User manual for the Member State Rapid Risk Assessment (MS-RRA) tool

World Health Organization

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Contents

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Abbreviations

CFR	case fatality rate
CTC	cholera treatment centre
CTU	cholera treatment unit
ICU	intensive care unit
IHR (2005)	International Health Regulations (2005)
MS	Member State
MS-RRA	Member State Rapid Risk Assessment tool
OCV	oral cholera vaccine
PCR	polymerase chain reaction
PHI	public health intelligence
PHSM	public health and social measures
QIRA	Quick and Immediate Risk Assessment algorithm
RDT	rapid diagnostic test
RA	risk assessment during public health events
RRA	rapid risk assessment
STEEEP	social, technological, economic, environmental, ethical, policy and political (consequences)
WASH	water, sanitation and hygiene
WHA	World Health Assembly
WHO	World Health Organization

Glossary

Confidence	Describes how sure the assessment team is of an estimate; it reflects what some disciplines call the certainty or uncertainty around an estimate. Even with perfect information (i.e. no uncertainty), natural variation (i.e. "variability") will still exist *(1).*
Detection	Finding through systematic means *(1)*; in the context of public health intelligence, detection refers to gathering data or information in order to identify public health events through indicator-based surveillance and event-based surveillance.
Hazard	Any biological, chemical or physical agent with the potential to cause an adverse health effect *(1, 2).*
Impact level	The magnitude of negative consequences (i.e. the level of severity of consequences) for cases and the population; the level of impact is an assessment of the combined magnitude of potentially negative public health and other relevant consequences on humans. In the World Health Organization's (WHO) 2012 manual on rapid risk assessments, the impact level is referred to as the consequence level *(1)*. The term impact level is used in the MS-RRA manual to align with the terminology in the One Health approach *(2)*.
Immediate risk assessment	Swift risk assessment for all events detected and monitored through public health intelligence activities. It supports the identification of immediate response actions. When necessary immediate risk assessments can even be performed before event verification (i.e. for signals). The immediate risk assessment is an iterative process and can be updated in case of epidemiological or contextual changes. The Quick and Immediate Risk Assessment (QIRA) algorithm has been developed by the World Health Organization (WHO) to support Member States in streamlining the immediate risk assessment process.
Likelihood level	The probability of a situation occurring.
Public health event	The International Health Regulations (2005) define an event as "a manifestation of disease or an occurrence that creates a potential for disease…" *(3)*. Events may be infectious, zoonotic, chemical, radiological or nuclear in origin or affect food safety, and are transmitted by persons, vectors, animals, goods, food or through the environment. In the context of public health intelligence, an event refers to a signal that has been verified. (See also Signal)
Public health intelligence (PHI)	Public health intelligence is defined by the United Nations terminology database as "a core public health function responsible for identifying, collecting, connecting, synthesizing, analysing, assessing, interpreting and generating a wide range of information for actionable insights and disseminating these for informed and effective decision-making to protect and improve the health of the population" *(4, 5)*.

Rapid risk assessment (RRA)	A risk assessment conducted for an event that meets specific criteria, which indicate a need for an in-depth analysis and for more detailed output than the immediate risk assessment (see Risk assessment and Immediate risk assessment); An RRA is rapid, but not as swift as the immediate risk assessment, commonly due to the need to use more extensive information and wider expertise. The WHO's MS-RRA tool has been developed to aid this process.
Response capacity	The capacity of a system to mitigate risk by reducing the likelihood and/or the impact of an event on cases and the population; in the MS-RRA tool, response capacity is measured on a scale from very low to very high.
Risk	The likelihood of the occurrence and the likely magnitude of the consequences of an adverse event during a specified period *(1).*
Risk analysis	A process consisting of three components: risk assessment, risk management and risk communication *(1)*.
Risk assessment	The systematic process of gathering, assessing and documenting information to characterize risk *(1)*; in the public health intelligence field, risk assessment for acute public health events is conducted taking into account the hazard, exposure to it and the context of the event *(1)*. Risk assessment is a continuous process, from the detection of the signal to the response to the event *(6).* Depending on the conditions, various approaches can be used, with or without a dedicated tool. The QIRA algorithm and the MS-RRA tool have been developed by WHO to support Member States in streamlining the risk assessment process. (See also Immediate risk assessment and Rapid risk assessment.).
Risk characterization	The process of assigning a level of risk to the combination of a hazard, exposure to it and context assessments *(7).*
Risk management	Risk management is the process of weighing policy options in the light of a risk assessment and, if required, selecting and implementing appropriate intervention options, including regulatory measures *(8).*
Risk communication	Risk communication encompasses a range of communication principles and activities, and the exchange of information required among responsible authorities, partner organizations and the communities that are at risk to encourage informed decision-making, positive behaviour change and the maintenance of trust *(1, 9)*.
Signal	A piece of data or information, or both, considered to represent a potential acute risk to human health detected through any source (i.e. from event-based surveillance or indicator-based surveillance) *(6)*. Once a signal is verified (see "verification"), it can be referred to as an event.
Verification	

Refers to proactive cross-checking of the validity (or veracity) of signals by contacting the original source or additional sources, or by performing a field investigation; verification requires that hoaxes, rumours and artefacts are eliminated from further consideration *(6)*. Once a signal is verified, it can be referred to as an event.

1. Introduction

1.1. Short description of the chapters and annexes in this document

This document has three chapters. Chapter 1 (Introduction) provides an overview of risk analysis, the risk analysis package for Member States initiative, and the toolkit developed as part of this initiative. Chapter 2 (How to complete the MS-RRA tool) provides step-by-step guidance about how to complete the Worksheet and Output sheet of the tool. Chapter 3 (The MS-RRA tool) includes the Worksheet and Output sheet. These three chapters are followed by six annexes. Annex 1 provides guiding questions to support the completion of the Worksheet. Annex 2 provides guidance on interpreting the categorical responses used in the Worksheet. Annex 3 provides guidance on assigning a confidence level. Annex 4 provides information about various tools and guidance developed by the World Health Organization (WHO) to support Member States undertaking risk assessments. Annex 5 summarizes the three key approaches to risk assessment. Annex 6 provides an example of using the Worksheet and Output sheet during an outbreak scenario.

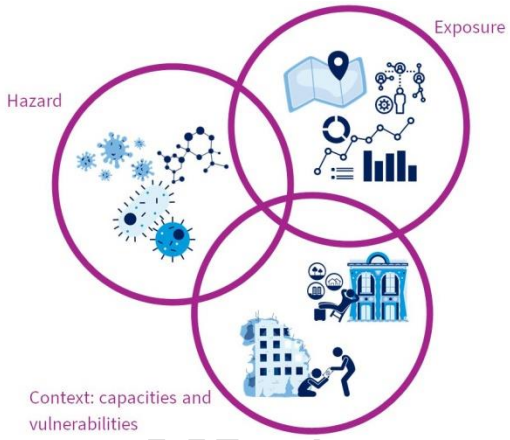
1.2 Background

1.2.1 Risk analysis and risk assessment during acute public health events

Risk analysis is essential for guiding effective public health measures. It includes three key components: risk assessment, risk management and risk communication *(1)*. Risk assessment is the systematic process of gathering, assessing and documenting information to characterize risk *(1,7).* Risk management is the process of weighing policy options in the light of a risk assessment and, if required, selecting and implementing appropriate intervention options, including regulatory measures *(8)*. Risk communication encompasses a range of principles and activities, and the exchange of information required among responsible authorities, partner organizations and the communities that are at risk to encourage informed decision-making, positive behaviour change and the maintenance of trust *(1, 9)*.

Risk assessment is a continuous process from the detection of the signal to the response to the event *(6)*. At the start of, or during an ongoing acute public health event, systematic and swift risk assessment (RA) can support defensible decision-making for risk management and provide a basis for risk communication. In conditions of finite resources, often complicated by incomplete information, especially at the start of a public health event, RAs can be used as a tool to aid in prompt evidence-based resource allocation and mobilization.

Figure 1. Inputs into a risk assessment during an acute public health event



In a systematic RA process, the team conducting the assessment uses both qualitative and quantitative information about a hazard, exposure to it and the context (including capacities and vulnerabilities) (Fig. 1). RAs are carried out using the best evidence available at the time of the assessment. This evidence is interpreted by relevant experts on the RA team, who may use various evaluative and analytical approaches to support their conclusions. For more information about approaches to risk assessments, see Annex 5.

The World Health Organization (WHO) regularly conducts RAs during acute public health events using their Rapid risk assessment (RRA) approach. These assessments are based on an all-hazards approach and routinely carried out across the three levels of the Organization: headquarters, and regional and country offices. The results of RRAs guide the decision-making process between WHO and its Member States about responses during acute public health events. Key audiences for the RRAs carried out by WHO include WHO senior management and relevant technical teams, as well as the United Nations system, for events assessed as high or very high risk. More information on WHO RRAs for acute public health events can be found on the WHO website on risk assessment *(10).*

Member States require the capacity to independently conduct risk assessments during acute public health events within the public health institutions that support their internal decision-making. RAs can be used by Member States to provide guidance for defensible decision-making, especially when established standard procedures for responses do not cover a particular event or data are missing, or both. RAs can also form the basis for communications about risks. Results from the RA can be documented and used during the response and also for early, intra- and after-action reviews, including for consistency with the International Health Regulations' (2005; IHR) Monitoring and Evaluation Framework *(3, 11)*. The key audiences for the outputs for risk assessments carried out by Member States are decision-makers and stakeholders at the national, subnational and local levels involved in a response. More information on tools that support risk assessment within Member States can be found on the WHO website on risk assessment *(10)*.

1.2.2 The risk analysis package for Member States initiative

During the Seventy-fourth World Health Assembly in 2021, Resolution WHA74.7 under IHR (2005) stated that, WHO should "provide swift support to countries in detection and assessment of and response to public health emergencies" *(12)*. The Seventy-seventh World Health Assembly in 2024, Resolution WHA 77.17, adopting amendments to the the IHR (2005), stated that "Each State Party shall develop, strengthen and maintain the core capacities: … to assess all reports of urgent events within 48 hours; and … (a bis) to rapidly determine the control measures required to prevent domestic and international spread" *(13)*. To support these needs, the Risk analysis package for Member States initiative was started by WHO in 2023, with the main objective being to enhance Member States' capacity to perform their own risk assessments during acute public health events.

The initiative started with a survey and a gap analysis; both were carried out among various national organizations in 19 Member States, including ministries of health and other public health institutions, from all six WHO regions. The survey's objectives were to describe the diversity of approaches used by Member States to conduct risk assessments during acute public health events and identify challenges to conducting risk assessments at the national level, as well as needs associated with building and strengthening capacities to perform risk assessments. A major identified need was the lack of harmonized and standardized risk assessment tools and user manuals for the tools. Respondents expressed interest in having a risk assessment tool that would be universally applicable to all hazards and that could be used in the form of an algorithm, as well as a simple, practical, easy-to-use and user-friendly tool to perform a more comprehensive RA that could be applied at the national and subnational levels. The needs identified by the survey mirrored findings from numerous discussions with teams conducting risk assessments at all three levels of WHO.

As a result of the responses, an all-hazards risk assessment toolkit was developed to address the gaps described by Member States. This toolkit includes two key components: the Quick and Immediate Risk Assessment (QIRA) algorithm, a fast assessment that can be completed in less than 1 hour, and the Member State Rapid Risk Assessment (MS-RRA) tool, which provides a more comprehensive and nuanced assessment. The toolkit is designed to support Member States in characterizing the risk posed by an ongoing event, providing recommendations about response activities, identifying and documenting information gaps, and assessing the level of confidence in the outcome of the assessment. It also provides a foundation for further risk management and risk communication. More information about the two tools in the toolkit can be found in Box 1.

Box 1. A toolkit with two tools for risk assessments in Member States during acute public health events

Two tools have been developed to aid WHO Member States in conducting risk assessments for a wide range of hazards (i.e. adopting an all-hazards approach) in their routine PHI workflow. The tools are described below.

- The QIRA algorithm is primarily intended for quick and immediate risk assessments of events that have been verified within PHI activities. It is designed for immediate use by the team involved in routine detection and verification activities. It provides orientation to the level of risk associated with an event and the immediate actions to be taken, identified from a prespecified list. In some instances, QIRA may be used before verification, particularly when a risk assessment is needed urgently. QIRA can also be updated in case of epidemiological or contextual changes in an ongoing event.

- The Member State Rapid Risk Assessment (MS-RRA) tool supports more in-depth assessments for events meeting specific criteria that indicate a need for a nuanced approach using more extensive information and expertise, and providing more detailed output when compared to QIRA. MS-RRA completion should involve a multidisciplinary team, whose members have diverse technical and operational experience. Event-specific actions can be identified through this systematic approach, and major information gaps can be documented where relevant. MS-RRA can be performed after signal verification and updated in case of epidemiological or contextual changes.

1.3 Aims and objectives of the MS-RRA tool

The MS-RRA tool can be used and adapted by Member States to conduct their own independent RRA for acute public health events occurring at the national and subnational levels. The tool can be adjusted, according to a Member State's context, response modality and resources. This MS-RRA manual provides guidance for all users, regardless of their experience in risk assessment, enabling them to effectively characterize risks by looking at the hazard, and the exposure and context in which a public health event is happening and to support the response to acute public health events.

1.4 How the MS-RRA tool was developed

The MS-RRA tool and user manual were developed to address the needs of Member States, identified in the previously discussed survey in 2023. The MS-RRA tool was designed with collaboration from risk assessment experts from national and international organizations, in line with WHO's 2012 Guidance, *Rapid risk assessment of acute public health events (1)*.

The development of the tool and manual was carried out in several steps. First, in December 2023, a workshop was organized that included experts in designing risk assessment methodologies. During this workshop, the experts co-designed the architecture and key components of the tool. Second, in 2024, after the workshop, the tool was further fine-tuned and reviewed not only by the experts who had participated in the workshop but also by PHI teams from WHO's regional offices and headquarters Third, the user manual and tool were further adapted based on feedback from a live, in-person testing session attended by representatives from 11 Member States from all WHO regions.

1.5 Positioning of the MS-RRA tool

1.5.1 The MS-RRA and public health intelligence activities

PHI activities involve identifying, collecting and synthesizing a wide range of information to get actionable insights and disseminate these for informed and effective decision-making to protect and improve the health of a population. PHI consists of detection, verification and risk assessment *(1, 6)*. These steps build a foundation for informed public health decision-making and response planning. Fig. 2 demonstrates the steps and the positioning of the QIRA algorithm and the MS-RRA tools within the PHI workflow.

During detection activities, information is continually collected and analysed to detect potential acute public health events. Collection can be accomplished through indicator-based surveillance, mostly using structured data from health facilities and formal sources, and event-based surveillance *(6)*, using unstructured, ad hoc information from the media and informal communication.

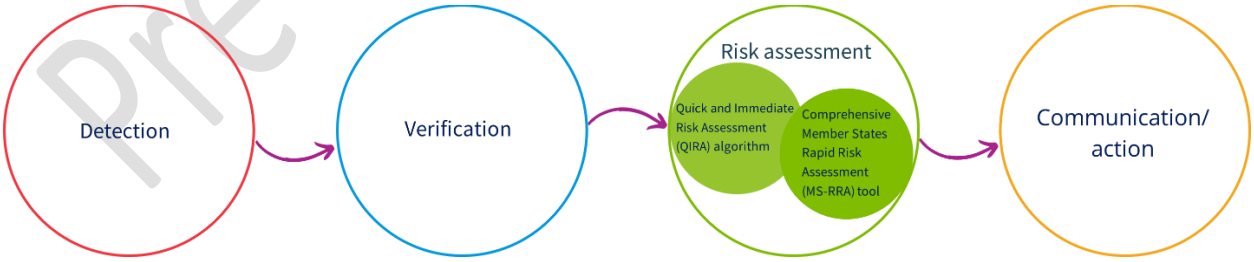
Data and information that may potentially indicate an acute risk to human health are defined as **signals**. During verification activities, signals of potential public health importance must be verified for validity and veracity. All verified signals are considered public health **events** (or, in short, events).

