operations process. The SLE will provide the basis for supporting, and in many cases implementing, the direction and guidance of the CDD. The SLE augment the "arm" of the response plan, bringing to bear assets and resources that, when necessary, have the legal ability to compel cooperation and behaviour, rather than merely request it. In some case, the "covenant of trust" between pubic health and the population can not be depended on to protect and defend that same population from threats; under those conditions, the population (however defined) must be compelled to follow direction, sometimes through the use of force.

It will be vital to ensure that the CDD and public health organizations not only understand the authority they may have at their disposal, but also clearly consider and define: the limits of that authority; how, and by whom, it may be exercised; and – possibly most importantly – at what point to *stop* using it. There must be very clear lines of control and command, and very well-defined criteria for what contexts justify use of force.

While generally there is little interaction between the CD community and the SLE, in the MG the security and law enforcement assets will be heavily involved in all aspects of the operation, and will provide an underlying basis for all operations. For that reason, an inordinately high degree of cooperation and coordination will need to be developed and maintained between the CDD and all levels of the SLE.

In considering the rationale for this in the context of mass gatherings, a number of factors unique to MGs should be considered, including the following:

- Occasionally, an MG will bring together many diverse cultures and backgrounds (and jurisdictions). This can be a source of potential confusion during a crisis. The use of a clear, easily-recognized and well-disciplined authority to provide guidance and control will be more important in these situations than under "normal" conditions
- An obvious, clear and demonstrated authority in managing an event will be important in maintaining the confidence of the participants and spectators
- The ability to protect key assets and personnel, particularly in times of crisis, will be vital in allowing for the implementation of preparation and response plans. Security elements usually have this responsibility, and it is important that communicable control and public health assets are protected in this way.

In planning for and implementing the involvement of SLE, it must be realised that the first priority is the protection and support of the management and support elements of the MG. The focus of SLE should be on protecting planners and organizers, public health personnel, medical personnel, etc., in order to ensure that they maintain their effectiveness in addressing whatever crisis may arise. To ensure that this happens effectively, a clear, well-designed and well-practiced plan must be developed.

In working with SLE, the following questions should be considered:

- Is there a clear, effective and secure way of identifying both SLE and communicable disease or public health personnel? For example:
    - Is there an agreed identification method? Special ID cards, passes, etc?
    - Are the proper people in the communicable disease and public health organizations provided with correct identification and access privileges?
- Are key areas and assets identified for SLE so that they know what areas to focus their resources on for protection and support?
- Are there compatible and secure communications structures that allow the CDD and his staff to guide and direct the SLE?
- Does the SLE have sufficient protective gear and training (for example, can they effectively practice IC procedures? Do they have the training and necessary PPE for their own protection?)
- Does the SLE know what special medical procedures or isolation environments they may have to support or work in?
- Were they involved in creating these procedures? For example, can they actually assist in implementing isolation and quarantine procedures if needed? Are these plans workable?
- Will SLE and medical/health response plans integrate and function in a coordinated manner? Were they developed jointly? Have they been exercised, and deficiencies corrected?
- What limits does the authority of the SLE have, and what are the correct processes for implementing that authority? For example, who has the authority to order quarantine, and what are the legal limits of authority for the SLE should a patient be non-cooperative? What other agencies (i.e. a judge) might have to be involved to enforce a medical decision?
- How will border and perimeter controls be coordinated with CD authorities?
- How will identification, location and transport of patients or victims occur?
- Is there a plan for coordination between CD and SLE authorities to identify, locate, transport and detain (if necessary) victims of communicable disease, in order to reduce the spread or impact on the MG?
- Have SLE personnel received proper vaccinations, medications and/or prophylaxis? Can their medical/vaccination status be easily identified by the CDD, so that these interventions can be properly applied in an incident?
- Are the legal authorities and limitations that apply to the SLE in these circumstances clearly considered, evaluated, and understood by all involved?
- Do all levels of management know what can and cannot be done, and under what circumstances?

6.6.2 Liaising with the military

It can be argued that the military almost always has the most effective and ubiquitous resources for logistics, communications, security, intelligence, etc. This array of resources, combined with specialized skill and training, makes coordination with military organizations in support of MGs vital in order to expedite and optimise the communicable disease mission.

In many countries, military assets are at the centre of a vast network of contacts, communications channels and resources. In many cases, the military is the last resort, and possibly the most capable, for dealing with a crisis. Aside from the obvious availability of weapons, the military also houses such diverse resources as medical support, communication and transportation assets, command, control and coordination capabilities, and – crucially – a ready supply of manpower. Careful consideration of how to

coordinate with and prepare military assets should be given: in almost every country, they are unique in their ability to support the missions and needs of a country, its people and its visitors.

In dealing with an MG, a diverse array of needs, missions and requirements will all coincide, requiring an agile and adaptable array of tools and resources in order to satisfy them. These will be especially important in dealing with what is almost always a dynamic, changing situation, not only fluid but frequently very large and resource-intensive.

When planning and coordinating with the military, some considerations may include the following:

- How are the military prepared? What vaccinations, training, special equipment and skills may be available and valuable? What are needed?
- Are specialized units available?
    - Public health?
    - Veterinary medicine?
    - Medical?
- Is there a single point of contact that can be counted on to be available for coordination and operational interaction?
- Is special equipment needed? Can it be obtained?
    - Special radios?
    - Vehicles?
    - Protective gear and equipment?
    - Identification?

6.7 Incident management, command and control, planning

6.7.1 Key issues

Some countries use the incident command system to promote communication and coordinated outbreak response; others have identified committees with the competent authorities involved. In both cases, the following considerations are crucial:

- Data gathered from multiple sources (surveillance sources, laboratories, intelligence, the media, etc.) needs to be integrated into succinct reports for decision makers
- Persons with decision-making authority for health concerns during a mass gathering need to be identified in advance, and the plans for responding to events must be tested through exercises in advance of the event.

No matter how large or small an event, a health sector coordination body is needed to gather data, and to have an understanding of what capabilities are available to respond to outbreaks and their broader consequences during MGs.

One of the most challenging aspects of incident command is the need to coordinate different agencies with overlapping responsibilities that may fall under the jurisdiction of different ministries or different parts of local, regional or state governments. Significant effort is likely to be required to ensure cooperation between such agencies, and detailed negotiations may be required. Legislation and

ministerial directives may be required to ensure cooperation, and formal memoranda of understanding (MOUs) and mutual aid agreements (MAAs) may be needed between different entities at all levels of government and the private sector, if they are not already in place. Even if they are in place, the comprehensive planning and exercising leading up to an MG may require that they be updated.

To streamline the multi-agency functions of the public health command and control structure, the functions of each member organization should be well defined in advance. In addition, the activities of the different participating organizations will be determined by the nature of the MG, its size and duration, and the problems that may be anticipated (e.g. seasonal temperature-related illnesses, accidental injuries) or possible (e.g. significant food- or water-borne disease outbreaks, acts of terrorism). Thus, the staff structure and roles and responsibilities of the assigned participants of the public health command and control committee will need to be expanded to meet the specific surveillance needs of a critical incident – such as an outbreak of a reportable communicable disease – if one occurs. Mechanisms to allow this expansion to occur smoothly and rapidly must be established in advance.

To deal with such contingencies, it is suggested that a core committee should be set up to run the command and control centre during routine pre-event surveillance, with other agencies acting as liaisons and providing information as necessary. However, once an incident has been identified, the full committee will become operational, and relevant pre-identified technical teams must be brought in to advise the committee.

In situations where an act of bioterrorism has occurred, some of the wider responsibilities of the public health command and control centre may be taken up by other ministries and organizations, allowing public health bodies to focus on managing the health aspects of the event.

