Mass Gathering

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Objectives

- Define mass gathering
- List MG characteristics that represent public health risk
- List and understand the steps of MG risk assessment
- Identify risk based on event assessment
- Understand the components of risk identification and characterization
- Understand the components of risk management: surveillance and response.
- Understand the role of WHO in MG.

Mass Gathering

- Mass gatherings (MGs) are events attended by large numbers of individuals, concentrated in a specific area for a specific purpose and over a limited period of time.
- Number of participants: >1000 persons, although most literature suggests >25000 persons

- The World Health Organization (WHO) definition also takes a broader view of mass gatherings to include the public health dimensions and defines mass gatherings as events attended by a sufficient number of people to potentially strain the public health resources of the community, city, or nation hosting the event.

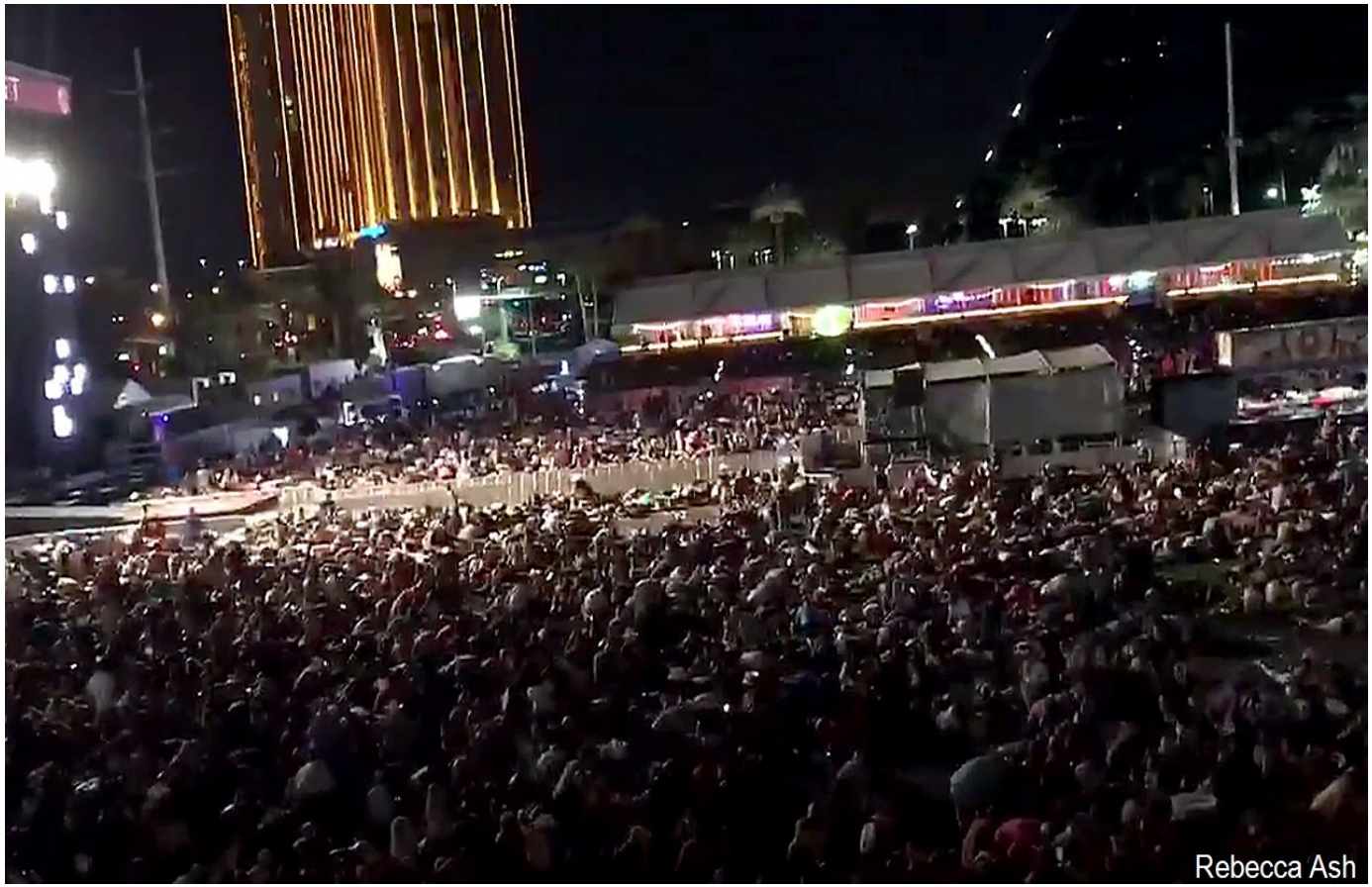
- “Mass Gatherings Medicine” is an area of medicine that deals with health aspects during mass gatherings including the health effects and risks of mass gatherings and strategies for effective health services delivery during these events.