Once a new event has been verified, or whenever an existing event being monitored undergoes changes that may affect the level of risk, it is recommended that a risk assessment be conducted to guide further decisions about communication and action. In PHI practice, risk assessment has two main forms: quick and immediate risk assessment and a more comprehensive, formalized RRA.

The QIRA algorithm and the MS-RRA tool that have been developed to aid Member States in conducting risk assessments adopt an all-hazards approach and can be integrated into the routine PHI workflow.

This manual describes how to use the MS-RRA tool.

Figure 2. Position of the Quick and Immediate Risk Assessment (QIRA) algorithm and the Member States Rapid Risk Assessment (MS-RRA) tool in the public health intelligence workflow



1.5.2 The MS-RRA tool and other risk assessments

WHO has developed and published several guidance documents and tools for risk assessments (See Annex 4). These use similar concepts but differ in their scope, objectives, hazard range (e.g. disease-specific versus all-hazards), context of use, geographical scope, time frame for use and target users. Understanding how MS-RRA fits into existing risk assessment tools is important to determining when to apply it. Annex 4 compares MS-RRA with other risk assessment documents and tools, including the Strategic Tool for Assessing Risks (STAR), which is a comprehensive toolkit for all-hazards health emergency risk assessment *(14)* and the Joint Risk Assessment Operational Tool (JRA OT) *(2)*, which is a guide to assessing risks posed by zoonotic diseases.

1.6 Indicative criteria (reasons) for initiating use of the MS-RRA

The MS-RRA tool should primarily be used when an event may have serious public health implications, requires further follow up and when response actions are not already prescribed (e.g. based on a hazard-specific standard operating procedure). Applying the MS-RRA tool is more resource-intensive than the QIRA algorithm, requiring a more in-depth analysis from a wider team and more time to complete. It should be initiated for events meeting certain criteria. Examples of indicative criteria for initiating use of the MS-RRA tool are described below. Member States can use these suggestions to create their own criteria. Specific considerations related to applying Annex 2 of IHR (2005) *(3)* and the MS-RRA tool to events that have not yet affected a certain population can be found in Boxes 2 and 3.

The use of the MS-RRA tool may be initiated based on:

- findings from other assessment tools, including for:
  - events with moderate, high or very high levels of risk based on results from the QIRA algorithm;
  - events in the country that meet or potentially meet the criteria for notification according to Annex 2 of the IHR (2005) *(3)*, including its amendments, such as those adopted by the Seventy-seventh World Health Assembly through resolution WHA77.17 in 2024 *(13)*;
- event-scale considerations, including:
  - events involving multiple subnational areas, such as states, regions, provinces, municipalities or districts;
  - events that might require a national or international response – that is, a response surpassing sub-national capacities or the Member State's capacities;
- hazard considerations, including:
  - events with an unknown etiology;
  - a highly dangerous hazard, such as a high-consequence pathogen, highly toxic chemicals, nuclear and radiological hazards with the potential to impact human health;
- stability or volatility considerations, including:
  - an event not unfolding as expected based on experience with similar events;
  - recent data on an endemic disease indicating that the risk level may change compared with baseline or compared with previous risk assessments;.

- other considerations, including:
  - high-priority events for the Member State, such as those causing a high level of concern among the public (e.g. a novel hazard, a high-impact hazard, a hazard tied to mis- or disinformation, extensive media coverage) or among authorities (e.g. limited experience with the hazard and limited associated expertise, limited response capacity, reputational risk to the government or authority);
  - events occurring among animals involving pathogens that have the potential to spill over to humans;
  - events occurring in a setting that poses a risk to or in a context with vulnerable populations (e.g. areas where there is civil unrest, environmental degradation, a weak health care system, weak economy, or during a mass gathering event or natural disaster).

Box 2. International Health Regulations (2005)

Please always consult Annex 2 of the International Health Regulations (2005; IHR) for any event that may meet the criteria for notification under the Regulations *(3)*.

Decisions about notification under the IHR (2005) *(3)* are not conditional on whether a rapid risk assessment (RRA) has been carried out or on the results of an RRA if one has been carried out.

However, the findings from the Member States RRA (MS-RRA) tool can be used as basis to support the application of Annex 2 of the IHR (2005) *(3)*, as the content of the tool is aligned with the considerations needed for Annex 2.

Note also the amendments to IHR (2005), such as those adopted by the Seventy-seventh World Health Assembly in 2024 through resolution WHA77.17 *(13).*

Box 3. Applying the MS-RRA tool to events that have not yet affected the assessed population

The Member States Rapid Risk Assessment (MS-RRA) tool is best suited to events already occurring in the population. However, it can also be used in cases in which exposure has not yet taken place or caused illness among the population being assessed (e.g. in cases of zoonoses with the potential for spill over to humans or in cases of events outside the country with potential for importation).

Guiding questions to support using the MS-RRA tool in such situations can be found in Annex 1 under the Exposure and susceptibility domain. Note that when the tool is used in such instances, the MS-RRA team must make a number of assumptions about the likelihood of importation. Thus, the assessment, while informative, may be rated as having lower confidence.

1.7 Establishing the team

Before using the MS-RRA tool, the risk assessment team must be established. The composition of the team depends on the specific expertise, experience and information needed for the assessment. It is advisable to engage with potential experts outside of (i.e. before or between) assessments to ensure their active participation during an assessment. The team should comprise:

- a clear lead, responsible for coordinating the risk assessment process and usually responsible for sharing the first draft of the assessment with other team members. This should normally be a person or persons from the PHI team (i.e. the team that handles PHI activities) at the appropriate level, whether national or subnational, depending on the geographical scope of the assessment;
- subject matter experts appropriate for the hazard, exposure and context, including:
    - experts with epidemiological knowledge, handling the data for the event; usually this is someone from the PHI team who also acts as RRA team lead;
    - experts with knowledge about the hazard, including its sources, and experts in toxicology, laboratory diagnosis or clinical management, as required;
    - subject matter experts with appropriate knowledge about relevant contextual factors and response capabilities at the local, regional or national level, as required;
- others, as required, based on the entire scope of the assessment; as the situation evolves, the composition of the team may change if additional expertise is needed. If, based on the event, it is considered important that social, technological, economic, environmental, ethical, policy or political (STEEEP) impacts are characterized, then relevant expertise needs to be added to the team.

Choosing appropriate team members is a key step in conducting any risk assessment. RRAs are often qualitative assessments, for which expert judgement and unpublished data are needed to inform the process. Expert judgement is key to a good-quality risk assessment, especially during the early stages of events, when data about the event may be scarce and multidisciplinary expertise is needed to inform reasonable assumptions, predictions and recommendations.

2. How to complete the MS-RRA tool

This chapter provides step-by-step details about how to complete the MS-RRA tool. The tool (Chapter 3) consists of two sections: the Worksheet and the Output sheet. In order to get well acquainted with the tool prior to using it, it is recommended that users print Chapter 3 of this manual (i.e. the Worksheet and Output sheet) and refer to it as they work through the current chapter. An example of how to apply the tool to a specific scenario with a completed Worksheet and Output sheet is provided in Annex 6.

The Worksheet (section 3.1) is intended to help the team use a logical flow when conducting the RRA by considering different aspects of the event that can help with the analysis and assessment of the risk. The parts of the Worksheet are:

(A) Risk framing (i.e. setting the scope of the assessment);
(B) Likelihood assessment using current response capacities and within the timeline of the assessment; this includes a descriptive assessment and an estimation of the overall likelihood;
(C) Impact assessment using current response capacities, considering the most likely event progression within the timeline of the assessment; this includes a descriptive assessment and an estimation of the overall impact;
(D) Assignment of the risk level (this is optional as the likelihood and impact assessments may be deemed sufficient for the analysis);
(E) Assignment of the confidence level.

The Output sheet (section 3.2) summarizes the findings to be shared with key stakeholders. After the Worksheet has been completed, the team can use details from it to complete the Output sheet.

The connection and flow between the Worksheet and the Output sheet are illustrated in Fig. 3.

Figure 3. Overall flow through the Worksheet and Output sheet of the Member States Rapid Risk Assessment (MS-RRA) tool

2.1 Completing the Risk framing table from the Worksheet

This section refers to the Worksheet, part A – Risk framing.

Risk framing is the team's first step in completing the MS-RRA. The MS-RRA is designed to generally assess the likelihood of an event worsening and its potential impact in order to provide a basis for decisions about risk management and risk communication; risk framing sets the scope of the MS-RRA by defining the specific what, why, where, who and when of the assessment. In addition, risk framing helps to identify the triggers for considering a reassessment, as well as to identify the expertise and input needed to complete the assessment.

Complete the Risk framing part of the Worksheet as described below. Instructions can be found here, and examples of expressions that can be used in each row can be found in gray in the Worksheet (Section 3.1) and in Annex 6.

- **What?** This row of the Risk framing part should include two components – Hazard/disease and Primary concern. The Hazard/disease component refers to the disease or agent (e.g. a pathogen, or chemical, radiological or nuclear hazard, a product). In situations in which the cause is unknown, but disease is present, include information about the clinical symptoms or syndrome. The Primary concern component allows the team to describe what it is that they are most worried about. This should be answered in terms how the situation might worsen within a specified time frame. (See "When?" below for guidance on the time frame.).
- **Why?** Use this row of the Risk framing part to describe the key reason for initiating the assessment (see section 1.6 for examples of reasons to undertake an RRA). This row can also include more specific information on the context, purpose, and objectives of the assessment, particularly in terms of the types of decisions it will inform. In general, the main purpose of the MS-RRA is to provide a basis for decisions about risk management and risk communication, but this can be adapted and made more specific, if needed. For instance, the types of risk management and communication decisions an assessment can inform include those about prevention measures, surveillance strategies, providing guidance to relevant professionals, developing communication products and response policies, including control measures, as well as resource allocation. The MS-RRA may proceed even if some of these are unknown; however, knowing about them in advance improves the tool's utility for decision-making as it ensures key information is contained within the assessment.
- **Where?** In this row, describe the geographical area of occurrence and impact – that is, the geographical scope or bounds of the assessment. This could be the whole country, a subnational area (e.g. region, district, town) or a specified area of interest. If more than one area need to be assessed separately, see Box 4 for suggestions of various assessment approaches.
- **Who?** This row describes the population affected by the event – that is, the population at risk. Usually, this is the general population in the region of interest for the risk assessment. Sometimes, the assessment may also include specific subpopulations of interest. Subpopulations may include groups who are at higher risk of exposure or impact, or geographical areas where there is a higher

probability of exposure or impact, as well as vulnerable groups or populations who may be socially, physically or economically disadvantaged and have challenges in accessing health care. If there is more than one population/sub-population of interest, see Box 4 for various assessment approaches.

When? This row describes the relevant time frame to be considered within the risk assessment to support estimates of likelihood and impact. Note that the time frame does not refer to the process-related timeline for completing the risk assessment. The time frame is the forward-looking window of time that the MS-RRA is concerned with. This is primarily important for answering the likelihood questions appropriately. Generally, the time frame should be commensurate with how rapidly the event is evolving and at an appropriate scale to inform action. If rapid risk-related changes to actions are needed as the event evolves, then a shorter time frame may be required. If the event is fast-moving, then the time scale should be short, such as within the next 3 days; for a slower-moving event, the time frame could be within the next month. The time frame can also be used to help answer the impact questions; however, it may sometimes be beneficial to include impacts that occur at longer time scales, for example long-term sequelae of infections or social and economic impacts. The time frame may also be linked to when the MS-RRA may need to be updated. For example, if the original time frame expires, the MS-RRA team could assess the need for an update (see the next point about triggers).

- **Trigger for considering reassessment**: This row describes the set of conditions under which a reassessment may be considered (e.g. if new information becomes available that may increase or decrease the risk or if there are changes in key factors that affect the risk assessment). Risk is expected to change at different phases of an event; hence, it is important to predefine when the risk will be reassessed. The time until reassessment can be fixed (e.g. “3 months from the date of the assessment”) or conditional (e.g. “3 months from the date of the assessment unless conditions arise that may significantly increase risk and necessitate a new assessment”). Reassessment or, at a minimum, a discussion among the MS-RRA team about whether a reassessment is needed may also be considered as a way to support a decision to de-escalate the response when the situation is improving or an outbreak is dying out. For additional clarification about timelines and triggers in risk assessment, please see Box 5.
- **Expertise and input needed**: This is the row where the type of expertise required to complete the risk assessment should be noted, including the agencies and other stakeholders whose input is needed to get this expertise. Usually, the team providing input should include people familiar with the hazard (e.g. epidemiology, clinical management), exposure to it (i.e. current data) and the specific context in which the event occurs. For more information on establishing the team, see section 1.7.
- **Risk question (optional)**: The Risk framing part sets the scope for the risk assessment and can support the optional formulation of a risk question. A risk question, similar to a research question in a scientific study, pinpoints the key overall question the risk assessment is trying to address. A risk question can facilitate a clearer focus during the assessment and support further communication of the findings. A risk question can be general or specific.

Generally, the overall risk question can be phrased as, “What is the likelihood of the event worsening, and what is its potential negative impact?” Or it could be, “What is the likelihood of the event worsening, its potential impact and the overall risk associated with this event? The second option would be used if a risk level is assigned, although note that risk level assignment is optional (i.e the team may elect to only assign likelihood and impact if those are sufficiently informative).

The risk question could also include more specific details, integrating the information from other parts of the Risk framing part. When crafting a more specific question, the team can use and expand on the following sentence structure, “What is the likelihood and potential impact of <Hazard/disease and Primary concern from What> in the <population(s) of concern from Who and/or the location from Where> in the next <time frame from When>?”

For additional examples of ways to word risk questions, see the Risk framing part of the Worksheet (part A) in section 3.1 and Annex 6, and for more guidance on risk questions in general, consult the Joint Risk Assessment Operational Tool (known as JRA OT) *(2)*.

Box 4. Possible assessment approaches when the risk to multiple areas or populations needs to be assessed separately

Sometimes in a risk assessment, it is relevant to provide separate considerations for more than one area or population affected by the event. In this case there are three options, described below.

- One option is to complete the Worksheet only for the main population and area of interest and then highlight descriptively, in the Output sheet the other areas or populations that may be at higher risk than the main population and area of interest.
- A second option is to complete the Worksheet and Output sheet more than once – for each area or population of interest.
- A third option is to assess more than one area or population within the same Worksheet, and report the results of this stratified assessment in the Output sheet. This approach can be accomplished through taking the steps described below.
    - In the Worksheet parts B.1 and C.1: Descriptive assessment and recommendations for the Likelihood and Impact dimensions, report information that is important to each of the areas/populations of interest. It is not necessary to fill in information by area/population in each cell, but it is important to highlight differences between the assessed areas/populations in cells where those differences occur.
    - In the Worksheet parts B.2 and C.2: Overall likelihood and impact estimation, duplicate the tables for each area/population of interest.
    - Where an overall risk level is assessed, in the Worksheet, part D: Overall risk level, duplicate the risk matrix and table with Final level of risk for each area/population of interest.
    - If the level of confidence differs for the different areas/populations of interest, in the Worksheet, part E: Assignment of the confidence level, consider duplicating the confidence table for each area/population of interest.
    - In the Output sheet, use the alternative table provided in section 2.5.2 to report overall likelihood, overall impact and (optionally) risk level per stratum (i.e. per area/population of interest), frame a separate risk statement for each area/population of interest, highlight differences in confidence by area/population of interest if relevant, and provide recommendations as relevant (describing necessary response actions for all areas/populations and, where needed, additional response actions for certain areas/populations based on the findings from the assessment).

