



وزارة الصحة
Ministry of Health

JEDDAH TOOL

FOR MASS GATHERINGS HEALTH RISK ASSESSMENT



USER GUIDE

GLOBAL CENTER FOR MASS GATHERINGS MEDICINE
(GCMGM)

V.2

_____ APRIL 1, 2020 _____



BACKGROUND

Protecting human health is a key goal of the interventions that are implemented to manage public health risks and strengthen health security at mass gatherings (MG). Risks assessment at MGs involves detecting and ranking health risks, assessing the mitigating capacity of the health system and recommending appropriate measures for risk mitigation, prevention and control.

Building on the Sendai Framework for Disaster Risk Reduction, the Jeddah tool was initially conceptualized as a holistic health emergency risk assessment framework in partnership with the World Health Organization Eastern Mediterranean Regional Office (WHO/EMRO).

In 2016, the tool was further developed to help identify, prioritize and analyze MG health risks based on a widely accepted functional correlation between hazards, vulnerabilities and capacities:

$Risk \propto Hazard\ magnitude \times Vulnerabilities / Capacities.$

As an outcome of the first Hajj strategic health risk assessment, the Global Center for Mass Gatherings Medicine (GCMGM) and WHO jointly organized an international technical consultation on health risk assessment tools for MGs in January 2017. The technical consultation adapted the tool as the Jeddah tool for MGs risk assessment and recommended the standardization of the hazard prioritization and weighting matrixes.

This document provides a step-by-step guide for public health personnel to conduct an all-hazard strategic health risk assessment at MGs using the Jeddah tool.

OBJECTIVES OF JEDDAH TOOL

- To evaluates the likelihood of occurrence and impact of hazards
- To provide understanding of the root causes of health emergencies
- To provide baseline data that can be used for research and preparedness planning
- To enhance the inter-sectoral coordination and collaboration for risk mitigation

DEFINITION OF TERMS

Health risk: The probability of health consequences from the interaction of hazards, vulnerabilities, and capacities

Hazard: A dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage.

Vulnerability: The characteristics and circumstances of a community, system, or asset that make its susceptible to the damaging effects of a hazard.

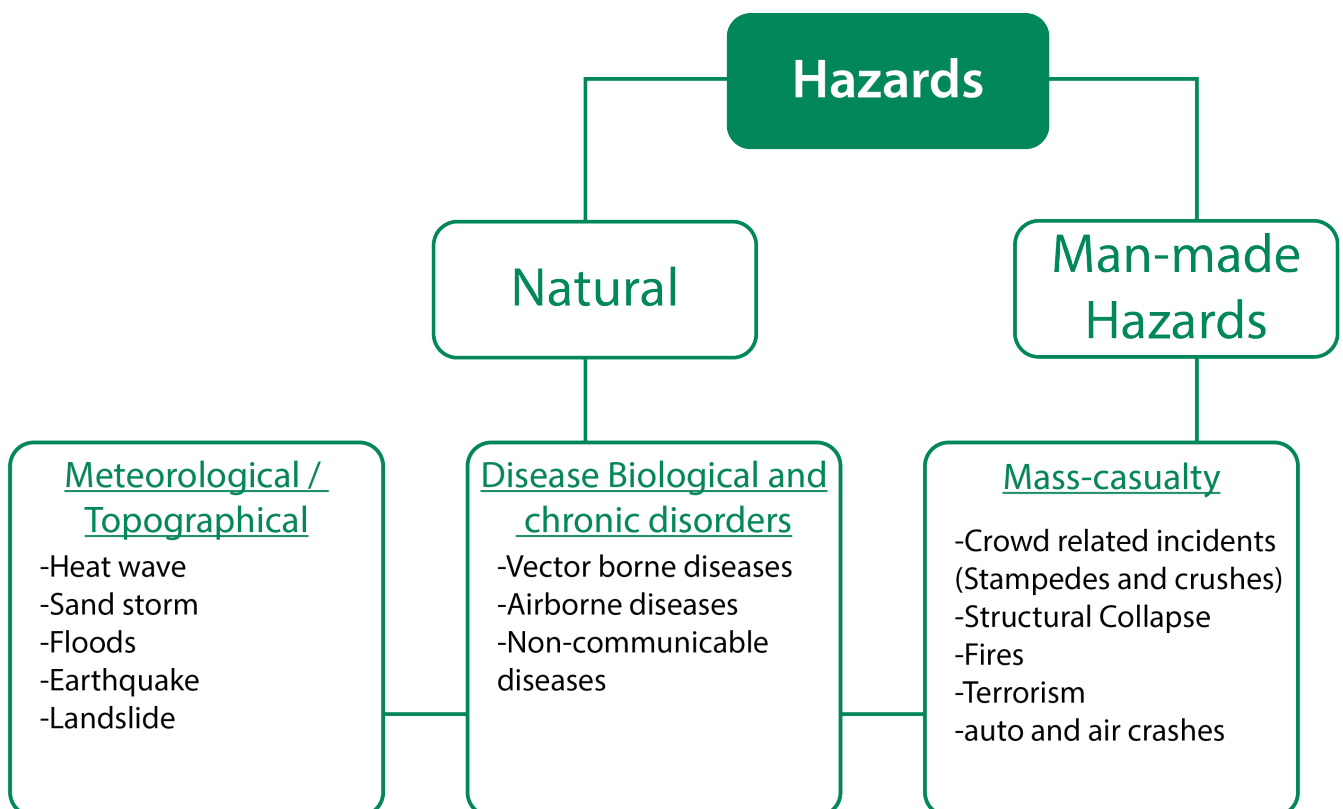
Capacity: The combination of all the strengths, attributes, and resources available within a community, society, or organization that can be used to achieve agreed goals.