- The formal discipline of mass gatherings medicine was launched at the World Health Assembly of Ministers of Health in Geneva in May 2014.

Examples of MG

The London Olympics 2012

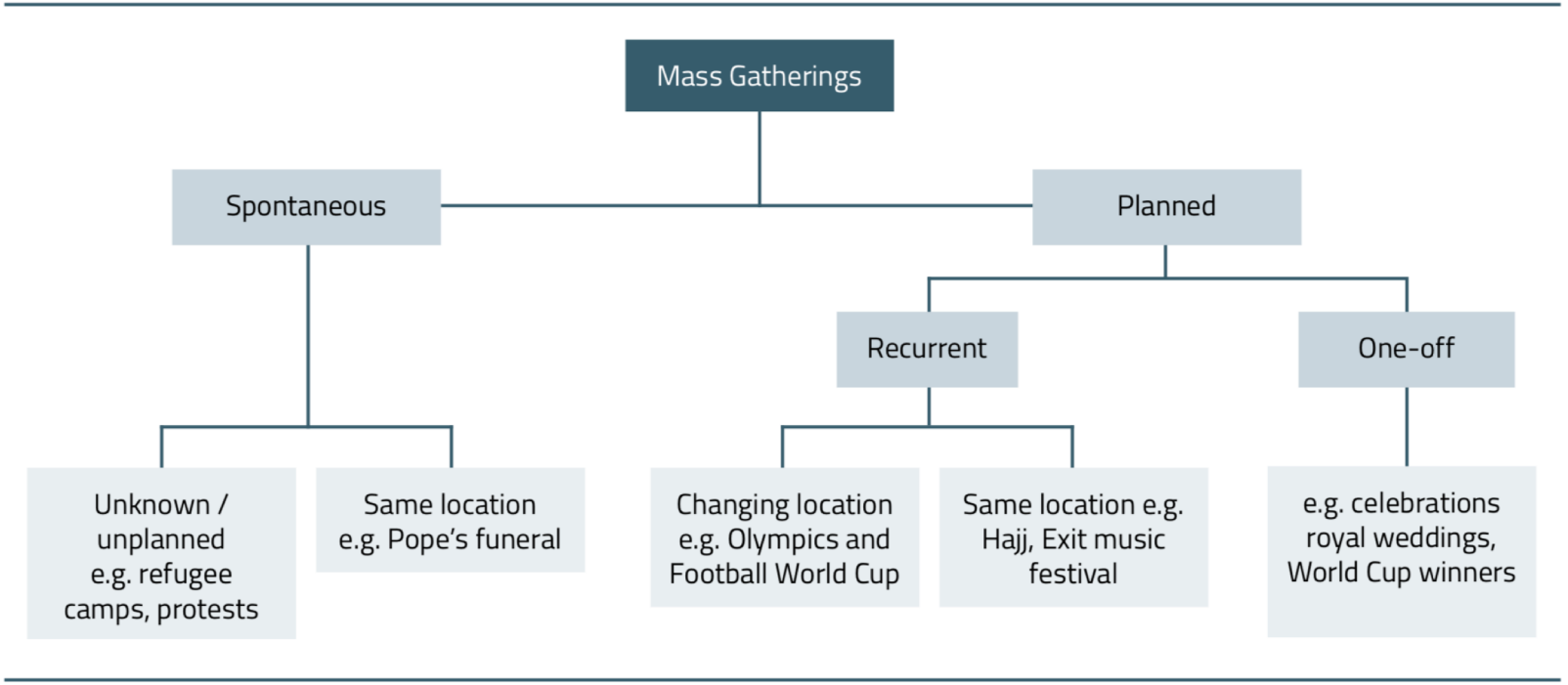
- 10,250 Olympic athletes and 4,000 Paralympic athletes
- 20,000 press and media
- 180,000 spectators/day
- 17,000 people living in the Olympic Village
- Estimates of 4.5 million visitors to London
- 26 Olympic sports in 30 venues
- 20 Paralympic sports in 21 venues