Participants

A non-exhaustive list of command and control committee members includes:

- Organizers of the MG
- Local government with authority where the event is taking place
- Health care authorities
- Public health authorities
- Emergency medical services
- Fire services
- Law enforcement
- Security services
- Military
- Environmental agencies
- Chemical and radiological/nuclear experts
- Food safety experts
- Public information bodies
- Communications organisations.

In addition to identifying the agencies represented in the command and control structure, the location of the command centre must be selected as part of the planning process. The centre must have access to multiple landlines for telephone, fax and internet communications, and good provision for radio, mobile and satellite communications. The centre must also be equipped with TV monitors, photocopiers,

scanners, telephone- and video-conferencing equipment, and other equipment necessary for its smooth functioning.

The command centre should be located away from high-risk targets identified by security organizations, and maintenance of its security must be planned for. Well-organized terrorists understand that command and control centres are important primary targets, just as on-scene first responders are likely targets for secondary devices. Therefore, the placement of command centres should not be widely publicized, and security protocols and systems – including ID badges for staff and visitors – must be planned for and put in place.

6.7.2 Event management systems, data communication and management

Rapidity in the detection of disease problems is essential, but the prompt sharing of alerts/information is even more crucial. It is essential to ensure the integrity of the information exchanged, to validate its content, authenticate the sender(s), and verify the reception of the messages sent. Pre-established notification forms may help speed transmission, as well as helping ensure the clarity of the information that is shared. Planning should include the establishment of a searchable archiving function for incoming messages, as well as the appointment of a moderator (for validating, modifying, adapting and selecting messages, adding information, and closing discussions or cases).

When planning for data management needs and communication tools and procedures for use between services, the following steps should be considered:

- Implementation of pre-established notification forms (the purpose of which is the rapid transmission of clear messages)
- Establishment of adapted, secured communication channels
- Authentication of sender(s)
- Validation of content
- Verification of the reception of messages
- Establishment of security measures to ensure availability of services and data, integrity of data, and authentication of nodes
- Maintenance of security
- Fulfilment of the requirements of different services
- Ensuring that different services are competent to cope with all risks
- Setting up a platform to establish – and regularly update – standards for collected epidemiological data and results (currently in development in field event/investigation management tools (i.e. FIMS, EMS) in WHO)
- Establishment of adapted secured communication channels
- Establishment of standards in electronic reporting of collected lab data and results
- Establishment of standards in routing and security of data
- Development of common metadata descriptions
- Integration of information from multiple data sources, preserving linkages between entities, objects and events
- Identification of the national and international partners of this platform (WHO, etc.)
- Liaison with command and control structures.

6.7.3 Multi-agency coordination

A mass gathering will entail the coordination of a vast array of organizations, agencies, services and resources. In many cases it will bring together organizations that have never worked together before. More importantly, the public health and communicable disease organizations will begin to expand their array of contacts, and to work with groups who had never even considered the existence of communicable disease problems, let alone included them in their planning processes.

In preparing for an MG, it is vital to consider how communicable disease and public health organizations will be integrated, and how they will interact with the wider planning process. Involvement in the process at as early a stage as possible will be necessary to ensure not only that the CD agencies are aware of how planning is progressing, but that they have the opportunity to influence the process.

During an MG, it will be necessary for communicable disease agencies to work outside their normal spheres of contacts for a variety of reasons, including the following:

- A vast array of new skills and resources will be needed to support the MG, and they will be functioning together in novel ways
- Use of data and resources, such as security and intelligence services, will be important. In the majority of cases they will have little experience of being drawn upon and/or integrated together in a public health context
- Integration with international groups and organizations, using the new resources they present but also bringing to bear new skills, will be important.

As plans are developed, not only must they take into account the needs of managing the CD aspects of an MG, they must also be compatible with the plans of those organizations with which the CD community will interface. In creating these plans, important considerations include the following:

- Security organizations need to be contacted, including those involved with: intelligence collection and analysis; law enforcement; immigration and customs; logistics and communications; border control and enforcement; and government departments and ministries of foreign affairs. It is important not only to invite them to join the CD planning process, but to ensure also that key members of the CD community are invited to their meetings as well
- If members of the CD team need to have security clearance or access to classified material in order to fulfil their responsibilities, the process of acquiring it should begin many months before the MG, because it can often be a lengthy one
- If secure or otherwise special facilities or communications are needed in order to share information with other organizations, they should be made available and tested well in advance of the MG
- If special training is needed to interact with various groups, this should also be carried out in advance. For example, the law enforcement community might require special training and equipment in order to join CD personnel in their operations when needed
- The potential special requirements of any other relevant agency personnel must be considered in advance
- It must be ensured in advance that relevant agency personnel have proper vaccinations, access to PPE and relevant training, and access to proper medication and medical care
- Any necessary approvals from senior policy makers must be in place well in advance to define relevant roles and missions, and provide proper authority when needed
- Contacts must be made in advance with key personnel internationally.

6.7.4 Strategic (health) operation centre

The creation of a strategic (health) operation centre (SHOC) will be necessary in order to ensure proper coordination, control and distribution of information to the various health authorities and organizations involved in preparation, monitoring and response. The SHOC will act as the single point of coordination and control for all health-related bodies, and as the principal point of coordination with other involved agencies and organizations. This is necessary because the various assets of the health system are diverse and widely dispersed, and newly-developed procedures and other challenges increase pressure on health systems during MGs.

Considerations related to the development and implementation of a SHOC include the following:

- Information management: fast display of important data, graphs and pictures, and fast transmission of early warning and alert messages, are necessary in order for stakeholders to make rapid decisions based on correct information
- Communication: the SHOC must coordinate the gathering of information and monitoring of information sources, dissemination of validated information, and provision of support to stakeholders
- Establishment of systems and methods to allow all agencies to communicate
- Establishment of systems and methods to exchange scientific advice, including *ad hoc,* real-time consultations on precautionary and control measures
- Data management and communication: managerial tools are needed for various aspects of response
- Ensuring direct feedback from intervention teams and on-site support, and providing assistance in epidemiological investigations and the collection and analysis of data
- Ensuring further feedback from teams with expertise in clinical and patient isolation matters and other response aspects
- Ensuring the facility can operate 24 hours per day, seven days per week
- Monitoring and directing intra-community activity leading to the linking of existing health emergency operations
- Coordinating between existing national operation centres serving as “hubs” for the MG
- Linking up with the early warning and response system (EWRS) of the WHO or other international/sub regional agencies (EU, ASEAN, etc.)
- Providing a platform for exchange of information on planned activities relating to specific health threats and emergencies, and response to unexpected health threats and incidents.

6.7.5 External expertise

External scientific advice is useful in this context in order to integrate relevant information, through rapid consultation and identification of vulnerability and possible response actions. This is done through risk assessment, determination of corresponding control actions and countermeasures, and identification of the resources and methods needed to implement these actions.

In planning for rapid external consultation during incidents with public health consequences, the following are key considerations:

- Are contact lists available for individual experts?
- Do procedures exist for rapid consultation of relevant experts?

Operational links need to be set up to consult experts. These require the following:

- Arrangements for consultation of expertise for each kind of incident
- Lists (directories, registers, inventories) of available national expertise/points of contact to be used in case of nuclear, chemical, toxicological or biological incidents
- Definition of the role of external agencies such as WHO, CDC, HPA etc. as contact points for CD and public health expertise, and of their role in the management/maintenance of the public health expertise list
- A public health directory based on at least three groups of experts: laboratory; clinical management; and epidemiological/outbreak management
- Setting up of operational links with and between the national/regional structures expert in animal health plant, food, civil protection, radiological issues, and so on
- Setting up of operational links with and between the points of scientific expertise available in external agencies such as WHO, CDC, HPA etc., and the relevant scientific committees in the fields of consumer safety, public health and the environment
- Setting up of operational links with WHO, and any other necessary international organizations, for the MG.