Box 5. Timelines

Different timelines have been mentioned in this document. The differences are summarized here.

Time to complete a risk assessment tool: This refers to the time it takes to complete a tool. This is <1 hour for the Quick and Immediate Risk Assessment (QIRA) algorithm and, depending on the process, several days for the Member State Rapid Risk Assessment (MS-RRA) tool. This timeline should not be confused with the deadlines that sometimes exist in international and national regulations for completing assessments, for example recommendations that an assessment needs to be finalized within a certain time frame after an event has been verified.

Risk assessment time frame (the When row in the Worksheet part A – Risk framing): This is a forward-looking window for the assessment being conducted. The assessment focuses on the likelihood of an event worsening and the potential impact of an event in the following number of days, weeks or months. The team should choose the number of days, weeks or months for the time frame.

Trigger for considering a reassessment (in the Worksheet part A – Risk framing): This refers to the conditions for considering a reassessment after the current assessment. These could be temporal (e.g. "A reassessment will be considered in 3 months.") or situational (e.g. "A reassessment will be considered if the situation evolves and the likelihood, impact or risk level has changed.").

2.2 Completing the descriptive likelihood and impact assessment (including recommendations) in the Worksheet

This section refers to the Worksheet, part B.1 – Descriptive assessment and recommendations for the Likelihood dimension – and part C.1 – Descriptive assessment and recommendations for the Impact dimension.

The Likelihood and Impact dimensions are built on a set of three specific questions each.

- The questions for the Likelihood dimension are the following.
  (1) How likely are individuals from the population to be exposed at this moment and develop illness?
  (2) How likely is it that the scale of the event will increase within the time frame?[1]
  (3) What is the the response capacity to limit exposure and to limit further cases and geographical spread?
- The questions for the Impact dimension are the following.

[1] Increases in scale refer to an upsurge in the number of people affected or a geographical expansion of the event. Time frame refers to the forward-looking window of the assessment (i.e. as set out in the When component of part A – Risk framing).

(4) What is the potential level of negative impact on cases?
(5) What is the potential level of negative impact on the population, taking into account the current and expected number of cases?
(6) What is the response capacity to mitigate impacts on the population, including on cases?

All six questions should be answered by taking into account knowledge about the three key elements needed for a risk assessment: the hazard, exposure and context, including capacities and vulnerabilities. Annex 1 contains examples of guiding questions that can be used to help answer each main question, as well as additional factors to consider. It can be helpful to try to keep in mind the key driving factors for each question. Driving factors may differ among events, and are often useful for substantiating the estimates and crafting the risk statement for the Output sheet.

The six Worksheet questions are not designed to be mutually exclusive – that is, partial overlap between questions occurs in some instances. When completing the Worksheet, keep in mind that it is meant to encourage risk assessors to consider the issues from all key perspectives, rather than having entries "correctly placed" in particular cells.

For each question, the risk assessment team is required to provide a short description of **What is known, What is not known** and **Recommendations**, while **considering the forward-looking window** (set in the "When" row of part A –Risk framing) and **current response capacities.** Below are key instructions for each element.

- For **What is known**, be concise and focus only on the main points and critical evidence from the literature, data from indicator-based surveillance and information from event-based surveillance, as well as on feedback from relevant subject matter experts, especially when trying to interpret situations for which key current data may be unavailable.
- **What is not known** should cover any critical information gaps, limitations in data and knowledge, and other sources of uncertainty at the time of writing. Focusing on the key missing information is useful for completing this column (e.g. gaps in knowledge regarding the driving factors and critical evidence). The "What is not known" element is often useful when estimating and substantiating the confidence level.
- Provide **Recommendations** to (i) reduce the likelihood and/or impact of the event, or improve capacities, depending on the question and to (ii) fill in critical data gaps (i.e. obtain information important to improving the risk assessment and/or the response). Note that overlap between questions is expected for recommendations; one recommendation is often applicable to different questions; hence it can be either copied into other relevant cells or some cells can be left blank. If knowledge of the hazard or event is insufficient to precisely identify the critical measures that should be taken to reduce the likelihood of the event worsening or to mitigate its impact, the team should use their best judgment based on the data available and update the risk assessment as soon as new information becomes available. Additional resources for public health and social measures are provided in Box 6.

If there is a need to separately characterise the risk to more than one population or geographical area, it is recommended that information about each population or geographical area (i.e. stratum) is provided where relevant. It is not necessary to provide stratum-specific information in every cell of the descriptive tables and under every question. Provide information in cells where there are relevant differences among strata. For more information about possible assessment approaches when the risk to multiple areas or populations needs to be assessed separately, see Box 4.

Box 6. Formulating recommendations: public health and social measures

When formulating recommendations, especially those linked to the Likelihood domain, it may be useful to refer to the guidance provided by WHO about public health and social measures (PHSM). Key resources are summarized below.

- PHSM Taxonomy *(15)*– a classification matrix that places PHSM policies into cascaded categories and offers a structured approach to review the comprehensiveness of selected recommendations and identify overlooked options.
- PHSM Knowledge Hub *(16)* – an online gateway to research and resources about PHSM, developed under the auspices of the WHO Initiative on Public Health and Social Measures (PHSM) *(17).* It includes:
  - PHSM Recommendation Finder *(18)* – a collection of PHSM-related recommendations sourced from WHO guidelines that can be filtered by disease, mode of transmission, PHSM policy category and settings;
  - PHSM Bibliographic Library *(19)* – a repository of multilingual and multidisciplinary research articles and resources about PHSM that is continually updated. In addition to research articles, it includes guidance and technical documents from WHO, other United Nations agencies and the various centres for disease control.
  -

2.3 Estimation of the overall likelihood and overall impact

This section refers to the Worksheet, part B.2 – Overall likelihood estimation and part C.2 – Overall impact estimation. The overall likelihood refers to the overall likelihood of an event worsening. The overall impact refers to the overall potential negative impact of the event.

After completing the fields for What is known, What is not known and Recommendations for the three likelihood and three impact questions, choose a categorical answer for each question in parts B.2. and C.2 of the Worksheet, and use the driving factor or average score approach (described below and exemplified in Fig. 4) to derive the overall likelihood of an event worsening and its overall impact. Annex 2 provides recommended interpretations of the categorical answers for each question. The scales in Annex 2 are qualitative – that is, they use non-numerical categories, such as minimal, moderate or severe. Note also that the recommended interpretations in Annex 2 are indicative and can be adapted by Member States to better align with the circumstances in their specific setting.

In each separate table, you can use one of the two approaches described below to estimate the overall likelihood (based on questions 1–3 in part B.2) and overall impact (based on questions 4–6 in part C.2).

- **Driving factor**: One of the three questions for each of the Likelihood and Impact dimensions may be deemed more important than the others (i.e. the questions do not necessarily need to be assigned equal weight in the overall assessment). When this is the case, the assessment of the overall likelihood or overall impact can be driven by the assessment of the most important (i.e. driving factor) question. If the assessment of the overall likelihood or overall impact is strongly driven by the answer to only one of the three questions in a table, the team should consider highlighting the key concerns and recommendations related to this question in the Output sheet.
- **Average score**: All three questions for each of the Likelihood and Impact dimensions may be deemed of equal importance. When this is the case, score each categorical answer to questions 1–6 based on its relative position. The scores range from 1 to 5, with 1 indicating the best-case situation and 5 indicating the worst case. Calculate the average score for the three Likelihood questions to obtain the overall Likelihood score in part B.2. Calculate the average score for the three Impact questions to obtain the overall impact score in part C.2.

The categories for each question and corresponding scores are summarized below and in Annex 2.

- For questions 1 and 2 the scores are: very unlikely = 1, unlikely = 2, likely = 3, highly likely = 4 and almost certain = 5.
- For question 3, which addresses the capacity to reduce the likelihood of an event worsening, the categories and scores are slightly different: very strong = 1, strong = 2, moderate = 3, weak = 4, and very weak = 5.
- For questions 4 and 5, the categories and scores are: minimal = 1, minor = 2, moderate = 3, major = 4 and severe = 5.
- For question 6, which addresses the response capacity to modify the impact, the categories and scores are slightly different: very strong = 1, strong = 2, moderate = 3, weak = 4 and very weak = 5.

The estimations of overall likelihood and impact achieved using either approach are indicative. If relevant, the team could also make another choice regarding the overall likelihood or impact, based on event-specific considerations and team consensus. Box 7 provides guidance on building team consensus when estimating overall likelihood and impact. Throughout the assessment, if the confidence in the assessment is low, and if there is a range of possible overall likelihood or impact levels, the team may elect to mention this range in the Output sheet or choose one estimate over the others, based on either a stronger rationale or on consensus. If information about the event is severely limited, the team should consider rating the response capacity as weak or very weak until new data are available, especially if current data indicate the potential for significant public health effects.

Fig. 4 provides an example of the driving factor and average approaches as applied to an overall impact assessment.

Figure 4. Examples of the driving factor and average approaches to obtaining the overall impact score

(a) Driving factor approach (question 4 deemed more important)

Question	Categorical answers (from worst to best scenario)				
4. What is the potential level of negative impact on cases?	☒ Severe	☐ Major	☐ Moderate	☐ Minor	☐ Minimal
5. What is the potential level of negative impact on the population, taking into account the current and expected number of cases?	☐ Severe	☐ Major	☒ Moderate	☐ Minor	☐ Minimal
6. What is the capacity to mitigate the impacts on the population, including on cases?	☐ Very weak	☒ Weak	☐ Moderate	☐ Strong	☐ Very strong
OVERALL IMPACT (Please consider the answers to questions 4, 5 and 6 and use the guidance provided in section 2.3 of the manual to respond to the question: what is the potential negative impact of the event?)	☒ **Severe**	☐ **Major**	☐ **Moderate**	☐ **Minor**	☐ **Minimal**

(b) Average (equal weights) approach

Question	Categorical answers (from worst to best scenario)				
4. What is the potential level of negative impact on cases?	☒ Severe	☐ Major	☐ Moderate	☐ Minor	☐ Minimal
5. What is the potential level of negative impact on the population, taking into account the current and expected number of cases?	☐ Severe	☐ Major	☒ Moderate	☐ Minor	☐ Minimal
6. What is the capacity to mitigate the impacts on the population, including on cases?	☐ Very weak	☒ Weak	☐ Moderate	☐ Strong	☐ Very strong
OVERALL IMPACT (Please consider the answers to questions 4, 5 and 6 and use the guidance provided in section 2.3 of the manual to respond to the question: what is the potential negative impact of the event?)	☐ **Severe**	☒ **Major**	☐ **Moderate**	☐ **Minor**	☐ **Minimal**

Box 7. Team consensus

In general, estimates within a risk assessment (i.e. the likelihood, impact and risk levels) should be obtained through consensus among the rapid risk assessment team, in a process through which everyone provides input on the estimates that are related to their expertise, using all the information available at the time of the assessment. When there are diverging opinions and consensus is not possible, the strategies described below can be employed.

- The risk assessment team can provide both estimates for the particular question, resulting in a range of values. For example, if half of the group estimates the overall likelihood as very unlikely and the other half estimates it as unlikely, the resulting estimate could be presented as “unlikely to very unlikely”.
- The risk assessment team can choose one estimate over the other, based on either a stronger rationale or on a stronger agreement. If this approach is chosen, the lack of full consensus and the alternative opinions should be documented along with the rationale for the final choice made, either within the Worksheet if the consensus is not in a critical dimension for the assessment, or, if critical, in the Output sheet, along with the confidence level and sources of uncertainty.

If there is a need to separately characterise the risk to more than one population or geographical area (i.e. stratum), copy and complete the tables to estimate the overall likelihood and overall impact for each stratum. For more information on possible assessment approaches when the risk to multiple areas or populations needs to be assessed separately, see Box 4.

2.4 Assignment of risk and confidence level

This section refers to the Worksheet, part D – Assignment of the risk level (optional) and part E – Assignment of the confidence level.

2.4.1 Assignment of the risk level (optional)

Assigning an overall risk level is optional in this risk assessment tool because representing the risk through reporting the overall likelihood and overall impact may provide sufficient information (e.g. through a summary such as "the likelihood of the event worsening is very low; however, the impact would be major, given the severity of the disease").

If desired, however, the team can decide to use an overall risk level as their final assessment. To obtain the overall risk level, the team can:

- combine the likelihood and overall impact using a risk matrix (part D.1) to derive a risk level and mark the final level of risk in part D.2 (final level of risk) based on the matrix; or
- assign a risk level that is based on event-specific considerations and differs from that which would be derived through the risk matrix. If that is the case, in the second row of the table in part D.2, the team can provide a descriptive rationale behind the assigned level of risk.

If there is a need to separately characterise the risk to more than one population or geographical area (i.e. stratum), copy and complete the risk matrix in part D.1 and table in part D.2. for each stratum. For more information on possible assessment approaches when the risk to multiple areas or populations needs to be assessed separately, see Box 4.

2.4.2 Assignment of the confidence level

Including an overall confidence level in the risk assessment is an important step in ensuring that an assessment is used and interpreted appropriately in decision-making and that the limitations of the assessment are well understood. For example, if an assessment is done at a time when data are insufficient, it is important to be clear about the lower-than-optimal confidence in the assessment, and this information then provides a clear basis for updating the MS-RRA when more information becomes available.

The confidence level is chosen based primarily on whether additional data and information are likely to change the assessment. The confidence level mainly depends on whether the data or information available at the time of the assessment are deemed sufficient and accurate enough to allow the team to estimate the likelihood and impact of the event, and characterize the risk with reasonable certainty. As such, confidence highly depends on the reliability, completeness, timeliness and quality of the information used, as well as the underlying assumptions made. However, even with perfect information, natural variation (i.e. inherent variability) will still exist, and this may also affect the confidence level.

The overall confidence level for the assessment (part E of the Worksheet) should largely be based on the content of the fields addressing What is known and What is not known for each of the six questions in parts B.1 and C.1. Annex 3 provides guidance on assigning confidence levels and illustrates the inverse

relationship between confidence and uncertainty, as well as offering additional considerations to help identify the most appropriate confidence level overall. Once an appropriate confidence level is chosen, it is important to communicate the main rationale for the choice in the Output sheet (section 3.2).

If there is a need to separately characterise the risk to more than one population or geographical area (i.e. stratum), and there is a difference in the confidence level among strata, copy and complete the confidence level table for each stratum. For more information on possible assessment approaches when the risk to multiple areas or populations needs to be assessed separately, see Box 4.

2.5 How to complete the Output sheet

Use these instructions to complete the Output sheet in section 3.2 of this manual. Please note that the Output sheet also has sample text in gray to guide its completion.

Using the results from the Worksheet, the MS-RRA team can prepare the Output sheet, which summarizes and adapts the main findings so they can be shared with key audiences. If there is a desire to also share the Worksheet with some audiences, it should be adapted (e.g. the Recommendations fields should be simplified, and other changes could be considered, such as simplifying the information in the Likelihood and Impact dimensions).