Rebecca Ash

Types of MG

- Fairs, exhibitions (World Expo Shanghai)
- Concerts, festivals (Riyadh season, Glastonebury, UK)
- Sports (Olympics)
- Religious (Hajj)
- Political (G20)

Categories of MG



Where is the risk in MG?

- Mass gatherings can pose several significant public health challenges to the health and security authorities both within the host country and abroad.
- They place additional pressures on health systems, which must operate for the duration of the mass gatherings stretched to surge capacity.
- require intersectoral approaches to risk mitigation and coordination and cooperation across multiple disciplines, agencies, sectors, and ministries.

MG characteristics that represent public health risk

- Higher population concentration
  - Diversity of population characteristics
  - Different communities/ parts of the world/ regions
  - Imported diseases
  - Epidemic prone diseases
  - Different health-related behaviors
- Environmental conditions
  - Heat/ cold
  - Vectors of diseases

MG characteristics that represent public health risk

- Pressure on infrastructure
  - Hotels
  - Food sales
  - Healthcare system
- Political attention
  - Terrorism/ bioterrorism

Outbreak

Risk of outbreaks?

The importation of infectious diseases during a mass gathering may result in outbreaks.

- Mass gatherings health deals with the diverse health risks associated with mass gatherings including transmission of infectious disease, non-communicable disease, trauma and injuries (occupational or otherwise), environmental effects (such as, heat-related illnesses, dehydration, hypothermia), illnesses related to the use of drugs and alcohol and deliberate acts, such as terrorist attacks

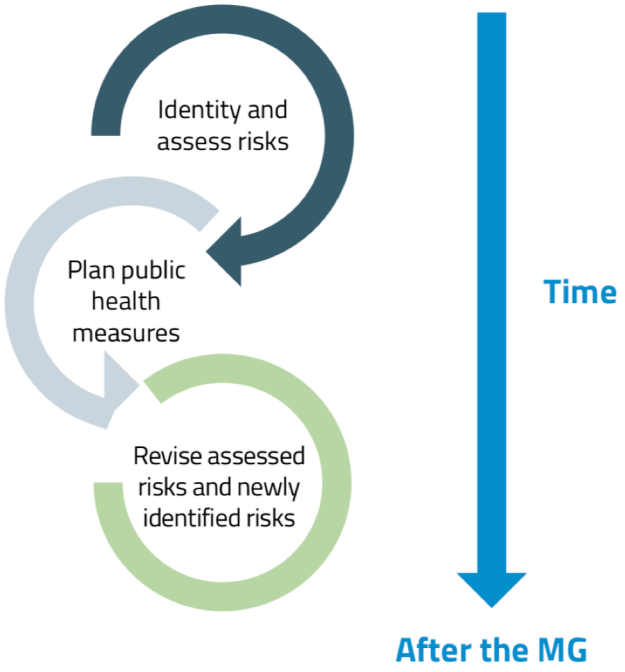
Year	Location	Event	Cause	Deaths	Injuries
1993	Madison, WI, USA	Football game (12 000)	Crowd crush	0	69
1994	Athlone, South Africa	Political rally (20 000)	Crowd surge	3	21
1994	Mecca, Saudi Arabia	Religious festival (2 500 000)	Crowd surge	270	Unknown
1994	Baytown, TX, USA	Sports event	Grandstand collapse	1	17
1994	Saugerties, NY, USA	Rock festival (350 000)		2	7500
1995	Rio de Janeiro, Brazil	Rock concert (3 500 000)		Unknown	Unknown
1996	Cleve, Australia	Circus	Stand collapse	0	48
1997	Mecca, Saudi Arabia	Religious festival	Fire	343	2000
1997	Tel Aviv, Israel	Sports event	Bridge collapse	4	Unknown
1997	Ciudad del Este, Paraguay	Political rally	Structural collapse	38	100+