The following questions also need to be asked:

- Have the Global Outbreak Alert and Response Network (GOARN) member states designated their experts?
- Have experts been approved to participate in MG planning and/or operational processes?
- Is a system in place for the consultation and use of expertise?
- Do member states update and forward their lists of experts on a regular basis?
- Have the necessary issues been addressed for the participation of experts in planning and running the MG (travel, reimbursement, passports, insurance, etc.)?

Operational links for a consultation process and use of expertise may also be considered and planned for. These require the following:

- Agreement on the procedures for consulting for advice or participating in an intervention
- Agreement on the procedures and the financial rules for exchanging advice or expertise
- Agreement on the procedures and the financial rules for exchanging advice or expertise internationally
- Agreement with WHO on the international aspects of outbreak investigation

- Agreement on rules of conduct
- Endorsement of agreements by specific authorities
- Rapid mechanisms for raising funds for participation in international interventions.

6.7.6 Country experiences

- Greece did not have a health sector coordinating body prior to the 2004 Olympics. They established the coordinating body in preparation for the Games: it functioned well during the Olympics and has continued to serve the country since
- At time of writing the United Kingdom is planning for the 2012 Olympics. They are using an incident command structure adapted to their unique governmental structure. Strategic, operational and tactical response objectives have been identified
- For the Hajj, Saudi Arabia has committees that include the relevant government bodies tasked with addressing the issues identified in prior years of the Hajj.

6.7.7 Managing infections/outbreaks with WHO

During an MG, host country health authorities can request assistance – via their national focal point (NFP) – from WHO and possibly from the Global Outbreak Alert and Response Network (GOARN).

The roles of WHO in such instances include the following:

(1) Public health surveillance, response, and support. WHO provides global public health surveillance and coordination/collaboration in investigation, assessment and response, and gives technical support to states parties
(2) Dissemination of key event-related public health information to states parties, and others as specified in the IHR (2005)
(3) In public health emergencies of international concern, the IHR (2005) also provide for determination by the WHO Director-General that one or more extraordinary events constitute public health emergencies of international concern (PHEIC) according to specified criteria and procedures. While such emergencies are expected at present to occur relatively rarely, the context of international MGs may present unusual opportunities for international disease spread. In such contexts, the Director-General would, among other actions, issue specific "temporary recommendations" for health measures to be implemented internationally in order to prevent or reduce the international spread of disease, and to avoid unnecessary interference with international traffic (articles 12, 15, 17-18, 48-49 of the IHR (2005)).

Office of the WHO Representative (WRO)

In most countries, the WHO has a country office led by a WHO Representative (WRO). The WRO provides the most important link between the WHO and the affected country for the purposes of gathering technical information, providing the local context in which an event takes place to WHO, conveying the opinions and preferences of the country to WHO regional and central headquarters, and relaying relevant information back to the affected country. During an MG event, the WRO's role in the event management process includes the following:

- Exchanging technical information between the event management group (EMG) and National Authorities, including NFP
- Contributing to WHO assessments
- Conveying WHO assessments to national authorities
- Representing countries' needs to WHO
- Coordinating WHO's assistance in response and supporting/administering WHO event-specific field missions
- Being the spokesperson for WHO.

Event management by WHO during mass gatherings

At the request of the MG organizers, WHO may appoint an event manager (EM) for a given MG. The EM is responsible for reviewing all event assessments from a global perspective, and leading the event management process when an event involves more than one region. This function is broken into two primary elements:

1. Performing and maintaining ongoing technical assessments of events
2. Undertaking effective responses to events when warranted.

The EM may be located in the country office, in the relevant regional office (RO), or at WHO HQ. The role and activities of the EM and the EM team include the following:

- Leading event management processes for events that may impact member states other than the host nation, by:
    - Performing initial screening of data
    - Ensuring that WRO input is provided and captured in event management systems (EMS)
    - Maintaining communications with NFPs (through contact points)
    - Maintaining communications with HQ
    - Recording actions/decisions
    - Identifying potential public health risks of international importance, and entering them into EMS
    - Instructing contact points to send verification requests to NFPs
    - Leading joint risk assessment processes
- Liaising with country offices
- Summarising available information
- Driving ongoing risk assessment with NFPs
- Sharing all event-related information, actions and decisions in the EMG
- Instructing contact points to convey inquiries or responses to NFPs
- Ensuring that relevant global disease expertise – in WHO HQ and in technical institutions – is made available
- Ensuring consistency and the meeting of relevant standards.

6.8. Logistics

Perhaps the single most important aspect of any large-scale endeavour is logistics – but this area is often overlooked. Whether in an MG, a national pandemic response or a war, logistics – the identification,

acquisition, transport, storage and provision of materials, resources and supplies – is the single most important aspect for planning and implementation. A breakdown or failure in logistics will impact all aspects of an operation, and will do so in a more dangerous and broad-based manner than failures of other aspects.

Logistics encompasses everything from having enough pencils and paper in conference rooms when needed, to getting unspoiled, edible food to those who are hungry when they need it. Among myriad other things, it involves ensuring adequate fuel for vehicles; providing those vehicles when they are needed; providing sufficient computers and cell phones; providing and maintaining the internet connections and phone accounts that allow them to work; providing electricity; and providing and the offices and lights that use it.

In an MG, logistics are even more demanding, for a number of reasons including the following:

- The infrastructure (and therefore the logistics system) will be strained, as it will usually have been designed to deal with "normal" as opposed to extreme conditions like those imposed during an MG (crowded roads, lost tourists, high communication demands, unplanned and extreme burdens at all levels of supply, etc.)
- Simultaneously, the needs of an MG make logistics even more important
- The more diverse needs of a dynamic and rapidly-changing MG population will increase the diversity of supplies needed
- In the event that a crisis does occur, suddenly everyone will need support immediately, and all their needs will be high priority
- Medical and public health needs can often provide unique challenges, as drugs and pharmaceuticals not only require special storage transportation and monitoring conditions, but may also, in the event of a communicable disease disaster, require special security for protection from the public.

When considering logistics needs, it is vital that there is close and continuous communication between the CDD and their staff and logistics and supply personnel. Apart from normal supply needs (shelter, communications, food, water etc.), there may be specific and unique requirements to be addressed, in addition to the issue of what priority is placed on those needs. When developing a logistics plan, the following questions should be asked:

- Are logistics personnel aware of any special procurement, handling, transportation and distribution requirements?
- Have the security and law enforcement people been involved in the process as well, to ensure they are also aware of special security requirements?
- Is there sufficient redundancy in the public health and CD systems (communications, power, transportation, security) to allow vital services to occur? Often, the CD and public health portion of the response to an MG is overlooked in planning, and not considered "critical" when priorities are defined. Make sure that this issue is addressed early and effectively
- Are sufficient supplies available, or planned for, to address sudden surge requirements during times of stress or crisis? These include the obvious, like food, water and medication, but also the less obvious, such as special medications, communications, and transport
- With a large number of diverse cultures and religions potentially involved in an event, are their unique needs addressed? Will medications and supplies be available for various, potentially unfamiliar, ailments? Will various types of chronic disease treatments be available based on anticipated attendance? Specific populations may have an unfamiliar incidence of diseases
- Will special religious or cultural medical and health needs be addressed effectively?

- Based on risk assessment models, some response requirements can be anticipated and supplies from stockpiles can be pre-positioned to be readily available for the event: have caches of special supplies been defined and planned for?
- Have special distribution needs been prepared for? For example, should the mass distribution of vaccines be required, have sufficient trained personnel and supplies (for example, bifurcated needles for smallpox vaccine), as well as vaccination sites, been planned for and made available?
- Will sufficient security be available for materials and delivery personnel? Do security personnel know where vaccination provision-sites are, and do they have a plan for providing support to them?
- Are logistics personnel aware of, and prepared to deal with, special sampling and testing procedures that may be required to ensure the safety of food and drugs?