A. Identify all the hazards that might constitute a threat to the mass gatherings using the matrix in Table 1 and Figure 2

Table 1: Hazard Identification Matrix based on epidemiological characteristics

Type	Definition of Hazard	Source of data
1	Hazard was reported in the past during the MG	Literature, Government, reports, Historical archives
2	Current local, national or international public health event(s)	Surveillance reports News items Government reports
3	Hazard may occur based on experience from similar events/context	Literature Government reports
4	Hazard may occur based on changing hazard/vector characteristics	Published/Unpublished Literature Government reports
5	Hazard may occur based on changing host characteristics	Published/Unpublished literature Government reports

Figure 1: Hazard identification matrix based on hazard type



B. Prioritize the identified hazards to focus on the most important hazards that could pose a threat to the MG using the frequency matrix in Table 2&3

Table 2: prioritization matrix

Hazard	Frequency	Magnitude	Exposure	Hazard score
	1 (min.) to 5 (max.)	1 (min.) to 5 (max.)	1 (min.) to 3 (max.)	$F \times M \times E$ (max 75)

Table 3: Criteria for mapping frequency, magnitude and exposure

Frequency mapping	Category
Hazard is reported yearly/ each time MG is hosted/endemic disease in area/city hosting MG	5
Hazard was reported at least once during the MG in last 5 years or is currently reported as a national event/outbreak e.g. MERS in Saudi Arabia	4
Hazard was reported at least once during the MG in last 6-10 years/endemic diseases in country of MG attendee/ infectious diseases currently reported internationally e.g. Ebola	3
Hazard was reported at least once during the MG in >10 years	2
No previous event/hazard reported	1
Magnitude mapping	Category
Mortality or critical injuries/illnesses with long-term or permanent incapacitation >1/10,000 population	5
Mortality or critical injuries/illnesses with long-term or permanent incapacitation >1/100,000 population Or serious injuries/illnesses >1/10,000 population	4
Mortality or critical injuries/illnesses with long-term or permanent incapacitation >1/1,000,000 population Or serious injuries/illnesses >1/100,000 population	3
Mortality or critical injuries/illnesses with long-term or permanent incapacitation >1/10,000,000 population Or serious injuries/illnesses >1/1,000,000 population	2
Mortality or critical injuries/illnesses with long-term or permanent incapacitation <1/10,000,000 population Or serious injuries/illnesses <1/1,000,000 population	1

Table 3: Criteria for mapping frequency, magnitude and exposure

Exposure mapping	Category
General population	3
Vulnerable groups in population. eg Healthcare workers, elderly	2
Only MG attendees	1

C. Select the hazards with the highest prioritization scores (Table 4), benchmarking based on the availability of resources for the RA, including time, personnel and data

Table 4: Example of some prioritized Hazards during Hajj in Saudi Arabia

Hazard	Frequency	Magnitude	Exposure	Hazard score
	1 (min.) to 5 (max.)	1 (min.) to 5 (max.)	1 (min.) to 3 (max.)	$F \times M \times E$ (max 75)
Stampede	4	5	2	40
MERS-COV	4	3	2	24
Seasonal Influenza	5	2	3	30
Heat Illness	4	3	3	36
Food Poisoning	5	3	2	30