The aim is to:

Know the **risk**,	→Risk assessment, identification
Know **when** it happens,	→Surveillance
Know **what to do** when it happens	→Response

Steps of risk assessment

- Risk identification (depending on event assessment)
- Risk characterization (impact, likelihood)
- Risk management (surveillance and response)



Event Assessment ⟶ Risk identification

Risk identification

- Host country context assessment
  - Systems: need for enhancement in surveillance, testing, reporting, response and command, control and communication
  - Training: responsibilities
  - Population factors: immunity (hosts, visitors)
  - Baseline status for CD

MG event assessment characteristics

MG features		
Type	Sporting event	▪ Energetic, potentially emotionally aggressive mood. Risks of injuries and violence. Risk of cardiovascular events
	Religious event	▪ Higher risk of participants with existing medical conditions which may increase the need for on-site medical care
	Cultural event	▪ Risk of alcohol and drug use ▪ Risk of sexually transmitted infections ▪ Risk of dehydration, hyperthermia, hypothermia
	Political event	▪ Energetic and potentially aggressive moods ▪ Risk of demonstrations or riots, injuries
Activity level	Seated	▪ Risk of collapse if infrastructure inadequate to support attendees
	Standing	▪ Risk of injuries, fatigue
	Mobile	▪ Risk of injuries, crushes

Venue characteristics		
Venue	Indoor	▪ Poor air circulation
	Outdoor	▪ Potential for inadequate sanitation, food and water preparations
	Contained venue (fenced)	▪ Overcrowding ▪ Spread of infectious diseases
	Uncontained venue	▪ Difficulty locating services near attendees due to geographic spread
	Rural	▪ Increased distance to health services, particularly advanced level care ▪ Increased potential for contact with animals and insects
	Temporary	▪ May lack infrastructure for safe food and water delivery ▪ May lack infrastructure for emergency medical services ▪ May lack financial capacity to create infrastructure necessary for a safe and successful MG
	Permanent	▪ Infrastructure may be aged or failing ▪ Infrastructure may need upgrading in order to comply with current standards (e.g. accessibility or fire codes)

Duration	≤ 24 hours	▪ Lack or decrease of perceived vulnerability by participants ▪ Lack of preparations by participants, health systems due to shorter duration
	1 day – week	▪ Lack or decrease of perceived vulnerability by participants ▪ Lack of preparations by participants, health systems due to shorter duration
	1 month	▪ Higher risk of communicable disease ▪ Increased duration of strain on public health system
	> 1 month	▪ Higher risk of communicable disease ▪ Extended strain on public health systems due to need to function at surge capacity for the whole period
Occurrence	Recurrent	▪ Excessive reliance on previously used systems ▪ Inflexible health systems
	Single	▪ Inadequate health systems ▪ Lack of planning

Environmental factors		
Season	Summer	▪ Risk of dehydration, heat stroke/hyperthermia
	Winter	▪ Risk of hypothermia ▪ Risk of injuries with snow or ice ▪ Potential for damage to infrastructure
	Wet	▪ Drowning, flood–related injuries ▪ Waterborne disease ▪ Potential increase in vector-borne and waterborne diseases ▪ Loss of property, damage to infrastructure
	Dry	▪ Risk of dehydration, waterborne disease ▪ Risk of allergies ▪ Risk of fires, decreased air quality