6.9. Communications systems

In recent years, large-scale emergencies have exposed communications failures in EMS and health care systems. Disaster events have not only overwhelmed emergency response communications capacity, but they have at times uncovered emergency medical and hospital communications systems that are antiquated and unable to harness the benefits of modern communications technologies.

The backbone of any plan or response is always the ability to communicate. This is no less so during an MG. Especially in the case of the management of a CD outbreak, it is vital for implementers of the CD plan to be able to communicate information and instructions throughout the entire organizational structure of the MG.

Communications take many forms, and must function within many diverse environments. A wide range of information, from audio and video data to laboratory results to feedback from remote monitors and sensors to Internet data, will all need to make use of the communications backbone. In addition, a wide array of audiences and media will be involved, ranging from the general public using radios and television, to the use of specialized, highly secure, encrypted video-teleconferencing or cellular phone devices; all may be part of the network.

The most important consideration in planning communications systems is ensuring **interoperability** – the ability for all different devices and systems to function together. Just as one cell phone on one network can call and speak with a telephone made by a completely different manufacturer and hosted on a different network on the other side of the world, so must one radio be able to interact with another. This is doubly important when working across different organizations that impose the added complexity not only of different networks and hardware, but also of different levels of security that may occasion various, and possibly conflicting, needs for secure communications. The need for proper allocation of radio channels, plans for radio discipline, etc. are vital.

When dealing with security, it is necessary to consider a whole array of issues that may be foreign to the CD and public health communities. Issues ranging from access control to hardware to special protective measures associated with information may all need to be implemented. This is particularly important when dealing with national security organizations (such as the military, law enforcement or security agencies) that may have much higher requirements and standards for dealing with information, well beyond traditional requirements of patient privacy. The procedures of such organisations are almost certainly more standardised and detailed than those traditionally associated with medical and public health data.

In considering communications networks in the context of an MG, a number of factors unique to such an event should be considered, including the following:

- An unusually large number of cell phones, many of them placing unfamiliar loads on the existing network, will be present and competing for bandwidth
- People from many different cultures and countries will be present, speaking and reading a wide array of languages. Therefore, the operation of communications by those unfamiliar with the devices and their instructions will result in a larger-than-usual number of errors and mistakes
- Due to the surge in requirements, traditional services and support personnel and systems (e.g. cable electricians, phone company services and computer technical support personnel) will be in high demand but will have low availability; this will impact the timeliness of responses to needs and service calls
- Being so vital, but also so vulnerable, the communications system may be at great threat as a potential target for terrorists. While CD and public health organizations may not be specific targets, they may nonetheless be seriously affected in the event of an attack
- Working in an environment of this nature is often outside of the normal experience of the CD, public health and medical communities. As such, extensive training in procedures, policies and requirements may be required. In addition, the procurement of large quantities of new and potentially unfamiliar devices may be needed. As a result, planning for communications needs, to include the types and sources of data needed as well as the acquisition of equipment and the installation and training that goes along with it, should start as far in advance as possible.

To address many of these needs and provide some issues for consideration, the following issues and questions should be considered when creating the communications part of the CD plan.

- First and foremost, redundancy and reliability must be considered in the communications
    - Conclusions about what is needed will be the result of considering a number of factors, including the results of the risk assessment, the available resources (funding), and the priorities placed on different communications aspects by the overall organizing committee
- What requirements will exist for safeguarding equipment? Are sufficient resources available to meet them?
    - Many communications devices are both expensive, and designed to be portable. Is there sufficient secure storage, and are monitoring systems (inventory control, etc.) in place to ensure proper protection from pilferage and loss?
- Has the communication plan been prepared and coordinated with all relevant organizations?
    - What types of information will be needed, from where, and how often?
    - Are facilities available (rooms, desks, etc.)?
    - Is the necessary infrastructure available (cell towers, phone and internet lines, phone jacks, etc.)?
    - Have all of the other agencies (both up and down the command chain) been involved?
- Have the various support organizations (such as cable and phone companies, internet service providers, and so on) been coordinated with? Have timelines for their involvement been developed?
- Are all relevant persons clearly aware of the requirements they must fulfil? If there is a central communications management group, do they know what is needed?

- Have sufficient time and resources been set aside to train users both in the use of new equipment, and in any new protocols and procedures that may be required?
- Have sufficient resources been dedicated for a "help desk", to ensure that all users have sufficient access to technical support to meet the communicable disease plan needs?

    - Do all relevant personnel know how to contact technical support?
    - Is technical support sufficiently available (i.e. open enough hours) to meet operational needs?

- Do key and critical personnel have sufficient communications access?

    - Do key personnel need special phone lines or equipment installed in their homes? Cars?
    - Have other necessary arrangements, such as special security or storage requirements, been made?

- Are backup communications systems defined and implemented?

    - Are there radio networks available from one command post to another to provide key communications?
    - Have backup communications networks been defined, and are they sufficient?

- Is there a need for a dedicated communications technician whose exclusive task is to serve the needs of the CDD and his/her organizations?

    - Should there be a technician to act as a liaison and ensure that the technical issues and questions associated with CD and the public health plan are sufficiently addressed, even if the users lack sufficient technical knowledge to define those needs?

- Are there enough printers, displays, speakerphones, and related supplies (all of the peripherals needed) to meet the needs of the CD plan?

    - Are space, connections, power outlets, etc. sufficient to meet these needs?
    - Are they sufficiently configurable to address future changes?

- Is there a single communications plan that can be used and updated to ensure that the communications system is sufficient to meet the needs of the organization?

    - Is there a regular review process to ensure that the communications plan is up to date and meets everyone's requirements?

- Are contact numbers and information available for all key personnel, and have they been verified?

    - This may include details of international contacts, as well as those of scientific advisors and points of contact in other agencies.

- Is there a plan in place to ensure that, when key information (such as access codes) or hardware (secure phones) is lost, stolen or misplaced, it can be protected or deactivated so that the communications system is not compromised?
- Does the system provide for selective notification of key, predefined groups (such as, for instance, all epidemiologists)?

- Will the system allow for determination of geographic position (e.g. will it provide the precise location of someone who is calling on a cell phone)?
- If so, are there plans in place to make use of this capability?
- Is an automatic log of all calls and information made so that it can be referred to in the future?
- Are there ways of safeguarding or destroying (i.e. in a shredder) any hard-copy sensitive information from each potential source on the network?
- Have guidelines been written and provided to everyone on the proper and approved use of communications devices? For example, are personal calls allowed? Long distance? Who pays?

6.10 International Health Regulations (2005)/IHR (2005)

The International Health Regulations (2005) entered into force on 15 June 2007, and are legally binding upon 194 states parties around the world (including all WHO member states). While many IHR provisions will be relevant in the context of mass gatherings, key rights and obligations of states parties include:

1. State obligations to notify, report or verify public health events to WHO**:**

- **Reporting/notification by states parties to WHO:** notification to WHO is required for all cases of (i) certain specified diseases, and (ii) all events of sufficient seriousness according to at least two of the following four criteria, regardless of the particular disease or risk: (1) seriousness of public health impact of an event; (2) unusual or unexpected nature of an event; (3) risk of international spread of a disease; (4) risk of implementation of international restrictions on travel or trade. Events that fulfil any of these requirements are notifiable as events that may constitute a "public health emergency of international concern" (PHEIC). Unless it involves SARS, influenza of a new subtype, polio, or smallpox, notification of MG-related events would fall under the second category.