If the risk to more than one population or area has been characterized, the Output sheet should reflect that. For more information on how to report findings in the Output sheet when the risk to multiple areas or populations has been assessed separately, see Box 4.

2.5.1 First steps

Complete the <Disease/hazard/event, location> part at the top of the page including the disease, hazard and/or event and the geographical area/s covered by the risk assessment. The geographical location/s may be the whole Member State or a specified location within it. If the assessment is conducted for a particular group, rather than for the general population, this can also be specified in this part of the Output sheet. See section 2.1 about Risk framing for more details.

Add the date for the assessment. The assessment date can be the date when the assessment is published, the date on which it is finalized or the date of the most recent data used in the assessment. It is recommended that the team decides how the date should be chosen for this field and applies this decision systematically across assessments.

2.5.2 Overall likelihood, impact and risk level

Select the appropriate categories for the overall likelihood, impact and risk level (optional).

If there is a need to separately characterise the risk to more than one population or geographical area (i.e. stratum), use a table similar to Table 1 to report stratum-specific estimates. For more information on possible assessment approaches when the risk to multiple areas or populations needs to be assessed separately, see Box 4.

Table 1. Example of an optional output table that could be used to summarize the overall likelihood and impact, and risk levels for each stratum in a risk assessment with two strata

Stratum	Overall likelihood	Overall impact	Risk level (optional)
Stratum 1	☐Almost certain ☐Highly likely ☐Likely ☐Unlikely ☐Very unlikely	☐Severe ☐Major ☐Moderate ☐Minor ☐Minimal	☐Very high ☐High ☐Moderate ☐Low
Stratum 2	☐Almost certain ☐Highly likely ☐Likely ☐Unlikely ☐Very unlikely	☐Severe ☐Major ☐Moderate ☐Minor ☐Minimal	☐Very high ☐High ☐Moderate ☐Low

2.5.3 Event information

Next, complete the Event information part. This part should include key information describing the hazard or event of concern and the relevant context, as well as descriptions of the time, place and population that is affected. The Event description can be short (e.g. two to three sentences) or longer and include maps and graphs if necessary. If the reason and purpose of the assessment are described in the Worksheet's part A – Risk framing in the Why row, this information can also be included. If a specific risk question was developed for the assessment, it can be added either at the end of Event information or as a separate part before the Risk statement.

2.5.4 Risk statement

Complete the Risk statement. This text should be as concise as possible, ideally limited to one or two paragraphs. Sample text is provided in the Output sheet. A risk statement sentence ideally includes the population to which the statement applies, the estimate of the risk level (e.g. the likelihood level, impact level and, if applicable, the overall risk level), the rationale for the estimate, and the main source of uncertainty for the estimate. The team may elect to report only the likelihood and impact levels or to provide an overall risk estimate in the Risk statement. More text will be needed if multiple populations are at higher risk (i.e. for either exposure or impact) or if multiple or diverse geographical regions are covered by one assessment. The Risk statement can be crafted using key elements from the What is known and What is not known fields in parts B.1 and C.1 of the Worksheet.

2.5.5 Limitations and confidence level

Complete the Limitations and confidence level part. This should include any relevant limitations, especially those that are critical in the What is not known fields in parts B.1 and C.1 in the Worksheet, as well as the overall confidence level for the assessment, including the rationale for the confidence level from part E of the Worksheet. Some crucial limitations or gaps in information may exist – it is possible in some assessments that once new information is gathered to fill critical data gaps, the likelihood/impact/risk level may need to be reassessed. It is important to highlight the importance of gathering information in order to fill in those critical data gaps.

2.5.6 Recommendations

Complete the Recommendations. This part should summarize the key elements of the Recommendations in parts B.1 and C.1 of the Worksheet. Recommendations can be structured so that they best reflect local needs, context and relevant legal frameworks.

The Recommendations can be summarized under the five categories described in WHO's *Strengthening the global architecture for health emergency prevention, preparedness, response and resilience (20)*. In this way they will be aligned with the five interlinked systems encompassing and complementing the core capacities required by IHR (2005) *(3)*, as well as with the One Health approach. The five categories are:

- collaborative surveillance;
- community protection;
- safe and scalable care;
- access to countermeasures;
- emergency coordination.

Another possible approach would be to use the outline below.

- Public health interventions for prevention, response and recovery.
    - Case detection[2].
    - Clinical management and access to treatment.
    - Implementation and maintenance of relevant control measures, including vaccination.
- Collaboration and coordination, including across sectors.
- Risk communication and community engagement.

Other ways to structure the recommendations could also be used. For example, recommendations may be classified as strategic or operational, may include specifics about leadership and partnership, and may be divided into medical countermeasures and public health and social measures.

2.5.7 Reassessment

Describe when a reassessment will or may be considered. To draft this paragraph, consult the information entered in rows "When" and "Trigger for considering reassessment" of the Risk framing part in the Worksheet. Consider the forward-looking window chosen for the assessment. In addition, take into account the level of likelihood, impact, and, where assessed, overall risk, as well as the confidence in the available information, the planned or already implemented control measures, and the stability of the situation.

[2] Ideally, this is based on a clear case definition and includes laboratory confirmation, epidemiological investigation and surveillance.

2.5.8 Alternative Output sheet structures

The MS-RRA team may also consider structuring the Output sheet in other ways. Examples are provided below.

- The team and other contributors may be acknowledged.
- The overall likelihood, impacts and risk (if applicable) could be linked to their corresponding rationale or explanation, either in a table or in bullet points following each estimate.
- If the Risk matrix is used, it could be included in the Output sheet to visualize the likelihood, impact and overall risk level estimates. Note that if stratification is used, more than one subpopulation could be represented on the same matrix.
- If there is a desire to share the Worksheet along with the Output sheet for some audiences, the Worksheet should be adapted (i.e. simplified) for such purposes.

3. The MS-RRA tool

3.1 Worksheet

Disease/hazard/event, location

Assessment date: <Date>

A. Risk framing

Complete this part using section 2.1 of the manual.

What? (Hazard/disease, primary concern)	<For example: "Dengue, continued cases above expected levels">
Why? (Reason, context, purpose, objectives)	<For example: "There is an increasing number of cases being reported from an increasing number of regions of the country,; there is a need assess the likelihood and potential impacts of the event worsening to inform the next steps in terms of investigation and risk management, especially implementation of relevant response measures, and to obtain a risk level to aid in internal and external risk communication">
Where? (Area of occurrence and impact)	<For example: name of the affected country, region or city>
Who? (Primary population at risk, relevant subpopulations at risk)	<For example: "The risk assessment will focus on the general population in the country, with additional focus on children younger than 5 years">
When? (Time frame (i.e. forward-looking window) for the risk assessment)	<For example: "The risk over the next two months will be characterized in this assessment based on currently available data">
Trigger for considering reassessment	<For example: "A reassessment may be initiated after two months, or earlier in case new information emerges that likely affects the risk level, or in case the situation worsens substantially due, for example, to unexpected superspreading events">
Expertise and input needed	<For example: "Epidemiology and risk assessment expertise provided by the public health intelligence team, laboratory expertise provided by representatives from the National Reference Laboratory, medical expertise from the National Hospital, contextual expertise provided by representatives of the regional health authorities">
Risk question (optional)	<Examples: "What is the likelihood and potential impact of the event worsening" ; or "What is the likelihood, potential impact and risk from continued cases of dengue in the general population and children under 5 within the next 4 weeks?" >

STEEEP: social, technological, economic, environmental, ethical, policy and political (consequences).

B. Likelihood assessment using current response capacities and within the timeline of the assessment

Complete this part using section 2.2, and Annex 1 and Annex 2 of the manual.

B.1 Descriptive assessment and recommendations for the Likelihood dimension

Exposure and susceptibility

1. How likely are individuals from the population to be exposed at this moment and develop illness?

What is known[a]	What is not known[b]	Recommendations[c]

Rate, magnitude, spread potential

2. How likely is it that the scale of the event will increase within the time frame?[d]

What is known	What is not known	Recommendations

Response capacity (to limit exposure and spread)

3. What is the response capacity to limit exposure and to limit further cases and geographical spread?

What is known	What is not known	Recommendations

[a] Provide the main rationale and key evidence.
[b] Explain critical information gaps, limitations in the data and knowledge, and other sources of uncertainty.
[c] For questions 1 and 2, provide key actions to reduce the likelihood; for question 3, provide key actions to help increase capacity and address key information gaps.
[d] An increase in the scale refers to an increase in the number of people or a geographical expansion of the event, or both. The time frame refers to the forward-looking window of the assessment (as described in the When component of part A – Risk framing).

B.2 Overall likelihood estimation

If conducting a stratified risk assessment, please copy and complete a table for each stratum (e.g. population group or geographical unit).

Question	Categorical answers (from worst to best scenario)				
1. How likely are individuals from the population to be exposed at this moment and develop illness?	☐ Almost certain	☐ Highly likely	☐ Likely	☐ Unlikely	☐ Very unlikely
2. How likely is it that the scale of the event will increase within the time frame?	☐Almost certain	☐ Highly likely	☐ Likely	☐ Unlikely	☐ Very unlikely
3. What is the response capacity to limit exposure and to limit further cases and geographical spread?	☐ Very weak	☐ Weak	☐ Moderate	☐ Strong	☐ Very strong
OVERALL LIKELIHOOD (Please consider the answers to questions 1, 2 and 3 and use the guidance provided in section 2.3. of the manual to respond to the question: what is the overall likelihood of the event worsening?)	☐ **Almost certain**	☐ **Highly likely**	☐ **Likely**	☐ **Unlikely**	☐ **Very unlikely**

C. Impact assessment using current response capacities, considering the most likely event progression within the timeline of the assessment

Complete this part using section 2.2 and Annex 1 and Annex 2 of the manual.

C.1 Descriptive assessment and recommendations for the Impact dimension

Severity and other effects on cases

4. What is the potential level of negative impact on cases?

What is known[e]	What is not known[f]	Recommendations[g]

Public health and other impacts on the affected population and society

5. What is the potential level of negative impact on the population, taking into account the current and expected number of cases?

What is known	What is not known	Recommendations

Response capacity (to limit impact)

6. What is the response capacity to mitigate impacts on the population, including on cases?

What is known	What is not known	Recommendations

[e] Provide the main rationale and key evidence.

[f] Explain critical information gaps, limitations in the data and knowledge, and other sources of uncertainty.

[g] For questions 4 and 5, provide key actions to reduce the impact; for question 6, provide key actions to help increase capacity and address key information gaps.

C.2 Overall impact estimation

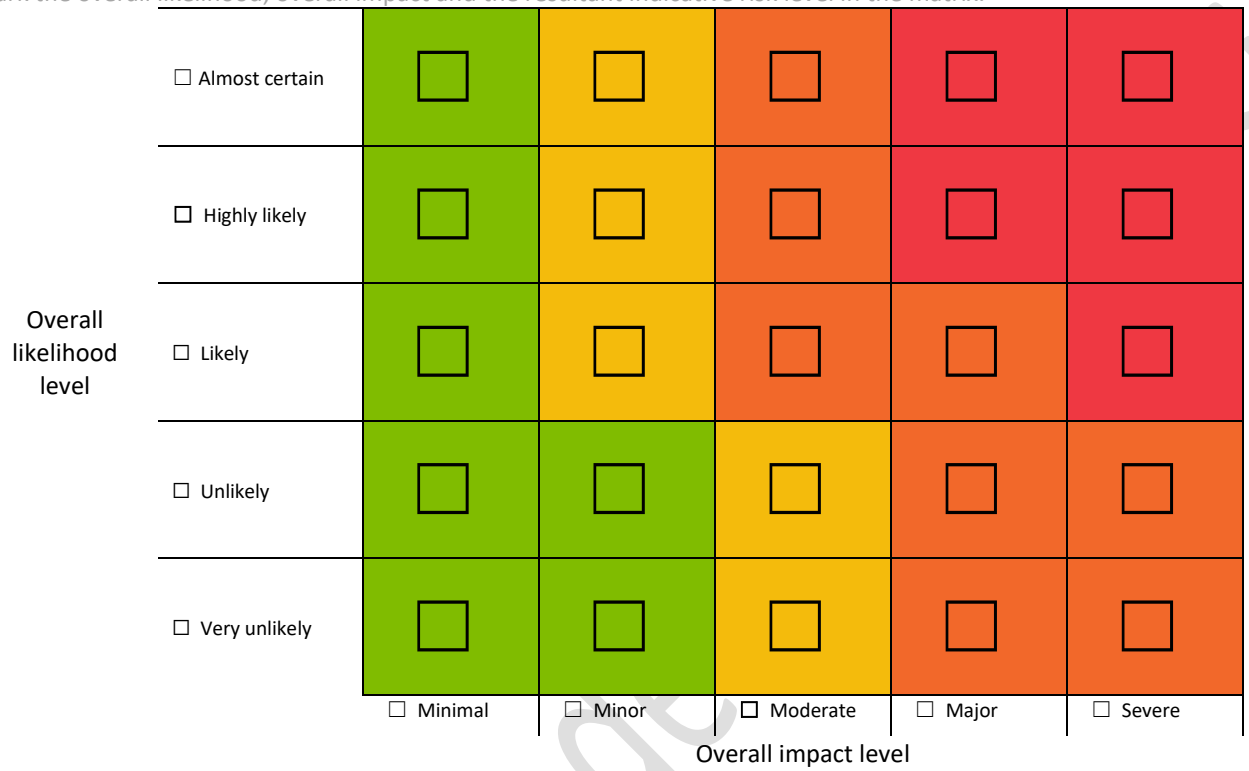
If conducting a stratified risk assessment, please copy and complete a table for each stratum (e.g. population group or geographical unit).

Question	Categorical answers (from worst to best scenario)				
4. What is the potential level of negative impact on cases?	☐ Severe	☐ Major	☐ Moderate	☐ Minor	☐ Minimal
5. What is the potential level of negative impact on the population, taking into account the current and expected number of cases?	☐ Severe	☐ Major	☐ Moderate	☐ Minor	☐ Minimal
6. What is the capacity to mitigate the impacts on the population, including on cases?	☐ Very weak	☐ Weak	☐ Moderate	☐ Strong	☐ Very strong
OVERALL IMPACT (Please consider the answers to questions 4, 5 and 6 and use the guidance provided in section 2.3 of the manual to respond to the question: what is the potential negative impact of the event?)	☐ **Severe**	☐ **Major**	☐ **Moderate**	☐ **Minor**	☐ **Minimal**

D. Assignment of the risk level (optional)

D.1 Indicative level of risk based on the risk matrix (optional)

Mark the overall likelihood, overall impact and the resultant indicative risk level in the matrix.



D.2 Final level of risk (optional)

Final level of risk	**☐ Very high**	**☐ High**	**☐ Moderate**	**☐ Low**
(Optional) Rationale if final level of risk differs from that which would be assigned through the risk matrix.				

E. Assignment of the confidence level

Mark the overall confidence level for the assessment, as well as the rationale (i.e. the factor or factors supporting the choice), using Annex 3 of the manual.