Participant characteristics		
Participant origins	National	▪ Complacency/low perceived vulnerability with health risks ▪ Potentially low immunity for imported infectious diseases
	International	▪ Risk of importation/exportation of disease ▪ Risk of delayed access to healthcare due to unfamiliarity with healthcare system ▪ Risk of delayed detection of pathogens by inexperienced healthcare system ▪ Risk of environmental risks for those not acclimatized such as heat or cold, altitude, pollution ▪ Communicable disease for unvaccinated or vulnerable travellers to endemic pathogens and parasites ▪ Unknown immunity of participants
Density of participants	High density	▪ Risk of communicable disease ▪ Risk of mass casualty event
Participants health status	Elderly or chronically ill	▪ Risk of non-communicable disease ▪ May require higher levels of health services
	Disabled	▪ Local infrastructure may not be adequate ▪ Will need special care ▪ Emergency preparedness requires planning

Alcohol sold	Yes	▪ Risk of injuries, including alcohol poisoning ▪ Risk of drunk driving, property damage ▪ Risk of violence
Likely drug use	Yes	▪ Risk of injuries ▪ Risk of overdose ▪ Risk of poisoning due to consumption of unknown, counterfeit or low-quality drugs
Level of medical services at the venues	First aid stations	▪ May provide some basic medical care ▪ Triage services ▪ Potential contact point for higher level medical support services
	On-site Medical posts	▪ May provide some basic medical care ▪ Triage services ▪ Potential contact point for higher level medical support services
	On-site hospitals for participants	▪ Easy proximity to higher level medical support services ▪ Increased number of healthcare providers

Catering	Professional catering	▪ Lower risk of food-borne illness ▪ Improved food security
	Informal	▪ Increased risk of food-borne illness
	Self-catering	▪ Increased risk of food-borne illness
Hygiene / Sanitation services	None	▪ Increased risk of infectious disease, including respiratory and diarrhoeal diseases ▪ Lack of hand washing facilities ▪ Lack of toilets ▪ Increased risk of open defecation
	Hand washing stations	▪ Decreased risk of infectious disease ▪ May include alcohol-based disinfectants
	Latrines: temporary	▪ Improved sanitation and waste disposal
	Latrines: permanent	▪ Preferable to temporary latrines ▪ Requires more infrastructure than temporary latrines for construction and maintenance

Risk identification based on event assessment

Event assessment	Risk identification
Type: Religious event	Older population with NCD, in-site medical care
Season: summer	Risk of dehydration, heat stroke
International	Imported diseases
Venue: indoor	Poor air circulation
Venue: temporary	Poor infrastructure
Catering: informal	Risk of food-born illnesses
Hygiene: hand washing stations	Decreased risk of infections

Risk characterization

- Impact on MG, impact on PH (minimal-severe)
- Risk likelihood

	Potential impact on the MG	Potential impact on public health
Minimal	Little or no consequence or disruption to the MG	Little or no consequences
Minor	Small impact on MG can be managed with little impact on the event	Few illness or injuries which public health and medical services can manage
Moderate	Some controlled impact on the Games and reputation for host	Death and or injuries or illness occur. Public and medical services are strained
Major	Event is disruptive to MG and reputation of host	Many deaths, injuries or illness. Disrupts public health and medical services
Severe	Event causes cancellation of some or all of MG. Significant adverse impact on MGs and host reputation.	Substantial loss of life and serious injuries or illness. Widespread disruption of local services and infrastructure

Why risk characterization?

- 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 highly likely

Then what?

- Once the risks have been mapped on the risk matrix, the objective of public health planning for the MG will be to reduce the likelihood of a threat occurring and to reduce the consequences of each threat: risk management.

Risk management

- What mitigation measures can be put into place to manage the risk and reduce either the probability or impact.