  Outbreaks or other serious public health events in the context of major MGs appear particularly likely to be subject to notification (especially when they involve international travellers, trade or transport), as they may fall under at least the last two notification criteria concerning international spread or restrictions. The IHR (2005) specify that criteria for notification may include events "in an area with a high population density", and hence that have the potential for a high public health impact; or those that occur in association with an international gathering, and hence which may pose particular risk of international travel or trade restrictions. Other criteria for notification may be triggered if there is evidence of local spread, or if a linked case has a history within the previous month of participation in an international gathering (IHR Article 6, Annex 2).

- **Reporting by states parties to WHO on imported/exported international public health risks.** Another provision requires that states other than the host country of the MG inform WHO of such international health risks outside their territories as are manifested by imported/exported human cases, infected/contaminated vectors, and contaminated goods. This may be particularly relevant for states receiving travellers or other traffic from a host country experiencing such an event (Article 9.2).

- **Verification.** If WHO receives information on an event that may constitute a PHEIC from sources other than official notifications or consultations, WHO is required to seek verification of the event and related public health information from the state in whose territory the event is allegedly occurring. States are obligated to provide such verification to WHO within specific time frames (Article 9.2; 10.1-2; 6.2).

2. Provisions specifying health measures which, potentially subject to various conditions, states may or may not apply to international travellers (e.g. compulsory examinations, contact investigation, isolation/quarantine) and international conveyances (e.g. inspections and document requirements for international aircraft, investigation of shipping and other carriers, trade restrictions, etc.)**.**

- For public health purposes and subject to specific requirements, states parties may impose the following requirements:

    - On arrival or departure in or from the country, travellers must provide information on their itinerary for inspection for potential contacts with infection/contamination, and on their destination so that they may be contacted. Travellers must also undergo a limited, non-invasive medical examination (Article 23.1(a)(i)-(iii))
    - On arrival or departure, international cargo, goods etc. must undergo inspection (Article 23.1(b))
    - International travellers, transportation and trade must be subject to additional necessary public health measures, based upon scientific evidence, principles and other requirements (including WHO guidance in some circumstances). In the case of international travellers, these may include, where appropriate, invasive medical examinations, vaccination/prophylaxis, and isolation/quarantine (Articles 23.2; 43)
    - International aircraft, ships, and land vehicles must be subject to health/sanitary document requirements

- When implementing health measures under the IHR (2005) that affect international travellers (i.e. persons undertaking an international voyage), states parties must comply with various requirements. These may be particularly relevant for states hosting MGs involving international travellers, as well as for other states in which such travellers may arrive after participating in the MG. These requirements include the following:

    - Restricted use/confidential treatment of personal health data (Article 45)
    - **Prior express informed consent:** subject to certain exceptions and requirements, no medical examination, vaccination, prophylaxis or other health measures can be carried out without a traveller's prior express informed consent (Article 23.3-.4). However, if the traveller fails to consent to medical examination, vaccination or other prophylaxis which is permitted under the IHR, or refuses to provide the specific information or documents authorized under the IHR (noted below), he/she may be denied entry, or in extraordinary contexts, public health measures may be imposed without consent (Article 31)
    - **Treatment of travellers:** states parties must treat international travellers with courtesy, and with respect for their dignity, human rights and fundamental freedoms. States must minimize any discomfort or distress associated with health measures implemented under the IHR. This includes taking into consideration issues of gender, socio-cultural, ethnic or religious concern. In addition, for travellers who are quarantined, isolated or subject to medical examination or other procedures for public health purposes, the state must provide adequate food, water, accommodation, clothing, medical treatment and other requirements (Article 32)
    - States must observe limitations on some charges that may be made to travellers for the health measures that are applied to them (Article 40).

3. National public health capacities. In an obligation that will become increasingly important over time (including with regard to MGs), the IHR states that all states parties must either have or develop national core public health capacities, throughout their territories and at some international ports, airports and ground crossings, for detection, assessment, control and reporting of public health events (Annex 1).

7. Other key issues

7.1. Psychological services during public health emergencies

A disease outbreak or other health emergency that happens during an MG may lead to increased demand for psychological support services. This may be magnified if the outbreak is particularly widespread, has a severe health impact, or is the result of a deliberate act. To cope with the need for services, a host nation will need to assess its current capacity to provide services to people in the following categories:

- People who have been directly affected by the disease, or who have been identified as potentially exposed or otherwise at risk
- People who are indirectly affected by the health crisis, but who nonetheless have an emotional or mental health response that requires psychological support. Such people may include the following:
    - Friends and family of patients
    - Attendees at the MG
    - Event organisers and staff
    - outbreak response personnel
    - Medical personnel.

If the outbreak affects visitors from other areas, it should be expected that there will be family members from the visitors' home nations who try to obtain information on the condition of their family member(s). Other nations that have hosted large gatherings have found it helpful to establish services to support such demand for information (e.g. family assistance centres, missing persons registries and hotlines, etc.). Establishment and maintenance of these types of services require well-staffed telephone helplines.

Religious leaders, counsellors and social workers who are available to support those seeking news can provide helpful assistance, and organizations such as the International Federation of Red Cross and Red Crescent Societies can play a critical role in such a response.

7.1.1 Mass casualties and psychosocial support

The term "mass casualty event" (MCE) can be defined as:

> *"An event that generates more patients at one time than locally available resources can manage using routine procedures, and which requires exceptional emergency arrangements and additional or extraordinary assistance."*

Most commonly used in connection with an accident or natural disaster causing large numbers of physical trauma cases, the term can be used in the context of MGs as a synonym for disease outbreaks or epidemics, whether natural or as the result of human activity (e.g. associated with mass catering, or due to the deliberate release of an organism). It should be noted that mass physical trauma events can be attended by high levels of CD infection if good aseptic and antiseptic procedures are not followed. In addition to MCEs that exceed surge capacity by virtue of the volume of patients, a small number of unusually complex cases (e.g. chemical, biological or radiological cases) can also exceed the response capabilities of the medical system.

All types of MCE can be attended by high mortality rates, but death tolls can be markedly reduced by proper planning. In addition, survivors of MCEs often suffer disabilities or long-term health impairment, physically or psychologically. Such disabilities impose a long-term burden both on the health sector and on society in general, and draw scarce resources away from other essential programmes. These long-term sequelae can be reduced by responding in a timely and effective manner to the initial MCE.

In MCE situations, it will be necessary to prioritize provision of care based on best outcome for the greatest number of patients, versus the more traditional approach of individual medical care. Triage will have to be used at various levels in the medical system, and this will consist of initial assessment and segregation of cases so that the most good can be achieved by the available medical resources. Factors impacting triage decisions (such as incident location, access and availability of trained response personnel and material resources) will influence the numbers of cases that can be assigned to different triage categories, and the severity of disease that can be managed by the available medical system.

Effective medical triage requires experienced and trained medical personnel on scene to direct patient sorting, whether those personnel are senior paramedics or physicians trained in emergency medicine, or other medical specialists. It is important that the triage process is carried out properly, because failure to assign priorities correctly can result in inappropriate use of resources, which may subsequently result in poor patient outcomes in patients who could otherwise have been saved or treated more effectively. Triage is a dynamic process that takes into account the fact that severely injured or diseased patients are inherently unstable and will deteriorate over time without definitive care. Many triage schemes are in use, and the CDD needs to assess which is the most suitable for use in the host nation (for more information, please see the further reading section). Triage will also need to occur at healthcare facilities, to which patients will be transported, or where they will self-present for care.

The following factors must be considered when planning the triage and management of large numbers of cases:

- Standardised triage procedures must be established among national/local multidisciplinary medical experts, including emergency medicine specialists
- Standardised triage procedures should be used consistently at all levels of the medical system, according to centralized guidance
- Staff at all levels should be trained in these methods
- Triage procedures must be developed for a wide variety of threats (e.g. deliberate release, human-related events such as food poisoning, and natural outbreaks such as influenza)
- Other relevant agencies must be aware of the triage process, and integrated in case of an event (e.g. police, armed services, border control authorities).