D. For each hazard, conduct vulnerability assessment using the indicator matrix in Table 5, 6 or 7

Table 5: Vulnerability risk characterization for infectious pathogens

Risk domain	1	2	3	4	5	score
Indicator area						
Proportion of cases with severe illness	<1%	1-3%	3-5%	6-10%	>10%	
Case fatality rate(CFR)	<0.5%	0.6-1%	1-2%	3-5%	>5%	
Endemicity	Not yet reported in countries of attendees or MG host country	Only imported cases in countries of attendees	locally transmitted in countries of attendees	Only imported cases reported in MG host country	Endemic/ locally transmitted reported in MG area/ country	
Route of transmission	STDs	Blood-borne	Feco-oral/ vector borne	Contact	Airborne/ droplet	
Vaccine effectiveness	>90%	80-90%	60-79%	<60%	No licensed vaccine	
Vulnerable population	None	Vulnerable group among attendees	All MG attendee	Vulnerable groups in population	All	
Effective cure	>90%	70-90%	40-69%	<40%	None	

Table 6: Vulnerability risk characterization for non-infectious hazards

Risk domain	1	2	3	4	5	score
Indicator area						
Morbidity rate	<1 /1000000 population	>1 /1000000 population	>1 /100000 population	>1 /10000 population	>1 /1000 population	
Percentage with permanent disability	<1 /1000000 population	>1 /1000000 population	>1 /100000 population	>1 /10000 population	>1 /1000 population	
Mortality rate	<1 /1000000 population	>1 /1000000 population	>1 /100000 population	>1 /10000 population	>1 /1000 population	
Frequency of reporting	Nil previous report during the MG	At-least 1 incident/ case reported in >10 years	At-least 1 incident/ case reported in last 6-10 years	At-least 1 incident/ case reported in last 1-5 years	Reported during each MG/ annually	
Vulnerable population	None	Vulnerable group among attendees	All MG attendee	Vulnerable groups in population	All	
Prevalence of risk factors in the population	<1%	1-5%	6-10%	10-20%	>20%	
Type of risk factors	None	Modifiable during MG (short term)	Modifiable before MG (long term)	Both modifiable and non-modifiable	Non-modifiable	

E. Assign weights to each vulnerability indicator (Table 7) and obtain the weighted score (Table 8)

Table 7: criteria for assigning weight to vulnerability indicator

Indicator type	Weight
Estimates effective counter measures, permanent complications and the fatal consequences of hazards eg CFR, mortality rate	5
Estimates routes of transmission, endemicity, morbidity rate , therapeutic and other preventive measures for hazards	4
Estimates the risk factors/psycho-social and economic outcome	3
Related to health status of general population	2
Non-health related	1

Table 8: Weighted score calculation matrix for each vulnerability indicator

Risk domain	1	2	3	4	5	Score (S)	Weight (W)	Weighted Score (WS)
Indicator area								
Proportion of cases with severe illness	<1%	1-3%	3-5%	6-10%	>10%	3	4	12
Case fatality rate (CFR)	<0.5%	0.6-1%	1-2%	3-5%	>5%	4	5	20

F. For each hazard, conduct capacity assessment using the indicator matrix in Table 9, 10 or 11

Table 9: Capacity indicator matrix for infectious hazards

Scoring criteria	1	2	3	4	5
Indicators					
Coordination Updated plan for coordination and incident management exist Designated Incident managers have requisite skills	Updated multi-sectorial plan for coordination and incident management exist	Updated intra-agency plan for coordination and incident management exist	Updated intra-department/unit plan for coordination and incident management exist	plan for coordination and incident management is not updated/ not fully established	plan for coordination and incident management is unavailable
	Designated incident managers have appropriate licenses/ qualifications, and have participated in at least 2 refresher courses (including drills and simulation exercises) in past 12 months	Designated incident managers have appropriate licenses/ qualifications, and have participated in at least 1 refresher course (including drills and simulation exercises) in past 12 months	Designated incident managers have appropriate licenses/ qualifications, and have participated in at least 1 refresher course without drills and simulation exercises in past 12 months	Designated incident managers DO NOT have legal authority/ appropriate licenses/ qualifications, AND/OR have NOT participated in any refresher course in past 12 months	Incident managers are not designated
Infection Prevention and Control (IPC) Updated IPC guideline is implemented in designated health facilities (HF) HF staff have valid basic infection prevention and control skill license (BICSL) Compliance with respiratory triage protocol	Updated IPC guideline is implemented in > 80% HF	Updated IPC guideline is implemented in 60-80% HFs	Updated IPC guideline is implemented in 50-59% HFs	Updated IPC guideline is implemented in <50 HFs/ not updated or partially implemented in >50% of HF	IPC guideline is not implemented/ are not monitored in HF
	>90% of HF staff have valid BICSL license	70-90% of HF staff have been trained (BICSL licensed)	50-69% of HF staff have been trained (BICSL licensed)	<50% of HF staff have been trained (BICSL licensed)	IPC training for HF staff is unavailable
	>80% of HF are compliant with respiratory triage protocol	60-80% of HF are compliant with respiratory triage protocol	50-59% of HF are compliant with respiratory triage protocol	<50% of HF are compliant with respiratory triage protocol	Compliance with respiratory triage protocol is not monitored