➢Could include:

- initiating new surveillance programmes
- implementing a range of special prevention (risk of food-borne, waterborne, airborne and person-to-person spread of diseases)
- developing plans for immediate acquisition of additional human and material resources should a crisis occur.

Surveillance in MG

When planning surveillance for the MG, the questions that public health authorities are likely to ask are:

1) What diseases or syndromes should surveillance be conducted for and what is the risk of these?

2) What is the best type of public health surveillance system(s) to use? (timeliness and sensitivity)

3) What are the special considerations for outbreak or public health response?

Diseases with the following characteristics should be considered for surveillance:

- Have outbreak potential
- Have modes of transmission enhanced in the MG (e.g. respiratory spread)
- Are known to be of particular potential use as bioterrorism agents
- May cause severe illness and require investigation and / or the application of control measures even for a single case

Cont.

- Imported diseases not usually seen in the host country (especially drug-resistant organisms and unusual serotypes)
- Endemic diseases for which event attendees may have no immunity
- Highly infectious diseases (e.g., norovirus or measles)
- Diseases or events that need to be reported under the IHR (2005).

Surveillance Problems posed by MGs

- Short time – problem for collecting information – systems sensitive and responsive
- Large, diffuse and highly varied population
- Include diseases not normally surveyed?
- People arrive from/return to many locations
- Multiple opportunities for exposure:
- – air travel
  – food
  – water
  – physical contact
- Varying health surveillance capabilities of – host nation
- – originating nation(s)
- Tracking (time/location) and notification – not just in location, but after
- returning

Preparing a surveillance plan

- Identify monitoring resources at all levels
- Define conditions to look for
- Establish priorities
- Set threshold / alert levels
- Identify mechanism for prompt investigation and feedback
- Link notification and response plan

MG Planning

A safe and healthy MG requires

Early multi-sectoral preparation involving:

- event organizers
- health emergency managers
- public health authority representatives
- local hospital emergency departments
- first-aid personnel
- other sectoral partners (e.g. police, emergency services, security services)

Depends on risk assessment and risk identification

- Medical care needs to be offered at the mass gathering but local care needs to be maintained as usual:

Examples of conditions included in surveillance at two previous MGs

For the ICC Cricket World Cup West Indies 2007 the following syndromes, which were included in the 'usual' reporting requirements, were reported daily:

- Acute flaccid paralysis
- Fever and haemorrhagic symptoms
- Fever and neurological symptoms
- Fever and respiratory symptoms < five years and > five years
- Fever and rash
- Gastroenteritis < five years and > five years

In addition the following conditions were added to the MG specific surveillance syndrome:

- Fever and jaundice
- Heat stroke
- Injuries

For the 2000 Sydney Olympic and Paralympic Games, an iterative risk assessment process led to the following conditions for surveillance via emergency departments and on-site medical clinics:

- Injury occurring outside the home
- Vomiting
- Pneumonia
- Diarrhoea
- Influenza-like illness
- Illicit drug-related
- Febrile illness with rash
- Meningitis
- Bloody diarrhoea
- Pertussis
- Acute viral hepatitis
- Other (Olympic family members only)