Existing day-to-day casualty management is the foundation for mass casualty management. The host nation's ministry of health (MOH), or alternatively the highest health authority in the country, should therefore strengthen all existing health care systems that address the issues of MCE (including, but not limited to, the trauma care systems in the country).

Baseline capacity building should begin with the MOH performing a comprehensive analysis of health care resources available in the MG host nation. This analysis should map and evaluate available health care facilities, personnel (numbers and specialization/training), and equipment. Based on this analysis, decisions can be made to evaluate what additional resources are required to enable the MG to respond to MCEs, and to enhance these resources to the optimum levels.

7.1.2 Psychosocial support services

A disease outbreak or other health crisis that happens during an MG may lead to an increased demand for psychological support services (PSS).

The need for PSS may be magnified if the outbreak is particularly widespread, has a severe health impact, or is the result of a deliberate act. Psychological issues can be divided into those relating to staff, performers or participants, and spectators. These three groups also need consideration in two contexts: in the course of their normal activities, and in response to an emergency.

To cope with the need for services, a host nation may need to assess its current capacity to provide services to people in the following categories:

- Those who have been directly affected by the disease, or who have been identified as potentially exposed or otherwise at risk
- Those who are indirectly impacted by the health crisis, but who nevertheless respond emotionally or mentally in a fashion that requires psychological support. These may include friends and family of patients, attendees of the MG, persons in the community with underlying psychological conditions or disabilities, and outbreak response and medical personnel.

While staff and volunteers can be trained in stress management, if the outbreak affects visitors from other areas, there will probably be family members from the visitors' home nations who will try to obtain information on the condition of their family member(s). Other nations that have hosted MG have found it helpful to establish services to support such demand for information (e.g. family assistance centres, missing persons registries and hotlines, interpreters, etc.). These types of services require large numbers of well-trained staff to man phone-in helplines, and a well-organized management system. The response to the emotional and psychological effects of the MG should be integrated into the overall incident management structure.

Considerations related the possible psychological issues affecting spectators include the following:

- The effects on individuals of such MG-related risks as crowding and physical stressors
- Crowd behaviour, before, during and after an event. Planning for this includes the prediction, prevention and management of potentially hazardous behaviours including convergence or hesitancy to evacuate
- The psychological environment, including expectations of conflict, delays, confusion, or vulnerability – for example, at large memorial/religious services
- Crowd and individual behaviour in emergency situations – for example, a bomb threat or a fire. Considerations include best methods of instruction, types of instruction, languages that will need to be spoken, and prediction of and response to unsafe behaviours (e.g. disorderly evacuation)
- The longer-term effects of an emergency on the spectators – including group and individual approaches to assisting psychological recovery. This includes ensuring means of identifying, contacting and providing services for those affected.

7.2 Environmental health

7.2.1 Introduction and key considerations[4]

One of the most fundamental defences against infectious diseases is good sanitation and hygiene. Environmental Health (EH) departments and Food Safety Agencies (FS) and their staff have key roles to play in the prevention and control of communicable disease at MGs, during which large numbers of people are potentially exposed to such environmental health hazards as impure water, contaminated food, overcrowded accommodation, and poor sanitary facilities in hotels, event venues and transport facilities, or on conveyances if appropriate controls are not in place. The role of EH and FS staff is to ensure proper identification, control and management of EH and FS issues, and to monitor facilities such as food preparation and food outlets. Water quality and waste disposal are key in the prevention of cases and outbreaks of common disease.

EH monitoring and surveillance is an integral component of the overall surveillance programme, and an integrated environmental health surveillance and response system will be needed to ensure comprehensive controls. Such a system will need to be set up early in the planning of the event, so that all the areas where EH and FS involvement is required can be defined, proper management and control systems can be set up, and potential problems can be identified.

Some key considerations in the creation of an environmental health and Food safety plan include:

- Monitoring of:
    - Food preparation hygiene
    - Water quality (includes drinking and recreational waters)
    - Accommodation (including hotels, boarding houses)
    - Facilities for the disabled
    - Travel sites (airports, ports, stations, bus stations) – monitoring should cover sanitation, food supplies, waste disposal, etc.
    - Conveyances
    - Waste management
    - Pest control
    - Potential causes of health problems (e.g. heat, cold, cooling towers, disease vectors, terrorism, etc.)
- Data collection and handling and the dissemination of results.

Unique sanitation challenges may present in the context of an MG, requiring special planning considerations. These might include the following:

- The fact that attendees are likely to come from disparate cultures and ethnicities, and will have varying general levels of health
- The fact that they will have different dietary practices and methods of food preparation that will complicate the monitoring process
- Wide variations in hygiene knowledge and practice

[4] For the full EH related informational materials, see www.who.int/phe/en/ or www.who.int/phe/en/

- Communication of health promotion regarding hygiene and sanitation guidance – this may be complicated due to language constraints
- The fact that many attendees may come from areas with very different climates to the host nation, or from areas of different altitude
- The fact that many may be exposed to novel infections, and may have little or no idea of control measures (e.g. for vector-borne diseases such as malaria)
- The presence of novel disease in visitors, interacting with environmental factors (such as potential vectors), could result in the establishment of novel infections in the host population.

7.2.2 Site assessment

Assessments will initially be needed to determine the capacity of the agencies involved in EH and FS issues to meet the demands of an MG. This may require a simple assessment in association with the HQ and management staff of the agency, or it may need an in-depth assessment of local capacity, especially in the area(s) immediately affected by the event. Environmental health/sanitation and food safety specialists should be involved in the consultation.

Since the results of the assessments may have considerable financial implications and may demand reconstruction, renovation or training activities if deficits are discovered and must be remedied, these assessments need to be undertaken as early in the planning process as possible.

Once the infrastructure is in proper shape, large numbers of inspections of locations and activities that will impact on attendees will need to be undertaken (e.g. inspections of hotels, food suppliers and outlets, public sanitation facilities, and water supplies). These should be identified by a proper risk assessment to identify high risk premises that will need particular attention. Data analysis of past performances will help identify those with previous poor performances.

7.2.3 Surveillance

A surveillance system will be needed to monitor specific problems impacting on EH and FS matters. Decisions will have to be made as to whether this should be part of the overall health surveillance, or separate. The former is the better option, to avoid the risks of duplication of results and breakdowns in communication. The EH and FS surveillance effort should therefore be a section of the whole surveillance system, staffed by specialists in the gathering, analysis and interpretation of EH data.

7.2.4 Emergency response

Problems detected by surveillance may demand an emergency response, and a rapid reaction team of EH or FS specialists should be available at the time of the event to deal with problems as they arise. Deliberate chemical and radionuclear events during an MG may require dedicated planning/response.

7.2.5 Water quality

There are numerous sources of water that will need to be monitored regularly for quality. These include the following:

- Sources of potable water (e.g. water treatment plants, supplies to food preparation areas and outlets, supplies to hotels etc. and domestic premises, bottled water preparation plants, and imported supplies of drinking water). Generally, bottled water is considered as food and is usually under the areas covered by food safety control authorities.
- Recreational waters (swimming pools, boating lakes, rivers etc. used for competitions or recreation)
- Water for general use (e.g. water used for washing, watering plants etc., or in any other context where contact with the public is possible – e.g. via aerosols).

It will be necessary to define and standardise items such as sampling methods and the types of laboratory tests used, as well as procedures for the emergency disinfection of water sources found to be contaminated.