Level of confidence in the risk assessment	☐ **Low**	☐ **Moderate**	☐ **High**
Rationale	• **Critical data gaps** • **Agreement among experts** • **Inherent variability**		

3.2 Output sheet

Member State Rapid Risk Assessment summary

<Disease/hazard/event, location>

Assessment date: <Date>

Overall likelihood	Overall impact	Risk level (optional)
☐Almost certain	☐Severe	☐Very high
☐Highly likely	☐Major	☐ High
☐Likely	☐Moderate	☐Moderate
☐Unlikely	☐Minor	☐Low
☐Very unlikely	☐Minimal	

Event information

<Short instruction: Add key information about the hazard, event of concern and context, and a description of the affected population, as well as place and time descriptions of the situation.>

Risk statement

<Example: "This assessment aims to establish the likelihood and potential impact of the current event worsening, (optional: as well as its risk level). A worsening of the event or significant number of new exposures/cases/illnesses in <population> is <very unlikely/unlikely/likely/highly likely/almost certain> over the next <time frame> due to <reason>. The potential negative impact is estimated to be <minimal/minor/moderate/major/severe>, given <reason>. (Optional: The overall risk is estimated to be: <very high/high/moderate/low>)">

Limitations and confidence level

<Example "The overall confidence level in this assessment is <low/moderate/high> due to <critical data gaps/agreement or disagreement among experts on key factors /inherent variability in the situation>. (Optional, if relevant: Some critical data gaps exist. Once new information is collected on these critical data gaps, a reassessment may be needed to establish the likelihood/impact/risk level with a higher level of confidence. These are <X>.)">

Recommendations

<Short instruction: Summarize recommendations using one of the optional structures from section 2.5.6 or another structure suitable to the specific context and situation.>

Reassessment

<Example: “The risk assessment team will reconvene to review new evidence and evaluate the need for reassessment <in number of days or months/when a specific trigger is met/if the situation escalates/once intervention measures have been applied and their effect is known/once new surveillance data are available”>.

References and further reading

References

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Further reading

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Annex 1. Guiding questions for the descriptive likelihood and impact assessments

The guiding question in this annex are meant to be a point of reference and considered while the risk assessment is conducted. Not all guiding questions are relevant to every risk assessment. The **guiding questions and the main questions in the Worksheet should be answered while taking into account all key elements: hazard, exposure and context, including capacities and vulnerabilities** (Table A1.1).

Table A1.1. Guiding questions for completing the MS-RRA

Part and question number	Domain	Main question	Guiding questions and clarifications to assist in responding to the main question
B.1, question 1	Exposure and susceptibility	1. How likely are individuals from the population to be exposed at this moment and develop illness?	**1.1. Are people likely to have frequent contact with (or exposure to) the hazard?** • What proportion of the population or area covered by the assessment is already affected? • If exposure has taken place among the population covered by the assessment, how much more exposure is likely to be occurring at the moment (e.g. is exposure intermittent, common)? • If exposure has not yet occurred among the population covered by the assessment, how likely is it to take place (e.g. if the hazard is not present in the country/area covered by the assessment, how likely is it to be introduced)? • If exposure has occurred recently but is not continuing, what proportion of the population is already affected by the hazard? • Given the type of hazard, exposure and/or route of transmission, consider: – environmental conditions (e.g. presence of vectors and population proximity to vector habitats, presence of a contaminated product on the market, climatic conditions enabling persistence of a hazard in the environment, transmissibility); – for communicable diseases, the current prevalence or incidence rate among the population; – for zoonotic diseases, the current prevalence in animals, particularly those in frequent contact with humans (i.e. to help assess the likelihood of exposure among humans); also consider populations at higher risk due to occupational exposure; – for environmental, chemical, or radiological or nuclear hazards, the level of the hazard in the environment potentially leading to exposure; – for endemic diseases, the factors that may affect exposure, allowing it to move beyond normally expected rates. • Consider if there is/are a specific population group/s more likely to be exposed. **1.2. Are people susceptible to developing disease upon exposure to the hazard?** • Is the level of exposure to the hazard sufficient to cause illness (e.g. when considering the dose–response relationship, infectivity)? • Is the population immune (e.g. through previous infection or vaccination)? • Consider if there is/are specific population group/s more likely to develop illness upon exposure.

B.1, question 2	Rate, magnitude, spread potential	2. How likely is it that the scale[a] of the event will increase within the time frame?[b] [a] An increase in scale refers to an increase in the number of people or a geographical expansion of the event, or both. [b] The time frame refers to the forward-looking window of the assessment (as described in the When component of the Worksheet, part A – Risk framing).	**2.1. Does the pathogen have a high potential to spread quickly?** • For infectious hazards: does the pathogen have outbreak or epidemic potential when considering the current context? • For environmental, chemical and radiological or nuclear hazards: are conditions present that enable the persistence or further and wider spread of the hazard in the environment, or both, and could these lead to a substantial increase in the number of illnesses associated with the hazard? **2.2. What is the current trend for this event, considering data on cases over time?** • Trend refers to recent changes in case numbers within the current event. The assessment of trend direction, or trajectory, is a qualitative prediction of whether the event is likely to increase in scale, based on whether the number of cases is currently increasing or decreasing. **2.3. How quickly is the hazard spreading geographically?** • What is the likelihood of the hazard being introduced from already affected areas into other parts of the country or territory? What is the likelihood of it being introduced into other countries or territories? **2.4. If the route of transmission or the type of hazard is unknown, or if both are unknown, have many cases been reported in a short time?**
B.1, question 3	Response capacity (to limit exposure and spread)	3. What is the response capacity to limit exposure and to limit further cases and geographical spread?	**Assess the extent of necessary additional control measures and associated costs by considering the following guiding questions.** **3.1. Are effective public health measures available and have they been implemented or are they ready to be implemented and maintained on a sufficient scale to prevent further exposure to the hazard or to prevent spread of the disease or hazard?** • These may include public health and social measures, contact-tracing, quarantine; measures to reduce contact among people, including movement restrictions, when required; proper disposal of contaminated materials; environmental cleaning; removal of products from the market; vector control activities; vaccination; timely diagnosis and isolation of infected individuals; adequate infection prevention and control at health care settings, including ensuring the availability and adequate use of personal protective equipment. • Consider the availability of key resources, such as human resources and necessary material resources, including stockpiles of these. • Does the country need external (e.g. regional or international) support with the response, including for management or logistics, or in terms of resources, laboratory confirmation or specific expertise? • Is multisectoral collaboration needed (e.g. involving the agricultural, wildlife or environmental sector) to identify or implement appropriate response measures, or both, to reduce current and further exposure? • If the situation involves a full multisectoral response, consider specifying the response needed from other sectors, for example animal vaccination or depopulation measures implemented by the agricultural or wildlife sectors to reduce exposure for humans. • For endemic diseases, consider the control measures already in place and any enhanced measures that may be necessary to deal with the escalating situation. **3.2. Is there a high level of public awareness among people at risk and affected populations of the risks and mitigation measures, which can be derived from the recommendations, and is knowledge about these supported by effective risk communication and community engagement?**

			3.3. Are there any major vulnerabilities or barriers that could undermine the effectiveness or uptake of preventive measures? **3.4. Are public health resources for limiting disease exposure and spread overwhelmed or are they likely to be overwhelmed by a rapid increase in cases?** **3.5. Are necessary coordination mechanisms, including for a multisectoral response, if relevant, in place and adequate?** **3.6. What are the main expected costs associated with the needed response measures?**
C.1, question 4	Severity and other effects on cases	4. What is the potential level of negative impact on cases?	**4.1. What is the hospitalization rate of cases in this event? What is the ICU admission rate among cases in this event? What is the CFR among cases in this event?** • If current estimates of hospitalization, ICU admission or CFR are not yet reliable due to data gaps, consider known estimates for the same hazard during previous events in similar contexts. **4.2. Is the disease associated with severe complications or long-term sequelae?** • Consider whether cases are occurring in specific populations that are susceptible to more severe disease. • Consider whether there are signs of reduced effectiveness of vaccines or treatment against severe disease and death. **4.3. Is the disease associated with severe psychosocial effects experienced by patients, including stigma and other effects? (See the STEEEP impacts for the next question.)**
C.1, question 5	Public health and other Impacts on the affected population and society	5. What is the potential level of negative impact on the population, taking into account the current and expected number of cases?	**Consider current and expected case numbers by the end of the forward looking window to answer the questions below. If relevant, consider a period longer than the forward-looking window to allow assessment of impacts that occur at longer time scales.** **5.1. Does the disease itself have an impact on overall mortality and morbidity at the population level?** **5.2. How are the community (i.e. both cases and healthy persons) and overall society currently impacted and how might they be affected in the future?** **5.3. What impacts on society might be expected, beyond direct effects on health and the health system?** • Consider any relevant STEEEP consequences (Additional information appears after this table.). • Consider both the impact of the event and the possible impacts of the response. **5.4. Are any critical impacts on society expected, either from the hazard or potential response measures, or both, beyond those that directly affect health or the health system?** • Consider any relevant STEEEP consequences (Additional information appears after this table.). **5.5. How does the public health response affect the population overall?** • Are there important consequences of control measures that should be considered? Are there actions that can be taken to mitigate any unintended consequences?
C.1, question 6	Response capacity (to limit impact)	6. What is the response capacity to mitigate impacts on the population, including on cases?	**Assess the extent of necessary additional control measures and associated costs by considering the following questions.** **6.1. Does current surveillance capture cases in a timely manner, allowing for timely treatment?** **6.2. Are adequate resources, capacities and services available and accessible to reduce morbidity and mortality, and psychosocial and other effects (e.g. economic)?** • Key resources may include human resources or necessary material resources, such as stockpiles, personal protective equipment, reagents or diagnostic kits. • Capacities and services may include ensuring that there is an adequate ability for the timely detection and treatment of cases; that adequate care and referral pathways are established, and clinical management capacities are in place; that adequate

	health care system capacities are available, such as hospital beds and a trained health care workforce; that health care services to treat the disease are accessible to the public; and that therapeutics with proven efficacy are available and affordable. • Consider the availability of key resources, such as human resources and necessary material resources, such as stockpiles, personal protective equipment, reagents and diagnostic kits. • Does the country need external (e.g. regional or international) support with the response, including for management or logistics, or in terms of resources, laboratory confirmation or specific expertise? Is multisectoral collaboration needed (e.g. involving the agricultural, wildlife or environmental sector) to identify or implement appropriate measures, or both, to reduce impacts (e.g. on education, social services, agriculture, wildlife)? If the situation involves a full multisectoral response, consider expanding response types to other sectors; for example, if animal depopulation is needed, then financial compensation may be required for farmers. • For endemic diseases, consider the control measures already in place and any enhanced measures that may be needed to deal with an escalation. **6.3. Are there any major vulnerabilities or barriers that undermine timely diagnosis or clinical management?** **6.4. Are health care systems being overwhelmed or likely be overwhelmed due to a rapid increase in cases who require hospitalization or admission to an ICU?** **6.5. Are necessary coordination mechanisms in place and adequate, including for a multisectoral response, if relevant?** **6.6. What are expected to be the main costs associated with the needed response measures?**

CFR: case fatality rate; ICU: intensive care unit; STEEEP: social, technological, economic, environmental, ethical, policy and political (used to refer to consequences).

Notes on potential overlap among questions

The Worksheet is designed in a way which allows the risk assessment team to consider a situation from all key perspectives necessary for a reasonable comprehensive risk assessment. At the same time, certain considerations may be relevant to more than one of the six key questions in the Worksheet. Some notes on this inherent overlap are presented below.

- Although the Worksheet separates likelihood and impact dimensions, some domains of risk bridge this type of division, especially the assessment of spread. There are aspects of spread in part B.1, question 2 (How likely is it that the scale of the event will increase within the time frame?) as well as in part C.1, question 5 (What is the potential level of negative impact on the population, taking into account the current and expected number of cases?). It is impossible to eliminate this overlap as the concept of spread inherently has components of likelihood and impact; therefore, the intent is to highlight aspects important for each question, knowing that there is necessarily some overlap.
- This is similar for the concept of vulnerability; as currently structured, vulnerabilities are explored throughout the Worksheet, but especially in part B.1, question 1, where it may be relevant to describe specific groups that may be more vulnerable if exposed, and part C.1, question 4, which considers, where relevant, specific groups at higher risk of developing severe disease.
- Moreover, since the Worksheet is structured to help identify specific recommendations for each domain of risk (i.e. parts B.1 and C.1, questions 1–6), there are multiple places where recommendations can be made, even though they may overlap between domains. For example, actions aimed at

reducing the spread of a hazard are likely applicable to several questions (e.g. questions 2, 3, 5 and 6), and some actions aimed at increasing resources to improve response capacity may overlap between questions 3 and 6. In going through the questions, if recommendations identified for a question have already been made for a previous question, cells may be left blank or applicable recommendations from the previous question can be copied into them.

Additional information on STEEEP consequences

Some of examples of STEEEP consequences that can be considered are provided below. A more comprehensive list can be found in the 2012 WHO manual for *Rapid risk assessment of acute public health events (1)*.

- **Social and cultural:** These may include (i) effects on individuals who are placed in isolation, especially when hospitalized at a distance from their community; (ii) effects arising from restricted contact (e.g. for families visiting infected and seriously ill patients); (iii) changes to important social or religious events (e.g. resulting from social distancing policies); (iv) impacts on lifestyle (e.g. changes to childcare arrangements); (v) acceptability of the control measures to the affected community; (vi) social stigma arising from having an infectious disease; and (vii) psychological impacts.
- **Technical and scientific:** These may include (i) morbidity, mortality and long-term disability; (ii) the effectiveness of control measures – that is, the ability to implement control measures in a timely manner; and (iii) side effects from treatment or prophylaxis.
- **Economic:** These consequences may include (i) direct financial costs for the preparedness and response agencies, the costs of the response activities for the affected individual, families or communities (e.g. the cost of treatment or other health care fees, the loss of domestic and farmed animals); (ii) indirect costs for individuals or families (e.g. if they are unable to work due to school closures, home isolation, loss of income, hospitalization), and (iii) effects on the national economy (e.g. on travel, trade and tourism).
- **Environmental:** These may include (i) negative effects of control measures on the natural environment (e.g. contamination or residues) and (ii) positive effects on the natural environment (e.g. simultaneous control of other diseases such as might occur from vector control activities).
- **Ethical:** These may include (i) unintended consequences (e.g. the removal of primary food sources for families when livestock is culled or contaminated crops are destroyed and no alternatives are provided); (ii) the need to protect communities and individuals from stigmatization (i.e. being regarded as unworthy or treated with disapproval); (iii) equity considerations (i.e. being fair or impartial); and (iv) transparency.
- **Policy and political:** These may include (i) the views of the Minister of Health and other ministers or senior management in a responding or supporting organization; (ii) the likely response of the media and key stakeholder groups; and (iii) legislative and legal instruments enacting constraints or other limitations.

References

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Annex 2. Lookup table for categorical responses for estimations of overall likelihood and impact

Member States may elect to use the indicative levels as they are interpreted here or adapt Table A2.1 and apply other criteria when completing the Member States Rapid Risk Assessment Worksheet.