Scoring criteria	1	2	3	4	5	
Indicators						
Rapid Response Team (RRT) RRT is established for public health threats	Appropriate RRTs are designated and assigned (having clear roles and mandate) for the MG	Appropriate RRTs are designated and assigned (having clear roles and mandate) at regional public health level	Appropriate RRTs are designated and assigned (having clear roles and mandate) at central/ national public health level	RRTs are designated but lacks clear roles and mandates	RRTs are not yet designated	
	RRT receive sufficient training within last 12 months	Completed at-least 2 accredited trainings in last 12 months, including drill and simulation exercise	Completed at-least 1 accredited training in last 12 months, that includes drill and simulation exercise	Completed at-least 1 accredited training in last 12 months, without drills and simulations	Completed at-least 1 unaccredited training in last 12 months,	Yet to complete any formal training in last 12 months
Disease Surveillance System An enhanced surveillance system with real time (near-real time) reporting	Existing case-based + syndromic + event-based surveillance with real-time reporting)	Existing case-based + syndromic surveillance system only with real-time reporting)	Existing case-based surveillance system only with electronic reporting	Existing case-based reporting system, with manual reporting	No identified disease surveillance system	
	Case definitions are disseminated to HFs	Appropriate case definitions have been shared with >80% of HF	Appropriate case definitions have been shared with 60-80% of HF	Appropriate case definitions have been shared with 50-59% of HF	Appropriate case definitions have been shared with <50% of HF	Case definitions are not developed
Laboratory Capacity Access to point of care diagnostic/screening test	Point of care diagnostic/ screening testing available in > 80% of HF	Point of care diagnostic/ screening testing available in 60-80% of HF	Point of care diagnostic testing available in <60% of HF	Point of care diagnostic/ screening test licensed but unavailable	Point of care diagnostic/ screening test not licensed	
	Access to confirmatory diagnostic test	Confirmatory diagnostic test is accessible locally (same city/town)	Confirmatory diagnostic test is accessible at state or regional level	Confirmatory diagnostic test is accessible nationally	Confirmatory diagnostic test is accessible internationally	Confirmatory diagnostic test is unavailable/ inaccessible
	Laboratory turn-around-time (TOT)	Time to confirmation of diagnosis < 6 hours	Time to confirmation of diagnosis 6-12 hours	Time to confirmation of diagnosis 12-24 hours	Time to confirmation of diagnosis 24-48 hours	Time to confirmation of diagnosis > 48 hours

Scoring criteria	1	2	3	4	5
Indicators					
Risk Communication Availability of MG-specific risk communication strategy/plan	MG-specific risk communication strategy/plan is developed or reviewed with the last 2 years	MG-specific risk communication strategy/plan is developed or reviewed with the last 3-5 years	National risk communication strategy/plan is developed or reviewed with the last 5 years	Risk communication strategy/plan is NOT reviewed for > 5 years	Risk communication plan is not developed
	Health promotion messages are disseminated to MG attendees	Health promotion messages are translated and disseminated to > 80% of MG population	Health promotion messages are translated and disseminated to 60- 80% of MG population	Health promotion messages are translated and disseminated to 50-59%% of MG population	Health promotion messages are translated and disseminated to <50% of MG population
Case Management An updated national-case management protocol is disseminated to HF Adequate supply of materials, including drugs and personal protective equipment (PPE)	A national-case management protocol is disseminated to >80% of HF	A national-case management protocol is disseminated to 60-80% of HF	A national-case management protocol is disseminated to 50-59% of HF	A national-case management protocol is disseminated to <50% of HF	A national-case management protocol is not developed
	Adequate supply of materials, including drugs and PPE in >80% of HF	Adequate supply of materials, including drugs and PPE in 60-80% of HF	Adequate supply of materials, including drugs and PPE in 50-59% of HF	Adequate supply of materials, including drugs and PPE in <50% of HF	The supply chain is not monitored