7.2.6 Food safety

The increase in the numbers of persons in an area as the result of an MG leads to a great increases in the amount of food that needs to be brought into the area, prepared for eating, and served, and the resultant waste to be removed. The number of available food outlets will need to be increased (possibly greatly increased), and existing outlets will have to handle greater throughput than usual. Increases in outlets and throughputs in turn demand increases in numbers of staff, and in requirements for training staff properly in food preparation and food hygiene.

Increases in staff numbers and the demand for large volumes of food pose a serious risk of transmission of food-borne illness. Many of the staff involved in preparing or serving food may be poorly educated in food hygiene, or may be from other countries and unable to speak the language of the host country very well. Many of these staff may be engaged at the last minute, or even during the event. In addition, individuals will attempt to take advantage of the situation and set up food vending operations at the last minute and free of any control or supervision. Ensuring high standards of hygiene in food preparation and distribution is therefore difficult, requires a good training and awareness programme, and necessitates large numbers of well-trained inspectors and supervisors.

It is desirable to have in place legislation to ensure that sanctions can be taken against unlicensed or unregistered vendors or those who fail to meet appropriate standards of hygiene in food preparation and vending areas, or who cause outbreaks or cases of food poisoning.

Several steps can be taken to reduce such risks:

- Establishing and strictly enforcing a licensing system for vendors of prepared foods (including everything from restaurants and cafes to street vendors and ice cream salespersons)
- Establishing a register of all vendors of prepared food, including the following:
    - Fast food outlets
    - Food/drinks at venues
    - Hotels
    - Markets
    - Restaurants
    - Providers of food on transportation systems, including trains, buses, aircraft and ships
- Recommending and/or providing training and awareness programmes for licensed and registered vendors

- Providing simple training materials for licensed vendors to use in training staff
- Implementing an expanded food hygiene inspection system
- Holding discussions with food manufacturers and working with them to ensure high standards. Those contacted should include the following:

    - Well-established manufacturers of national foodstuffs
    - Specialist manufacturers
    - Manufacturers of particular foodstuffs (e.g. ice cream, biscuits, meat products, sauces etc.)
    - Producers of national/ethnic foods
    - Producers of foods prepared according to specific religious practice (e.g. halal and kosher foods)

- Holding discussions with food importers and working with them to ensure high standards. Those contacted should include:

    - Importers of raw materials
    - Importers of prepared foodstuffs

- Assessing food distribution systems and holding discussions with appropriate trade associations, representatives etc., in order to ascertain clearly the pre-existing capacity for food preparation and distribution, and the changes required to meet the needs of an MG.

Many governments have, or are in the process of developing, food safety infrastructure to ensure that food produced for domestic consumption for export meets international food safety standards. Strengthening national food safety programmes requires that national policies and resources are put in place to support the necessary infrastructure, and that food legislation, monitoring and surveillance and inspection procedures are up-to-date, along with adequate and available food-borne disease surveillance, education and training. Proactive risk analysis can reduce vulnerability in the same way as analysis of the risks of inadvertent contamination.

The resources allocated to food infrastructure need to be proportional to the likelihood of a threat, the magnitude and severity of its potential consequences, and the vulnerability of the system. The possibility of intentional contamination needs to be an integral consideration in safety planning, and measures to prevent sabotage should augment, not replace, other activities. Typical food safety management programmes within the food industry include good agricultural practice, good manufacturing practice and 'hazard analysis and critical control point' (HACCP) structures and HACCP-based systems.

7.2.7 Public health/environmental health/Food control laboratory services

Public health and food control laboratories have three main functions in supporting the EH services. These are:

1. Testing of water samples (potable water, recreational water, and waters for use in public areas – such as for watering plants, settling dust, etc.)
2. Testing of food for bacteria, toxins and other microbiological, chemical and physical hazards.
3. Testing of environmental samples (for example, from preparation and serving surfaces in food outlets).

In the absence of a specialised toxicology/poisons laboratory, public health laboratories may be required to stand in.

Considerations when planning for environmental sampling include the following:

- Defining a sampling strategy with regard to the objective of the investigation, including the sampling method and number of samples to be taken
- Obtaining access to building plans, managers and technicians (e.g. acquiring information about fans, filters, ductwork, air conditioning systems, and so on)
- Defining risk limits
- Defining geographical dispersion areas and the mobile goods within them that need to be sampled
- Defining the percentage of negative controls ("field blanks") among the total number of samples that are to be taken, and the manner in which these will be obtained
- Defining procedures for obtaining bulk samples. Bulk samples can help investigators characterize the presence of contamination on such building materials as carpeting, dust cakes on air filters, settled dust (e.g. rafter dust), and office equipment. However, because extracting spores from bulk samples can pose exposure concerns for laboratory personnel, appropriate precautions (such as double-bagging of samples) ought to be taken to prevent secondary spreading of spores from contaminated bulk samples
- Defining detection limits
- Surface sampling with wipes or swabs (surface samples are collected by wiping or swabbing a moistened, absorptive medium across a nonporous surface). When planning for surface sampling, the following issues need to be considered:

    - Defining media that will be compatible with the laboratory's analytical procedures
    - The possibility of collection of surface samples via high-efficiency particulate air (HEPA) vacuuming. Collecting samples by vacuuming offers the advantage of flexibility – it covers large or dusty, non-porous and/or porous surfaces, including carpeting, ceiling tiles, ventilation systems filters, and cloth seats
    - Defining collection methods for different surfaces and materials

- When considering the collection of air samples:

    - Define procedures for collection of different contaminants.

7.2.8 Toilet facilities

It is essential that toilet facilities are provided with capacity to handle the MG attendees. These should be sited at convenient and readily accessible locations properly distributed throughout the site, and should be constructed and maintained so that they remain hygienic and pleasant.

- Separate toilets should be provided for men and women, with at least one toilet seat for every two hundred females and at least one toilet seat for every three hundred males. The location of all toilets should be plainly indicated by signs
- Each toilet room should meet the following requirements:

    - Doors should be self-closing
    - Adequate ventilation should be provided to the outside
    - Toilet tissue should be provided

- Easily cleanable receptacles should be provided for waste materials
- Waste receptacles should be covered
- Privies should be located and constructed so that they will not, whether via by leakage or seepage, pollute a water supply, surface water, or adjacent ground surfaces
- Suitable and adequate washing facilities should be provided which are convenient for toilets and privies, as well as to food-handling facilities.

7.2.9 Hand-washing facilities

Hand-washing facilities, with running water under pressure and soap and paper towels or other approved hand-drying methods, should be available near each group of toilets and near each food service area.

7.2.10 Sewage disposal

- If a chemical toilet rental service is to be used, all toilets should be located so as to be readily accessible by service vehicles, and should be serviced as often as necessary. Material removed from such toilets should be disposed of in a public or community sewerage system, according to local directives
- If water-carried sewerage facilities are provided, the sewer system should be connected to a public or community sewerage system with wastewater treatment facilities of adequate capacity to treat the flow of wastewater from the MG. No sewage should be discharged to the surface of the ground or into any watercourse
- Any toilet or sewage disposal system should be so constructed and located as to avoid polluting any source of drinking water or watercourse, or creating a public health hazard.

7.2.11 Solid waste collection and disposal

- Facilities should be provided for all solid wastes to be collected and stored in leak-proof, non-absorbent containers. All solid waste should be removed daily or more frequently, and disposed of in a community solid waste disposal facility, or in a sanitary landfill to be constructed in the area
- Approved receptacles should be provided at convenient locations throughout the site, and at each food service facility, for the collection of solid waste
- If bulk solid waste storage containers are used, at least two four-cubic-yard containers should be provided per 1000 persons in the case of once-daily removal, or two two-cubic-yard containers per 1000 persons in the case of twice-daily removal. These containers should be located so as to be accessible to solid waste service vehicles
- Adequate facilities should be provided and maintained for the satisfactory collection, treatment, and disposal of sewage.