Table A2.1. Lookup table for categorical responses to the MS-RRA Worksheet

Question	Score, categorical answer and recommended interpretations for each category				
	5	4	3	2	1
1 **How likely are individuals from the population to be exposed at this moment and develop an illness?**	**Almost certain** Expected to occur in most circumstances	**Highly likely** Will probably occur in most circumstances	**Likely** Will occur some of the time	**Unlikely** Could occur some of the time	**Very unlikely** Could occur under exceptional circumstances
2 **How likely is it that the scale of the event will increase within the time frame?**	**Almost certain** Expected to occur in most circumstances	**Highly likely** Will probably occur in most circumstances	**Likely** Will occur some of the time	**Unlikely** Could occur some of the time	**Very unlikely** Could occur under exceptional circumstances
3 **What is the response capacity to limit exposure and to limit further cases and geographical spread?**	**Very weak** A large number of additional control measures will be needed and most of these require significant resources to implement **and/or** will require serious increases in costs for authorities and stakeholders	**Weak** A large number of additional control measures will be needed and some of these require significant resources to implement **and/or** will require significant increases in costs for authorities and stakeholders	**Moderate** Some additional control measures will be needed and some of these require moderate resources to implement **and/or** will require moderate increases in costs for authorities and stakeholders	**Strong** A small number of additional control measures will be needed that require minimal resources **and/or** will require some increases in costs for authorities and stakeholders	**Very strong** Routine responses are adequate and there is no need to implement additional control measures **and/or** will require only minimal extra costs for authorities and stakeholders
4. **What is the potential level of negative impact on cases?**	**Severe** High case fatality rate **and/or** high severity or severe consequences, including	**Major** Moderate case fatality rate **and/or** high severity or major consequences, including	**Moderate** Moderate case fatality rate **and/or** moderate severity or moderate consequences,	**Minor** Low case fatality rate **and/or** low severity or minor consequences, including	**Minimal** Minimal or no case fatalities **and/or** Low severity or minimal consequences, including

	consequences on mental health or welfare (e.g. loss of income) for cases	consequences on mental health or welfare (e.g. loss of income) for cases	including consequences on mental health or welfare (e.g. loss of income) for cases	consequences on mental health or welfare (e.g. loss of income) for cases	consequences on mental health or welfare (e.g. loss of income) for cases
5 **What is the potential level of negative impact on the population, taking into account the current and expected number of cases?**	**Severe** Major impact on a large population or at-risk group **and/or** severe disruption to normal activities and services	**Major** Major impact on a small population or at-risk group **and/or** major disruption to normal activities and services	**Moderate** Moderate impact on a large population or at-risk group **and/or** moderate disruption to normal activities and services	**Minor** Moderate impact on a small population or at-risk group **and/or** minor impact on a large population or at-risk group **and/or** limited disruption to normal activities and services	**Minimal** Limited impact on the affected population **and/or** little disruption to normal activities and services
6 **What is the response capacity to mitigate impacts on the population, including on cases?**	**Very weak** A large number of additional control measures will be needed and most of these require significant resources to implement **and/or** will require serious increases in costs for authorities and stakeholders	**Weak** A large number of additional control measures will be needed and some of these require significant resources to implement **and/or** will require significant increases in costs for authorities and stakeholders	**Moderate** Some additional control measures will be needed and some of these require moderate resources to implement **and/or** will require moderate increases in costs for authorities and stakeholders	**Strong** A small number of additional control measures will be needed that require minimal resources **and/or** will require some increases in costs for authorities and stakeholders	**Very strong** Routine responses are adequate and there is no need to implement additional control measures **and/or** will require only minimal extra costs for authorities and stakeholders

The scales for and interpretations of categories provided are indicative; they contain minimal detail because they will need to be used in a variety of settings and for different types of hazards. The interpretations are adapted primarily from the manual *Rapid risk assessment of acute public health* events, and descriptions of impact levels are aligned with consequence-level descriptions from that manual *(1)*. The interpretations here can be adapted by Member States to better reflect the circumstances in their specific setting, provided they remain aligned with descriptions in the 2012 rapid risk assessment manual *(1)*. Some examples of possible adaptations are described below.

- If a Member State finds it necessary to adapt the Likelihood scale, it could be reduced to fewer categories. An example of alternative categorizations can be found in the Joint Risk Assessment Operational Tool (known as the JRA OT) *(2)*.
- If a corresponding numerical scale of probability is desired, the scale could be adapted depending on whether the jurisdiction more often deals with endemic events (i.e. non-rare) or rare events. For endemic events, a linear scale could be used – that is, a linear scale with percentages is exemplified

in the likelihood definitions in the 2012 rapid risk assessment manual *(1)*. For rare events, it may be more appropriate to use a scale in which the categories move up by an order or magnitude (i.e. a logarithmic scale).

- For the qualitative capacity and impact scales, Member States could add details that are relevant to their jurisdiction, especially if specific indicators are available and accepted in the context. These may include incidence or prevalence, the case fatality rate, the hospitalization rate and various estimated costs of impacts or control measures.

References

1. Rapid risk assessment of acute public health events. Geneva: World Health Organization; 2012 (https://iris.who.int/handle/10665/70810, accessed 28 January 2025).

2. Joint Risk Assessment Operational Tool (JRA OT): an operational tool of the tripartite zoonoses guide. Taking a multisectoral, One Health approach: a tripartite guide to addressing zoonotic diseases in countries. Geneva: World Health Organization, Food and Agriculture Organization of the United Nations, World Organisation for Animal Health; 2020 (https://iris.who.int/handle/10665/340005, accessed 30 January 2025).

Annex 3. Definitions and criteria for assigning a confidence level

Member States may elect to use these indicative levels or adapt Table A3.1 and apply other criteria.

Table A3.1. Definitions and criteria for assigning the confidence level for the MS-RRA Worksheet

Confidence		Uncertainty level[a]	Criteria[b]
Level	**Definition**		
High	Additional data and information are **unlikely** to change the result of the assessment	Low	• Few information gaps (e.g. relevant surveillance data available, sufficient peer-reviewed literature, detailed information from local authorities regarding response capacity, including data from previous response activities) • General agreement among experts about the risk (e.g. based on current or past experience with similar situations) • Low inherent (i.e. natural) variability[c] or the variability is well characterized
Moderate	Additional data and information are **likely to change** the assessment	Moderate	• Gaps in information are present; however, they are not necessarily key to assessing the risk (e.g. some surveillance data are available, peer-reviewed literature to support certain estimates is available, limited information from local authorities on response capacity) • Some agreement among experts, especially on key aspects of the risk (e.g. experience with previous events relevant to the current situation) • Moderate inherent (i.e. natural) variability or variability is characterized to a limited extent
Low	Additional data and information are **very likely to change** the assessment	High	• Critical gaps in key information needed to assess the risk (e.g. no relevant surveillance data, limited or no peer-reviewed literature, knowledge about response capacity not informed by communication from local authorities) • Low level of agreement among experts on key aspects of the risk (e.g. novel type of event, lack of experience with similar situations) • High inherent (i.e. natural) variability or variability is not well characterized

[a] Uncertainty includes aspects of variability. Variability reflects heterogeneity that cannot be reduced with additional information, while uncertainty (in its classical use in non–rapid risk assessments) can be reduced with additional information. Although aspects of uncertainty and variability are often separated in non-rapid, especially quantitative, risk assessments, in the context of a rapid risk assessment, being able to include variability within uncertainty can be helpful in describing the main sources of uncertainty to decision-makers, particularly for low likelihood–high impact events.

[b] These criteria are meant to help identify factors driving confidence in order to contextualize risk for decision-makers. It should be understood that uncertainty is a complex concept; hence, these criteria are usually not independent of one another.

[c] Variability refers to the effect of chance that cannot be reduced with further information.

Annex 4. Risk assessment guidance documents and tools published by the World Health Organization to be used by Member States

The World Health Organization (WHO) has developed and published several guidance documents and tools for risk assessments that Member States can use *(1–14)*. Figure A4.1 maps the different risk assessment guidance documents and tools to illustrate their different purposes and scope, and highlight their complementarity. These documents and tools use similar risk concepts but differ in their methods, scope, objectives, range of hazards covered, context of use, geographical scope, time frame of use and target users.

Table A4.1 details the objectives of each of the risk assessment guidance and tools illustrated in Fig. A4.1, the situations to which they are applicable and the target audience.

In 2012, WHO published the *Rapid risk assessment of acute public health events (1)*. This is an all-hazards methodological manual, and its primary audience is national departments with health-protection responsibilities, national focal points for the International Health Regulations (2005; IHR), and WHO staff *(1, 2)*. The guidance does not contain a tool for operationalizing a risk assessment.

Until 2024, an all-hazards risk assessment toolkit tailored to acute public health events that addressed Member States' needs for a risk assessment process and decision-making about response actions was lacking. The Quick and Immediate Risk Assessment (QIRA) algorithm and the Member States Rapid Risk Assessment (MS-RRA) tool (for comprehensive assessments), described in this document are designed to fill this gap *(3)*.

The MS-RRA tool and QIRA algorithm

The QIRA algorithm and MS-RRA tool are all-hazards tools applicable to assessing risk immediately after detection and during an ongoing, acute public health event. The MS-RRA aids in identifying specific response actions when an acute public health event arises. QIRA and the MS-RRA should be distinguished from tools designed for planning and risk profiling purposes (i.e. that are not for use during an acute public health event). For instance, the *Handbook for public health capacity-building at ground crossings and cross-border collaboration (4)*, the Generic all-hazards risk assessment tool for mass gathering events *(5)* and the WHO Strategic Tool for Assessing Risks (STAR) tool aid national and subnational entities in planning and preparedness activities *(6)*. The STAR tool supports the development of a risk profile to inform emergency preparedness activities. The output of STAR can be used to feed into the information provided in QIRA and the MS-RRA, and vice versa.

QIRA and the MS-RRA should also be distinguished from hazard-specific risk assessment tools, which can be used during or independently of acute public health events but are tailored to characterize the risk from some specific hazards (e.g. mass gathering events during COVID-19, influenza, measles, poliovirus, toxicological and chemical hazards) and cannot be applied to other hazards *(7–12)*.

The QIRA algorithm and the MS-RRA tool should also be distinguished from the Joint Risk Assessment Operational Tool (known as the JRA OT) developed by WHO, the Food and Agriculture Organization of the United Nations and the World Organisation for Animal Health to support countries in applying a consistent and harmonized approach to assessing the risks posed by zoonotic diseases *(13)*.

For natural disasters, WHO issued in 2006 Communicable diseases following natural disasters. This document details the priority measures that are necessary to reduce the impact of communicable diseases following natural disasters *(14).*

Finally, the MS-RRA and QIRA should be distinguished from situational assessments, which can sometimes be carried out during complex emergencies where threats may be posed by more than one hazard simultaneously, and the situation may merit a broader, more holistic assessment. Such broader situation analyses may take longer than risk assessments conducted for acute public health events or emergencies, which commonly focus on risks posed by a single hazard. During humanitarian emergencies, for example, public health situation analyses are conducted using secondary data to determine the immediate needs of a population, and these serve as a tool for planning joint responses. After an emergency, Member States may conduct a post-disaster needs assessment following disasters to evaluate damages, losses and recovery needs.

Comparing internal WHO processes and Member States' processes

WHO's internal and independent rapid risk assessment process, established in line with the IHR (2005) *(2)*, is based on the methods outlined in *Rapid risk assessment of acute public health events* from 2012 *(1)*. This process aims to independently assess the risks posed by acute events of potential public health concern under the IHR (2005) *(2)*, to provide a transparent and reproducible WHO decision-making process, and to identify and initiate WHO's response mechanisms.

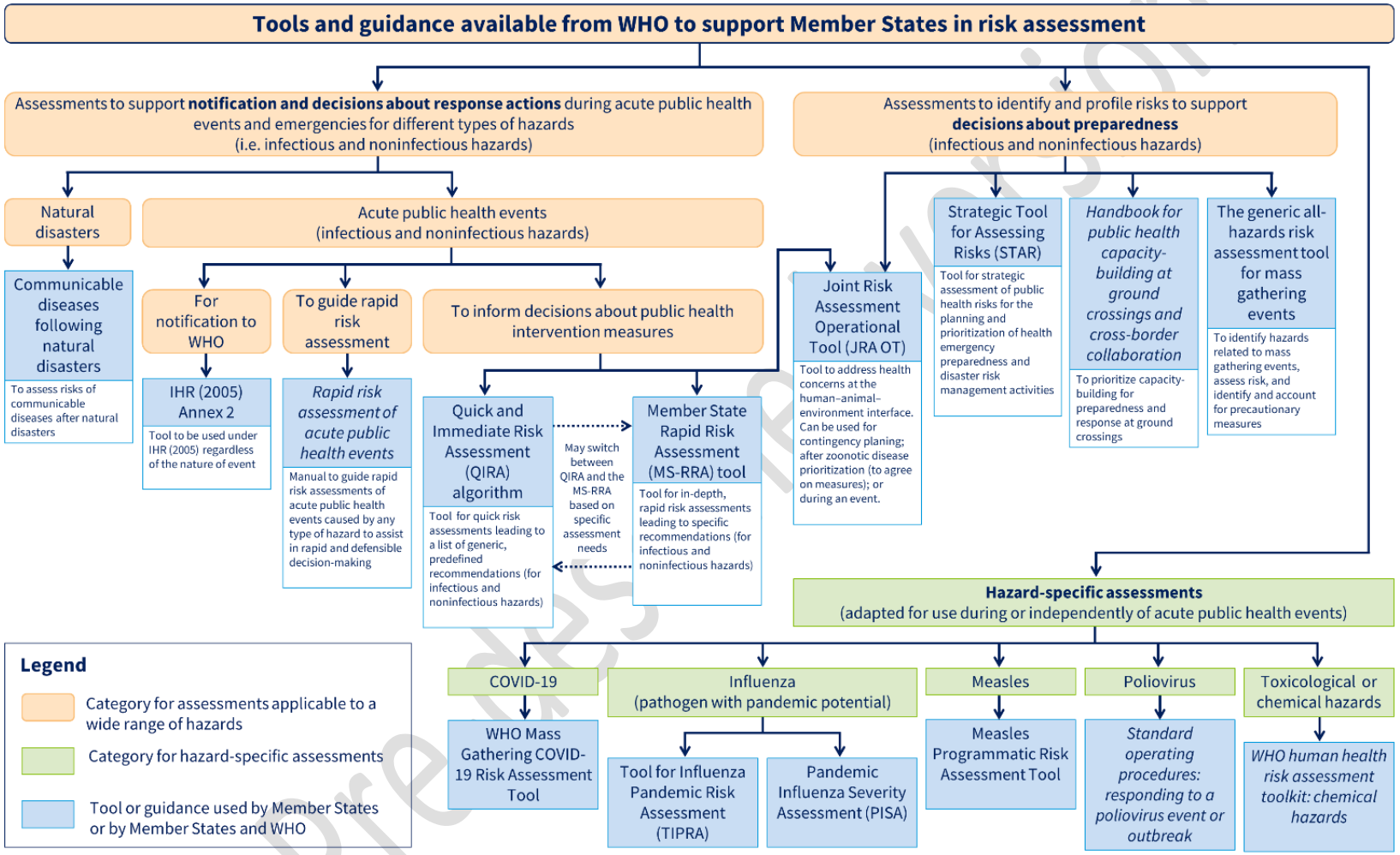
The results of a WHO rapid risk assessment are shared with national authorities whenever possible and selected ones are available on the WHO public rapid risk assessment webpage *(15)*. A summary of findings from a WHO rapid risk assessment can be found in the descriptive information regarding the respective event, reported on WHO's event information site *(16)* and on the disease outbreak news website *(17)*.

The Member States' risk assessment process for acute public health events (supported by QIRA and the MS-RRA) aids national- and subnational-level decision-making about response actions. Key audiences are national- and subnational-level stakeholders, and implementing partners involved in a national response. Moreover, the Member State rapid risk assessment process is initiated by a Member State according to criteria relevant to each State, which may differ from those relevant to WHO.

While QIRA, the MS-RRA, WHO's rapid risk assessment tools and their corresponding user guides are all based on the approach described in the 2012 *Rapid risk assessment of acute public health events (1)*, their distinct criteria reflect differences in their scope, and they are tailored to different target users, audiences and downstream information processes.