Table 10: capacity indicator matrix for external causes of morbidity and mortality

Scoring criteria	1	2	3	4	5
Indicators					
Coordination/ incident management Updated plans and procedures for coordination and incident management exist Designated Incident managers have requisite skills	Updated multi-sectorial plans and procedures for coordination and incident management exist	Updated intra-agency plans and procedures for coordination and incident management exist	Updated intra-department/ unit plans and procedures for coordination and incident management exist	Plans and procedures for coordination and incident management is not updated/not fully established	Plans and procedures for coordination and incident management is unavailable
	Designated incident managers have appropriate licenses/ qualifications, and have participated in at least 2 refresher courses (including drills and simulation exercises) in past 12 months	Designated incident managers have appropriate licenses/ qualifications, and have participated in at least 1 refresher course (including drills and simulation exercises) in past 12 months	Designated incident managers have appropriate licenses/ qualifications, and have participated in at least 1 refresher course without drills and simulations exercises in past 12 months	Designated incident managers DO NOT have legal authority/ appropriate licenses/ qualifications, AND/OR have NOT participated in any refresher course in past 12 months	Incident managers are not designated
Communication Formal inter-agency communication plans	Formal inter-agency secured communication plans exist	Formal intra-organizational secured communication plans exist	Formal intra-department (unit) secured communication plan exist	Informal communication channels only	Communication plans and channels are unavailable
In-patient bed density Number of in-patient beds/10,000 population	≥10 beds	7-9 beds	4-6 beds	2-3 beds	<2 beds
Core healthcare workers' density Number of core healthcare workers/10,000 population	>34 HCWS	30-34 HCWs	25-29 HCWs	20-24 HCWs	<20 HCWs

Scoring criteria	1	2	3	4	5
Indicators					
Pre-Hospital triage management Updated IPC SOPs and Guidelines for EMS staff	Updated pre-hospital triage management protocol exist as part of general emergency plan	Updated pre-hospital triage management protocol exist as part of MoH (organizational) emergency plan	Updated Pre-hospital triage management protocol exist but not linked to a broader emergency plan	Pre-hospital triage management protocol is not updated	Pre-Hospital triage management protocol does not exist
	IPC training for EMS staff	>80% of emergency staff had accredited refresher courses (including drills) in pre-hospital triage management within last 1 year	50-80% of emergency staff had accredited refresher courses (including drills) in pre-hospital triage management within last 1 year	< 50% of emergency staff had accredited refresher courses (including drills) in pre-hospital triage management within last 1 year	The pre-hospital triage management refresher courses for emergency staff were NOT accredited/did not include drills in last 1 year
Risk Communication Availability of MG-specific risk communication strategy/plan	MG-specific risk communication strategy/plan is developed or reviewed with the last 2 years	MG-specific risk communication strategy/plan is developed or reviewed with the last 3-5 years	National risk communication strategy/plan is developed or reviewed with the last 5 years	Risk communication strategy/plan is NOT reviewed for > 5 years	Risk communication plan is not developed
	Health promotion messages are disseminated to MG attendees	Health promotion messages are translated and disseminated to > 80% of MG population	Health promotion messages are translated and disseminated to 60- 80% of MG population	Health promotion messages are translated and disseminated to 50-59% of MG population	Health promotion messages are translated and disseminated to <50% of MG population
Emergency Response time: Average emergency response time for EMS providers	<10minutes	10-20minutes	20-30minutes	30-60 minutes	>60 minutes
	Average transit time for EMS ambulances to hospitals	<10minutes	10-20minutes	20-30minutes	30-60 minutes

Table 11: capacity indicator matrix for non-communicable diseases (NCDs)