Response

Establish a major incident response system

Well rehearsed multi-agency and cross government response systems

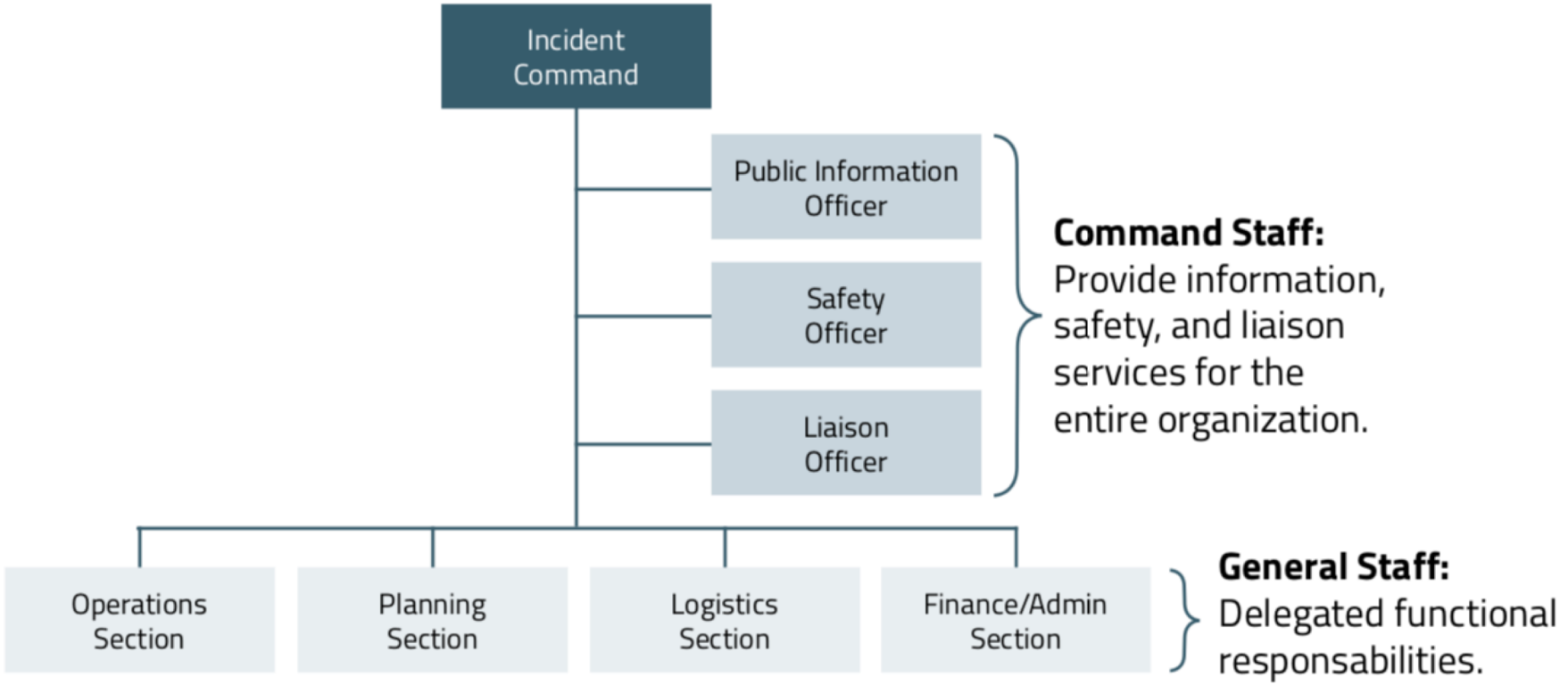
• Effective liaison across health sector • Public health engagement with:

– Police & other emergency services (threat assessment, incident response)

– Central government (threat assessment, preparedness, response)

– Intelligence services (threat assessment)