7.3 Management of fatalities

There is a likelihood that some of the individuals attending a large MG with a high number of attendees will die during the event, due to natural causes, accidents or other trauma. Locals and visitors who are citizens of the host nation who die can be dealt with by following normal national procedures. Procedures will also usually be in place to deal with small numbers of deceased foreigners, because this is a likely occurrence even without the presence of an Mg – especially if the host nation has a thriving tourist trade.

In all cases of death, the primary concern must be that the remains of the deceased are handled in a safe and effective manner, so as to reduce the possibility of risk or health complications for the staff and surrounding populations. Once safety is considered and addressed, the dead must be treated with respect and, as far as possible, the rites prescribed by their religion or culture should be followed.

Dealing with the dead requires great cultural and ethnic sensitivity. Different nationalities, races and religions have different death rituals, and should be allowed to observe them where possible. Such rituals may involve the laying out and washing of the deceased. The bodies of those who have died of natural causes, trauma or most infectious diseases pose no special hazard to those handling them, provided basic safety precautions are observed (protective gloves and aprons, hand washing, etc.). The ritual preparation of the dead for disposal can therefore be observed safely, although those involved should be advised as to appropriate hygiene precautions, and should be provided with the required PPE. Local undertakers (morticians), who will usually have the appropriate experience, should be involved from the outset in handling bodies.

Under such circumstances, the burial or cremation of the dead and observance of normal funeral activities pose no health problems. Should relatives wish to repatriate the deceased, arrangements will have to be made with the airlines involved and with the government(s) of the receiving country/countries, and the relevant embassy or consulate will be involved.

Relationships built during the planning stage with embassies and religious leaders in the host country will help ensure that such problems can be minimised or avoided. There are several reasons for which problems or challenges might arise:

- As previously mentioned, the relatives of those who die may wish to repatriate the body of the deceased. This will involve collaboration with diplomatic representatives and international transport carriers
- If terrorism is suspected or known to be involved, forensic examination of the deceased may be required. There may be conflicts between the need to investigate a death and religious customs regarding treatment of the dead
- Contaminants or pathogens may be present that prevent the release of bodies to relatives
- Bodies contaminated as a result of a biochemical incident will require decontamination before they are examined or transported for cremation or burial, and this may conflict with religious or cultural observances.

Emergency mortuary facilities may be required in the event of an MCE, and large numbers of pathologists may be needed for post-mortem examinations.

If the individual or individuals have died of a disease or deliberate incident that renders the cadavers unsafe, then the normal rituals may not be possible, repatriation will probably be impossible, and the local authorities, in consultation with the CDD, will have to consider whether burial is safe and appropriate, or whether the bodies should be cremated. Since this may conflict with the normal practices of particular religious or ethnic groups, discussions need to be held in advance with leaders of these groups, to ensure that they are aware of the possible situations and can act to support the authorities.

There are a number of key items that could be considered in such cases:

- Assessment of likely attendance at the MG by persons from other countries and of different faiths should be made in advance. Contacts should be made with the appropriate embassies and religious leaders, to discuss arrangements for the proper disposal of the dead of relevant nations or faiths
- Mortuary facilities must be provided in which the dead can be preserved until appropriate legal proceedings have been undertaken, and where relatives etc. may easily attend to identify and claim the deceased
- Plans should be made to provide emergency mortuary facilities in the event of mass fatalities. Cold stores normally used for food can be employed as temporary mass mortuary facilities, as can refrigerated vehicles. Alternatively, such facilities can be provided in buildings, huts or tented structures, but refrigeration will be needed and sources of suitable refrigerators should be identified in advance
- Some religions require that the dead be buried within 24 hours of death. Should this be impossible due to legal or other considerations, the relatives or friends of the deceased will need to be informed and counselled. Appropriate religious or ethnic leaders should be on hand for this purpose
- The dead must be identified. This may be difficult if they have, for example, been involved in an explosion or the collapse of a structure, and if they are from another country, dental records etc. may be difficult to obtain. Other related considerations include the following:

    - The need to cope with the psychological distress of survivors
    - Legal problems affecting the surviving relatives – for example, those concerning inheritance, compensation, insurance and/or the remarriage of spouses

- Capacity must exist for forensic investigation if a terrorist or criminal action is suspected or involved
- Diplomatic procedures must be in place should the death of a foreigner render them necessary
- Special care needs to be taken by those handing the cadavers of individuals who have recently died of:

    - Certain vector-borne diseases (e.g. plague, typhus), because the vectors may remain present and infective on the cadaver
    - Some gastrointestinal diseases, such as cholera
    - Acute haemorrhagic fevers (e.g. Ebola, Marburg, Lassa)
    - Suspected terrorism using a biological or chemical agent

- Proper use of PPE and good hygiene practices will protect such workers. These should include:

    - Universal precautions for blood and body fluids
    - Disposal or disinfection of contaminated items
    - Avoidance of contamination of personal items
    - Provision of facilities for hand hygiene after handling bodies and before eating
    - Disinfection of vehicles and equipment
    - Hepatitis B vaccination.

In addition to these general issues on management of fatalities, the following is a more specific and detailed list of questions that should be asked during the planning process:

- Do national guidelines exist on the management of large numbers of fatalities?
- Are links in place with clinical and surveillance services, to facilitate the collection and collation of data on mortalities and systems, and to share data with relevant agencies?

- Are systems in place for death certification and the generation of death certificates, especially for those from abroad and in the case of mass fatalities?
- Are national plans in place to address post-mortem care, and to inform pathology departments and clinical laboratories on the submission of specimens for examination or disposal, and the use of personal protective equipment and standards?
- Do guidelines on handling fatalities from transmissible agents exist?
- Are stocks of PPE available, and are staff trained in its use?
- Does the medical examiner/coroner service need to be developed to meet the needs of the planned MG?
- Are adequate mortuary facilities available, with plans for emergency facilities to deal with MCEs?
- Are there adequate stocks in place of items such as body bags, coffins, embalming fluids and other equipment and supplies?
- Is an adequate numbers of hearses available?
- Has the range of religious and ethnic groups attending the MG been assessed, and have contacts been made with relevant religious leaders and with embassies and consulates to discuss the arrangements for dealing with the potential deceased?
- Are psychological and counselling services available for the bereaved?
- Are legal services available for the bereaved, and are they capable of dealing with the range of national and international legal matters that can arise when resolving the affairs of the deceased, particularly foreign nationals?
- Are interpreters available?
- Are mechanisms in place to coordinate with law enforcement for investigation of MCEs, including those due to the deliberate release of biological agents?
- Are counselling and support services available for those who are dealing with the deceased, especially if large numbers of the deceased are involved, and if those dealing with them have little experience?

8. Key links and bibliography

8.1 Key links

Effective Media Communication during Public Health Emergencies, a WHO Handbook [1]

http://www.who.int/csr/resources/publications/WHO_CDS_2005_31/en/.

http://www.ahrq.gov/downloads/pub/biotertools/cbmprophyl.pdf

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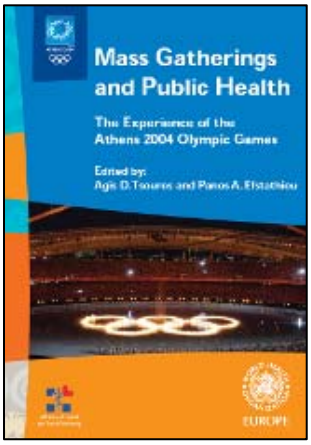

8.2 Further reading

In addition to what exists on the WHO web sites in HQ, regional HQs and country offices, the following selection of further reading may help the CDD, by providing additional considerations and technical information.

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