Scoring criteria	1	2	3	4	5
Indicators					
<p>Screening for NCDs/chronic diseases Updated inter-country NCD/chronic diseases screening guideline for MG exist</p>	Updated inter-country NCD/chronic diseases screening guideline for MG exist	Updated national NCD/chronic diseases screening guideline for MG exist	Updated organizational NCD/chronic diseases screening guideline for MG exist	NCD/chronic diseases screening guideline for MG is not updated	NCD/chronic diseases screening guideline is unavailable
<p>Access to health services proportion of MG population with access to free health services during MG</p>	>80% of MG population have access to free health services during MG	60-80% of MG population have access to free health services during mg	50-59% of MG population have access to free health services during MG	<50% of MG population have access to free health services during MG	There are no free health services at MG
<p>Core healthcare workers' density Number of core healthcare workers/10,000 population</p>	>34 HCWS	30-34 HCWs	25-29 HCWs	20-24 HCWs	<20 HCWs
<p>In-patient bed density Number of in-patient beds/10,000 population</p>	>7 beds	5.1-7beds	3.1-5 beds	3.1-5 beds	<1.5 beds
<p>Case management Accessibility of updated case-management guidelines for NCDs</p>	An updated national-case management protocol is disseminated to >80% of HF	An updated national-case management protocol is disseminated to 60-80% of HF	An updated national-case management protocol is disseminated to 50-59% of HF	An updated national-case management protocol is disseminated to <50% of HF	A national-case management protocol is not developed
<p>Proportion of staff who received training in case management of NCDs within last 1 year</p>	>80% of core health workers (doctors and nurses) had accredited refresher courses in case management within last 1 year	60-80% of core health workers (doctors and nurses) had accredited refresher courses in case management within last 1 year	50-59% of core health workers (doctors and nurses) had accredited refresher courses in case management within last 1 year	<50% of core health workers (doctors and nurses) had accredited refresher courses in case management within last 1 year	The case-management refresher courses were not available in last 1 year

Scoring criteria	1	2	3	4	5
Indicators					
Referral system (Formal inter-country referral system for NCDs)	Formal inter-country referral system for NCDs exist	Formal inter-organizational referral system for NCDs exist	Formal intra-organizational referral system for NCDs exist	Informal referral system for NCDs exist	No referral system for NCDs exist
Health Promotion Relevant health promotion messages are disseminated to MG attendees	Health promotion messages are translated and disseminated to > 80% of MG population	Health promotion messages are translated and disseminated to 60- 80% of MG population	Health promotion messages are translated and disseminated to 50-59%% of MG population	Health promotion messages are translated and disseminated to <50% of MG population	Health promotion messages are not developed

H. Calculate average score for each indicator area, then assign weights to each capacity indicator (Table 12) and obtain the weighted score (Table 13)

Table 12: Criteria for assigning capacity indicator weight

Indicator	Weights
Non-MG health	5
Non-Health Impact/Response/Recovery	4
Health Impact/Response/Recovery	3
Preparedness	2
Mitigation/prevention	1

Table 13: Obtaining the weighted score for each indicator area

Indicator area	Average score (S)	Indicator weight(W)	Weighted score (WS)
Coordination	2	4	8
Infection Prevention and Control (IPC)		5	
Rapid Response Team (RRT)		4	
Disease Surveillance System		5	
Laboratory Capacity		4	
Risk Communication		4	
Case Management	1	3	1

I. Sum the total vulnerability and capacity weighted score for each hazard to obtain the **Risk Score**

J. The risk score is assigned a **risk level** based on the difference between the highest expected risk score and the lowest expected risk score

LOWEST EXPECTED RISK SCORE:

sum of total vulnerability and capacity weighted score, if all indicator scores were 1.

HIGHEST EXPECTED RISK SCORE:

sum of total vulnerability and capacity weighted score, if all indicator scores were 5

Low risk	0-25 th percentile
Moderate risk	26-50 th percentile
High risk	51-75 th percentile
Very high risk	76-100 th percentile

For example: Risk score (R)=250, lowest expected risk score (L)=100, highest expected risk score (H)=500
(the risk score lies between 100 and 500)

$H-L = 400$

Since there are 4 risk levels, $400/4=100$

Add 100 to the lowest risk score to obtain the percentile range

Low risk= 100-200

Moderate risk=201-300

High risk=301-400

Very High risk=401-500

Therefore, the risk estimate from the value of R, would be moderate risk

I. Conduct Reputational Risk Assessment

Risk Level	1	2	3	4
Indicator Area				
Dimension of MG	Local	National	Regional	International
Nature of Hazard	Endemic diseases in countries of MG attendees	Local disease outbreaks (without significant risk of extensive geographical spread e.g food poisoning)	International/national disease outbreaks (significant importation/ exportation risk)	Pandemics/PHEIC/ intentional acts of terror
Number of Fatalities	None	1-4 deaths	5-10 deaths	>10 deaths
Number of attendees	<1000	1,000-5000	6,000-10,000	>10,000
Media Coverage	Local media	National main stream media	Regional media/ significant national social media	International media

Risk Category	Score
Low Risk	<6
Moderate Risk	6-8
High Risk	9-11
Very High Risk	12-20