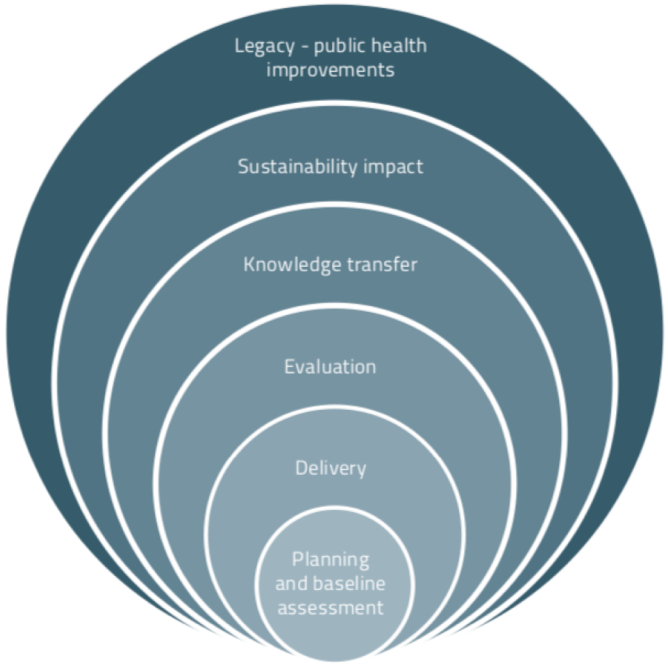
Incident Command System (ICS) structure



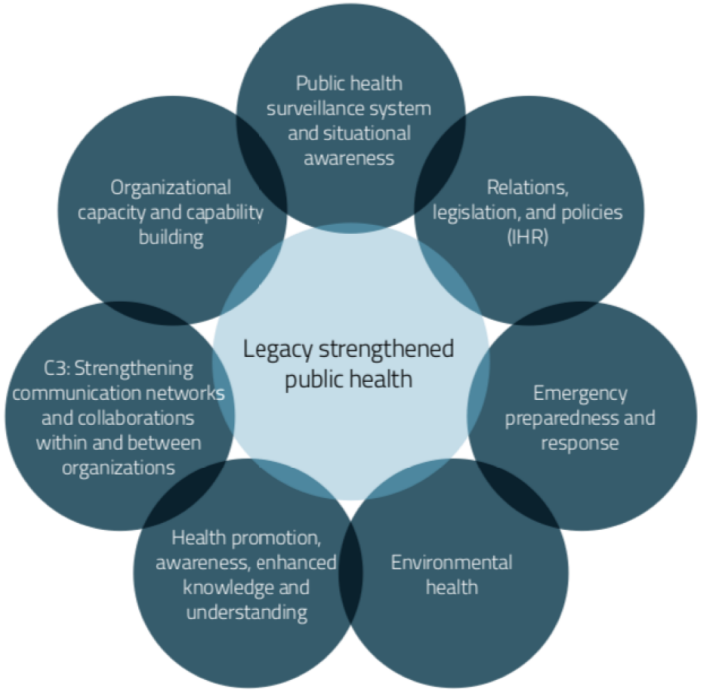
Legacy and Evaluation

- The wealth of knowledge and expertise generated from mass gatherings can drive best health promotion, education, and risk mitigation strategies and optimize the planning and delivery of effective health services during future mass gathering events.

Framework legacy process



Interconnected legacy areas



What is WHO’s role in mass gatherings?

- WHO provides advice and technical support to host governments preparing for mass gathering events.

How does WHO provide support to Member States for mass gatherings?

- To provide advice and technical support to Member States that are hosting mass gatherings, WHO draws on 5 WHO Collaborating Centres for Mass Gatherings and a Virtual Interdisciplinary Advisory Group (VIAG). VIAG is an informal network of mass gathering experts. Their role is to share expertise on public health requirements and best practices with any organization considering hosting a mass gathering event.

Activities to support host governments of mass gatherings often include:

- Prior to the event: all-hazard risk assessment, travel medicine and activities to encourage increased physical activity, cessation of tobacco use and avoidance of excess alcohol.
- During the event: international monitoring of potential disease spread and risk assessment, emergency medical services and hospitals and plans to manage fan zones.
- After the event: capture lessons learnt and share expertise with future mass gathering hosts.

What governs WHO’s work on mass gatherings?

- The decision states that the WHO "Director-General should, where appropriate, work closely with Member States that are planning and conducting mass gatherings to support cooperation and communication between the concerned health authorities in each country, and help Member States strengthen capacities to better utilize the International Health Regulations (2005)".

Does WHO have the power to cancel or move mass gatherings?

- WHO may provide advice and technical guidance to host countries on public health risks, but has no decision power to uphold, cancel or postpone mass gatherings hosted by Member States.

References

- *WHO, 2015. PUBLIC HEALTH FOR MASS GATHERINGS : KEY CONSIDERATIONS*.