Taking this into account, the level of risk from certain acute public health events may be characterized through internal processes at WHO and the Member State using QIRA or the MS-RRA tool, or both. Thus, it is important to remember that none of these processes overrides or replaces the other, although they complement one another. Differences in findings may occur. And those differences may result from the different perspectives used (e.g. national, regional or global for WHO, and national or subnational for Member States), contextual and timely knowledge, and the lens used by the teams involved. The WHO rapid risk assessment process, QIRA and the MS-RRA process inform actions from different institutions based on different perspectives, and actions recommended through WHO's rapid risk assessment, QIRA the MS-RRA will complement and enhance each other to provide a better response.

Figure A4.1. Flowchart to support choosing among key WHO risk assessment tools and guidance for responding to public health events and emergencies, and for preparedness and response activities[a]



IHR (2005): International Health Regulations (2005); WHO: World Health Organization.
Short titles are used for most tools and guidance. Where full titles are used, they have been italicized.
The flowchart does not present an exhaustive list and is based on tools available as of December 2024. The list of tools and guidance supports Member States in risk assessments for events, emergencies, and preparedness and response activities. Hazard-specific tools continue to be developed and published by WHO. Tools and publications that are not described here (e.g. the microbiological risk assessments series, risk assessments for food allergens, and others published on WHO's website) are for use in specific settings.
This flowchart was created by WHO through the Risk Analysis Package for Member States Project

Risk Analysis Package for Member States

World Health Organization

Table A4.1. List of key WHO risk assessment tools and guidance for public health events and emergencies, and for preparedness and response activities

Title of guidance or tool	Objective	Tool applicable to	Target users
2012 manual for the *Rapid risk assessment of acute public health events* *(1)*	This manual guides rapid assessments of acute public health events arising from any type of hazard in response to requests from WHO Member States.	Acute public health events	National departments with health-protection responsibilities, national focal points for the International Health Regulations (2005) and WHO staff, primarily the Public Health Intelligence team of the WHO Health Emergencies Programme
Annex 2, IHR (2005) *https://www.who.int/publications/m/item/who-guidance-for-the-use-of-annex-2-of-the-international-health-regulations-(2005)* *(2)*	States Parties are required to carry out an assessment of public health events occurring within their territories utilizing the decision instrument provided in Annex 2 of the Regulations, and then to notify WHO of all qualifying events within 24 hours of such an assessment.	All hazards	The guidance document is targeted to National IHR Focal Points and others responsible for assessing the need to notify WHO of public health events under the Regulations.
2025 Member State Rapid Risk Assessment (MS-RRA) tool	Member States will use and adapt this tool to conduct their own comprehensive rapid assessments of acute public health events.	Acute public health events	National ministries of health and public health authorities of Member States
2025 Quick and Immediate Risk Assessment (QIRA) algorithm *(3)*	Member States will use and adapt this algorithm to conduct their own quick assessments of acute public health events.	Acute public health events	National ministries of health and public health authorities of Member States
2020 *Handbook for public health capacity-building at ground crossings and cross-border collaboration* *(4)*	This handbook takes a comprehensive approach to health system strengthening at borders to support national focal points for the International Health Regulations (2005) and national agencies in developing and implementing evidence-based action plans for developing capacity for the Regulations at ground crossings.	Border health	Stakeholders with public health roles and responsibilities at ground crossings are not limited to the public health sector but also include other governmental, nongovernmental and private sectors, and other disciplines
2023 *The generic all-hazards risk assessment tool for mass gathering events* *(5)*	This all-hazards tool provides a systematic, evidence-based approach to identifying and classifying priority risks related to a mass gathering and accounting for precautionary measures that may reduce the risk, thus making the event safer.	All hazards	National governments, public health decision-makers and organizers of mass-gathering events
2021 Strategic Tool for Assessing Risks (STAR) *(6)*	This tool is used by national, subnational and local authorities to rapidly conduct a strategic and evidence-based assessment of public health risks to inform emergency preparedness and response planning and to prioritize key emergency preparedness actions. A STAR workshop is held among relevant stakeholders.	Developing a list of relevant hazards identified by STAR workshop participants	A range of stakeholders across the relevant sectors involved in emergency and disaster response management, such as different levels of government, ministries and other public institutions; intergovernmental organizations; the private sector; faith-based organizations; civil society; the media; academic and research institutions; and voluntary associations

2022 WHO Mass Gathering COVID-19 Risk Assessment Tool: generic events, version 3 *(7)*	This is used to assess the overall risk of further spread of COVID-19 for a mass gathering	COVID-19	Organizers of mass gatherings together with local and national public health authorities
2016 Tool for Influenza Pandemic Risk Assessment (TIPRA) *(8)*	This tool provides a standardized and transparent approach to support the risk assessment of influenza viruses with pandemic potential.	Influenza viruses with pandemic potential	WHO
2024 Pandemic Influenza Severity Risk Assessment (PISA) *(9)*	This tool is used to assess risks associated with influenza and syndromic acute respiratory illness activity in the context of historical data.	Influenza and syndromic acute respiratory illness	Public health professionals at the national level who perform or plan to perform assessments of national influenza or syndromic respiratory illness severity and who can contribute towards developing assessments of global severity
Measles Programmatic Risk Assessment Tool *(10)*	This document aims to help national programmes to identify areas not meeting measles programmatic targets and based on the findings, guide and strengthen measles elimination programme activities and reduce the risk of outbreaks.	Measles	National ministries of health and public health authorities of Member States, especially national measles programme managers
2022 *Standard operating procedures: responding to a poliovirus event or outbreak,* version 4 *(11)*	These standard operating procedures offer guidance to any country that detects any type of poliovirus outbreak or event to aid it in responding in a timely and effective manner, with the specific objective of stopping polio outbreaks within 120 days.	Poliovirus	National governments and public health decision-makers who coordinate responses to poliovirus events
2021 *WHO Human Health Risk Assessment Toolkit: chemical hazards (12)*	This toolkit is used to identify and characterize chemical hazards and to assess the magnitude of potential risks to human health associated with exposure to the chemicals.	Chemical hazards	People responsible for conducting health risk assessments (e.g., professionals in public health and environmental health, and scientific or engineering professionals) and making decisions about whether to take action to manage environmental risks
2020 *Joint risk assessment operational tool (JRA OT): an operational tool of the tripartite zoonoses guide (13)*	The tool adopts a multisectoral One Health approach and is used to conduct a joint risk assessment across quadripartite partners (i.e. human, animal, environmental and other sectors) should zoonotic disease hazards emerge or occur at the human–animal–environment interface. Often, sectors conduct specific risk assessments, and outputs from these could potentially be inputs for the JRA OT process.	Events that occur at the human–animal–environment interface	National ministries responsible for human health, animal health or the environment, or other government agencies responsible for the control and management of zoonotic diseases
2006 *Communicable diseases following natural disasters: risk assessment and priority interventions (14)*	This document aims to detail the priority measures that are necessary to reduce the impact of communicable diseases following natural disasters that will help to protect the health of affected populations.	Communicable diseases in post-disaster settings	National ministries of health and public health authorities of Member States

References

1. Rapid risk assessment of acute public health events. Geneva: World Health Organization; 2012 (https://iris.who.int/handle/10665/70810, accessed 23 January 2025).

2. International health regulations (2005), third edition. Geneva: World Health Organization; 2016 (https://iris.who.int/handle/10665/246107, accessed 23 January 2025)

3. User manual for the Quick and Immediate Risk Assessment (QIRA) algorithm for Member States: World Health Organization; (in press; URL to be added with the access date).

4. Handbook for public health capacity-building at ground crossings and cross-border collaboration. Geneva: World Health Organization; 2020 (https://iris.who.int/handle/10665/331534, accessed 24 January 2025).

5. The generic all-hazards risk assessment tool for mass gathering events [spreadsheet]. Geneva: World Health Organization; 2023 (https://iris.who.int/handle/10665/365577, accessed 19 February 2025).

6. Strategic toolkit for assessing risks: a comprehensive toolkit for all-hazards health emergency risk assessment. Geneva: World Health Organization; 2021 (https://iris.who.int/handle/10665/348763, accessed 23 January 2025).

7. WHO Mass Gathering COVID-19 Risk Assessment Tool: generic events, version 3, 16 June 2022 [spreadsheet]. Geneva: World Health Organization; 2022 (https://iris.who.int/handle/10665/356509, accessed 24 January 2025).

8. Tool for Influenza Pandemic Risk Assessment (TIPRA). Geneva: World Health Organization; 2016 (https://iris.who.int/handle/10665/250130, accessed 24 January 2025).

9. Pandemic Influenza Severity Assessment (PISA): a WHO guide to assess the severity of influenza in seasonal epidemics and pandemics. Geneva: World Health Organization; 2024 (https://www.who.int/publications/i/item/9789240093881, accessed 24 January 2025).

10. Measles Programmatic Risk Assessment Tool [website]. Geneva: World Health Organization; 2025 (https://www.who.int/teams/immunization-vaccines-and-biologicals/immunization-analysis-and-insights/surveillance/measles-programmatic-risk-assessment-tool, accessed 19 February 2025).

11. Standard operating procedures: responding to a poliovirus event or outbreak, version 4. Geneva: World Health Organization; 2022 (https://iris.who.int/handle/10665/363627, accessed 24 January 2025).

12. WHO Human Health Risk Assessment Toolkit: chemical hazards, second edition. Geneva: World Health Organization; 2021 (https://www.who.int/publications/i/item/9789240035720, accessed 24 January 2025).

13. Joint Risk Assessment Operational Tool (JRA OT): an operational tool of the tripartite zoonoses guide. Taking a multisectoral, One Health approach: a tripartite guide to addressing zoonotic diseases in countries. Geneva: World Health Organization, Food and Agriculture Organization of the United Nations, World Organisation for Animal Health; 2020 (https://iris.who.int/handle/10665/340005, accessed 23 January 2025).

14. Communicable diseases following natural disasters: risk assessment and priority interventions. Geneva: World Health Organization; 2006 (https://www.who.int/publications/i/item/communicable-diseases-following-natural-disasters, accessed 24 January 2025).

15. Rapid risk assessment [website]. Geneva: World Health Organization; 2025 (https://www.who.int/emergencies/risk-assessment, accessed 27 May 2025)

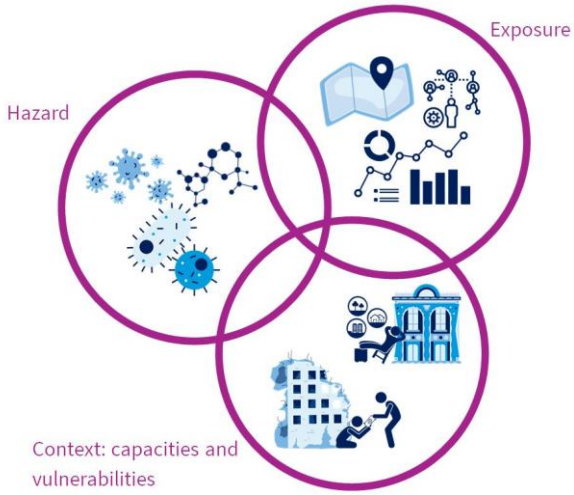
16. National IHR focal points [website]. Geneva: World Health Organization; 2025 (https://www.who.int/teams/ihr/national-focal-points, accessed 19 February 2025).

17. Emergencies: disease outbreak news (DONs) [website]. Geneva: World Health Organization; 2025 (https://www.who.int/emergencies/disease-outbreak-news, accessed 24 January 2025).

Annex 5. Risk assessment approaches

A risk assessment in public health uses as input both qualitative and quantitative information about the hazard, exposure and context, including information about capacities and vulnerabilities (Fig. A5.1). The assessments are carried out based on the best evidence available at the time of the assessment. This evidence is interpreted by the relevant experts on the risk assessment team, who may use various approaches to support their conclusions.

Figure A5.1. Inputs into a risk assessment during an acute public health event



Three different approaches can be used to support the assessment effort: qualitative, quantitative and semiquantitative. Each approach has benefits and drawbacks that may make it more appropriate for certain situations. The approaches are described below.

- **Qualitative** refers to assessments that are descriptive and interpretation-based, in which outputs are reported in categories (e.g. low, moderate, high), and the categorization is supported by a rationale. Inputs into qualitative risk assessments can be numeric (i.e. data or extrapolated from a model) or based on expert opinion that includes contextual knowledge. Given the inherent flexibility of this approach, qualitative methods are often used for rapid risk assessments of acute events, when there is limited time and there are limited data, and when contextual considerations, such as an evaluation of response capacities, and the documentation of data limitations are critical. Qualitative approaches inherently include transparent and clear rationalization and documentation of assumptions and logic used.
- **Quantitative** approaches are assessments based on mathematical models, in which both inputs and outputs are expressed numerically. Given their complexity, data needs and the time required to develop models and their parameters, quantitative assessments often focus on only single aspects of risk, such as estimating the probability of an event happening (e.g. exposure, importation). Quantitative models are useful adjuncts to qualitative risk assessments as they can help the team gain further insights, for example by increasing granularity in the information about risk, enabling comparison of the effects of mitigating measures or identifying critical steps through a sensitivity analysis. When using a quantitative

approach, teams should be experienced, as well as knowledgeable, about the assumptions behind this approach and aware of conditions under which it may not be fully applicable.

- **Semiquantitative** approaches combine aspects of qualitative and quantitative assessments in that they often convert qualitative data into categories and then into numbers (i.e. scores), combine the scores (e.g. add, multiply or weight) and then convert these composite scores back into qualitative categories (e.g. low, moderate, high). Inputs can include numerical data as well as information based on expert opinion. Given their ability to hold factors and weights constant across hazards, semiquantitative approaches are useful for ranking and prioritizing various risks, particularly for planning purposes. When using a semiquantitative approach, teams should be experienced, as well as knowledgeable, about the assumptions behind this approach and aware of conditions under which it may not be fully applicable.

Despite their limitations, qualitative approaches are often the best choice in urgent situations, including for rapid risk assessments; often, good documentation of the rationale behind the estimates, which is inherent to a qualitative approach, is as useful or even more useful to decision-makers than the estimates themselves.

The most important principle for all risk assessment approaches is transparency: the rationale for decisions (e.g. the choice of cut-offs for categories, choice of driving factors or weights) and assumptions (i.e. including model-based and context-based assumptions) should be documented in as much detail as possible.

Annex 6. Example of how to use the MS-RRA tool

In this annex, the use of the Member States Rapid Risk Assessment (MS-RRA) tool is demonstrated through a scenario that was inspired by real events. The details of the events have been changed for this example. This note should be included with any further use of the scenario or adaptations thereof.

The scenario includes a description of the situation and a completed Worksheet and Output sheet, with notes added in grey for the purposes of the exercise. The scenario is set in 2020-2021. However, note that the recommendations and case definitions are tailored to align with more recent guidance from WHO and the Global Task Force on Cholera Control *(1, 2)*.

Event overview

It is 5 April 2021, and a cholera outbreak that was confirmed in Tiria in October 2020 continues to rage. To date 4335 suspected cases[1], including 87 facility deaths, were reported from health facilities (case fatality rate [CFR]: 2.0%). Since February 2021, an upward trend in the number of weekly cases has been observed. More than 600 cases have been reported weekly in each of the past 2 weeks. Cases have been reported primarily from the Lotta and Vard regions, with 94% of suspected cases coming from these regions. Other regions are also affected. According to data from health facility-based surveillance, Vard stands out as the region with the highest CFR in this outbreak, at 3.1% as of 5 April 2021. The level of risk needs to be assessed nationally, with an additional focus on the regions of Lotta and Vard. Targeted evidence-based recommendations to mitigate risk within the country need to be made.

In recent years the Ministry of Health of Tiria has increased efforts to align with international recommendations on cholera surveillance, treatment and control. However, there still is significant room for improvement in this area *(1, 2).*

You are part of the national public health intelligence team in Tiria that has been asked to conduct a risk assessment for this cholera outbreak and present findings to major stakeholders seeking to implement evidence-based interventions to control the outbreak.

The multidisciplinary risk assessment team includes experts from several departments of the Ministry of Health along with other governmental departments as seen in the Risk framing part in the Worksheet. Team members have collected relevant information on the hazard, exposure and context. The most important points from this information are presented below under “Details” and “Background”. Taking into account this information, the team has then filled in the Worksheet and Output sheet of the Member State Rapid Risk Assessment tool.

[1] Suspected case numbers include all suspected cases plus a negligible number of confirmed cholera cases. In case of a confirmed cholera outbreak (i.e. an outbreak in an area where a surveillance unit has at least one locally acquired, confirmed cholera case) the outbreak can be (and commonly is) monitored using case numbers reported based on the case definition for “suspected case in the presence of a confirmed cholera outbreak”. For more information, see the case definitions in this Annex and the case and outbreak definitions in the Guidance document “Public health surveillance for cholera” *(2)*.

Event details

Epidemiological information

Tiria

- The country of Tiria experiences recurrent cholera outbreaks. On 12 October 2020, 6 months after the end of the previous outbreak, a cholera outbreak was again declared in the country. Six suspected cases of cholera were reported in the Yastos region (near the capital city, Waem), with three samples testing positive for cholera by culture at the National Reference Laboratory. Since then, the outbreak has affected 6 of the 10 regions of Tiria (Fig. A6.1), with the highest number of cases reported from the Lotta and Vard regions.
- Between 12 October 2020 and 5 April 2021, 4335 cases and 87 deaths were reported from health facilities (CFR of 2.0%). This CFR is higher than the CFR threshold of less than 1% during a cholera outbreak when timely and adequate treatment is available.
- Additionally, there are reports from media, as well as reports from informal communication regarding deaths possibly associated with cholera in the communities. However, community-based surveillance is not established in Tiria and the data on community deaths is not well documented.
- From February 2021 onwards, there has been an upward trend in the weekly number of reported cases, surpassing 600 suspected cases in each of the past 2 weeks (Fig. A6.2).

Lotta region

- The region of Lotta consistently reported the highest weekly number of suspected cholera cases from November 2020 until February 2021. A sharp increase in weekly case rates was reported from in Lotta in mid-March (Fig. A6.2). Between 12 October 2020 and 5 April 2021, a total of 2765 cases, including 44 deaths (CFR: 1.6%), were reported from health facilities in Lotta.

- At the beginning of February 2021, a reactive vaccination campaign with oral cholera vaccine (OCV) took place in three out of the sixteen districts in the Lotta region (Fig A 6.2). This was the first ever OCV vaccination campaign to take place in Tiria, and the three districts were selected because they were, at the time, hotspots of the outbreak. Within the three districts targeted by the campaign, 89% of the population was vaccinated. Consequently case numbers reported from these districts decreased significantly. However, after the OCV campaign in these three districts, an increasing number of cases started being reported from other districts of Lotta. More information on the campaign can be found under "Response actions until the present".

Vard region

- The region of Vard started reporting suspected cholera cases in February 2021. By 5 April 2021, Vard has the second-highest total number of suspected cases, following Lotta (Fig. A6.2). Between 12 October 2020 and 5 April 2021, a total of 1306 suspected cases, including 40 deaths (CFR: 3.1%), were reported from health facilities in Vard (Fig. A6.2). As of 5 April 2021, the Vard region has the highest CFR of all the regions (as detected through facility-based surveillance). Based on experiences shared by health workers in cholera treatment

centres and units (CTCs and CTUs), this has been related to patients reaching health facilities too late, and to an insufficient number of oral rehydration points or other community-level treatment.

Figure A6.1. Regions affected by the cholera outbreak in Tiria, 12 October 2020 to 5 April 2021

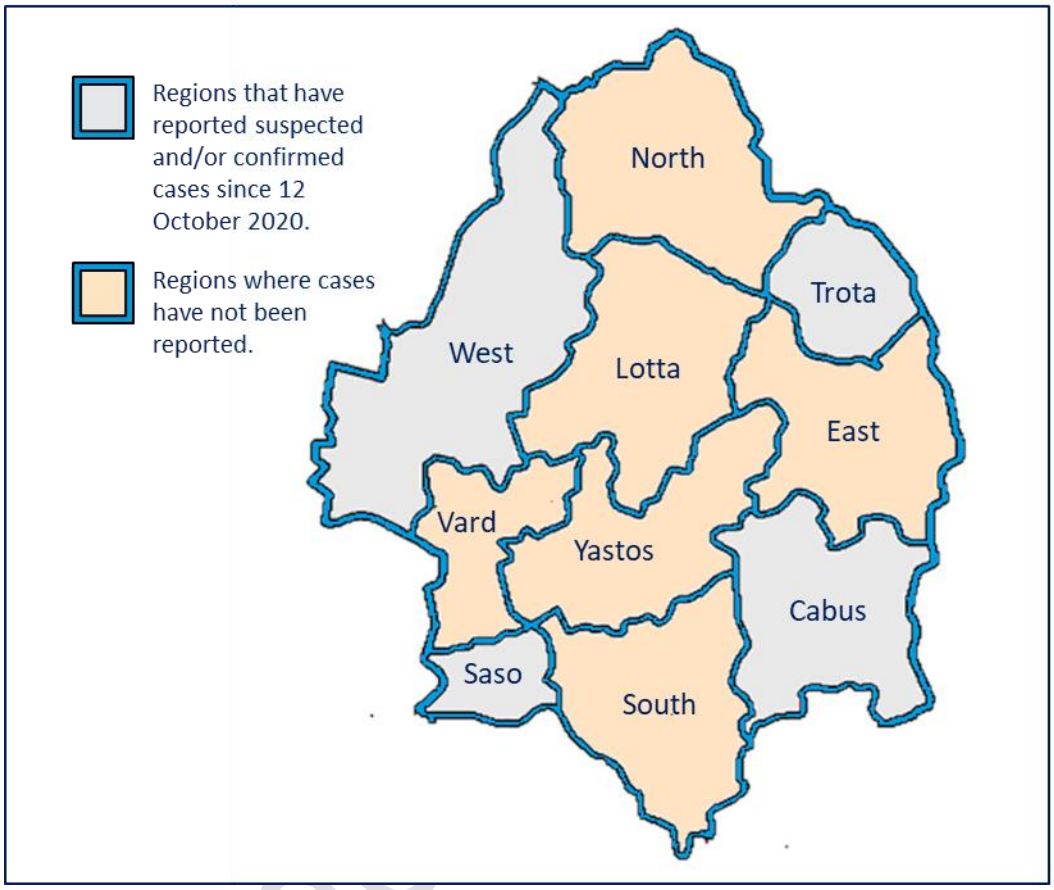
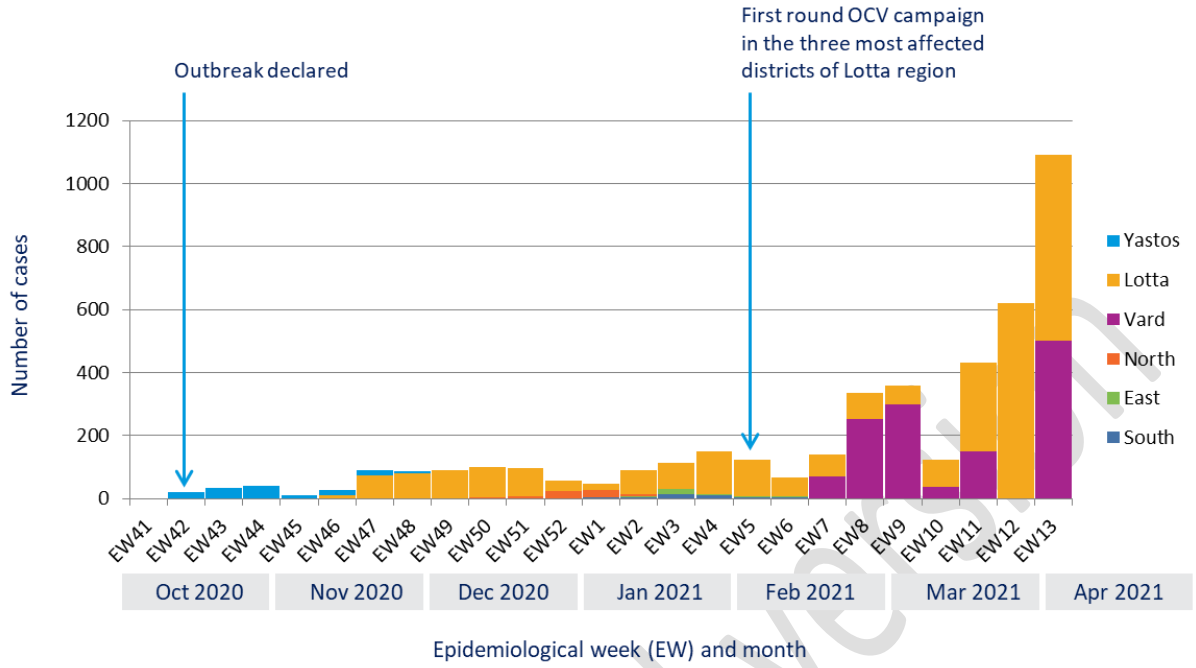


Figure A6.2. Weekly number of suspected cholera cases in in Tiria, by region, 12 October 2020 to 5 April 2021



OCV: oral cholera vaccine.

Response actions until the present

A national response was initiated on 12 October 2020 and included the actions described below.

- In the affected districts, surveillance activities were strengthened to increase the completeness of reporting and testing according to systematic protocols. Reporting from some regions to the Ministry of Health continues to be delayed. Last week's surveillance report from Vard (epidemiological week 12) has not yet been received by the Ministry of Health, and it is not clear whether the most recent report received (for week 13, ending on 4 April) is a batch report adding data from weeks 12 and 13.
- Two response teams have been deployed to major outbreak sites to support response activities and conduct investigations.
- Rapid diagnostic tests (RDTs) are available in all regions, and the National Reference Laboratory is able to perform confirmatory testing using polymerase chain reaction or culture.
- Cholera treatment kits were prepositioned in all regions before the start of this outbreak, and currently no regions are reporting shortages. However, due to the regional distribution of kits, the exact number of kits is unknown, and there is an ongoing national assessment of the current number of kits in regional stockpiles.
- CTCs and CTUs and ORPs[2] have been established quickly in affected districts, as needed. However, there is concern that in some hotspots, the repositioning of staff from hospitals to CTCs or CTUs creates human resource issues in terms of treating patients with diseases other than cholera. In addition, there are concerns raised from Vard that the number of oral rehydration points established is insufficient.
- COVID-19 is also spreading in Tiria, and this has posed further challenges to the response efforts for cholera *(note that the scenario is set at the height of the COVID-19 pandemic before vaccines were widely available)*.
- After a successful request for OCV doses, submitted to the International Coordinating Group on vaccine provision (ICG) to release vaccines from the global stockpile, the Ministry of Health initiated a reactive oral cholera vaccine (OCV) campaign in early February 2021. This was the first OCV campaign to ever take place in the country. The campaign targeted three out of the sixteen districts of Lotta region, as these three districts were hotspots of the outbreak at the time. By 10 February 2021, 901 400 people had been vaccinated with the first dose of OCV, and an administrative first OCV dose vaccination coverage of 89% was reached in the three districts. Consequently, cases reported in these three districts decreased significantly. Further cases reported from Lotta after this OCV campaign were from other districts of the region.
- A request for 900 000 additional OCV doses was submitted in March to the ICG to release vaccines from the global stockpile. This request has been approved. As of 5 April 2021, the vaccines are expected to arrive in the country within 1 week to be used for a first-round OCV campaign in additional hotspot districts in Lotta and Vard regions.

[2] Cholera treatment centres (CTCs) and smaller cholera treatment units (CTUs) are inpatient health care facilities set up during outbreaks to isolate and treat patients. Traditionally, CTUs have less capacity and are attached to existing health facilities, and CTCs are independent structures with higher capacity. ORPs refers to Oral rehydration points

- Water, sanitation and hygiene (WASH) interventions – including the distribution of water purification tablets and the decontamination of major outbreak sites – are being carried out. The overall current quantities of WASH and medical supplies are unclear owing to the multiple regional stockpiles.
- Community members and leaders have been trained in handwashing, water purification, and disinfection of homes and public spaces. Awareness-raising in the community is ongoing, although some overstretched areas find it hard to allocate human resources for communications activities.

Background

Tiria

- Tiria is a lower-middle-income country with a population of around 52 million people.
- The country has a weak health care system, composed of three levels:
  - the national, represented by the Ministry of Health and associated institutions;
  - the regional, represented by Regional Health Authorities that coordinate health activities in the 10 regions and provide technical support to health districts;
  - the district, represented by health services covering 168 districts.
- Infectious disease surveillance in the country is often hampered by suboptimal communication, leading to irregular epidemiological updates and the potential underreporting of cases.
- Tiria has a dense network of perennial rivers that are a major water resource for many homesteads. A significant proportion of the population lives without access to safe drinking water and relies on open water sources, such as rivers, which are prone to environmental contamination. According to national estimates, in 2018 only 59% of the population had access to safe drinking water and 43% had access to basic sanitation facilities.
- The North region is experiencing internal conflict due to intercommunity tensions. This has, in the last three months, lead to population displacement, which is likely to continue The majority of people fleeing conflict in the North region move into Lotta.
- Lotta, Yastos and South are the regions with highest population density, as well as with several large cities with overcrowding.
- Lotta, Yastos and South are also relatively better off economically, with a relatively better organized health care system.
- Vard region suffered a severe flooding last year, which disrupted the already sparse road infrastructure in the region. While repairs are ongoing, many roads are still not functioning.

Cholera in Tiria

- Tiria has had frequent cholera outbreaks during the past 20 years, with high morbidity and mortality.
- There is a seasonal pattern of cholera outbreaks in Tiria. Large outbreaks often happen at the start of and during the rainy season, which lasts from April to November.

- During the rainy season, flooding can take place, increasing the chances of environmental transmission of *V. cholerae*. While flooding has happened in different areas of the country, historically, Vard and Saso regions have most often been hit by heavy flooding during the rainy season.
- Over the last years, the Ministry of Health of Tiria has made efforts to align with international recommendations on cholera surveillance, treatment and control. However, there still is significant room for improvement in this area.

Cholera

- Cholera is an acute diarrhoeal infection caused by consuming food or water contaminated with the bacterium *V. cholerae*.
- Cholera outbreaks are linked to having limited access to safe water and basic sanitation facilities, and to poor hygiene practices. These may occur in situations of conflict; population displacement; during climate events, such as cyclones, floods or drought; and as a result of a lack of investment in maintaining and improving WASH services and infrastructure.
- Most people infected with *V. cholerae* do not develop symptoms but the bacteria can spread through their faeces for 1–10 days following infection. Symptoms appear 12 hours to 5 days after infection *(3).*
- Most people with cholera have mild or moderate acute watery diarrhoea and can be treated with oral rehydration solution. However, the disease can progress rapidly, so starting treatment quickly is vital to save lives. Patients with severe disease need intravenous fluids, oral rehydration solution and antibiotics. Severe disease can be fatal within hours if untreated.
- Preventing and controlling cholera involves a combination of strengthening surveillance, improving WASH services, increasing risk communication and community engagement, improving access to quality treatment and implementing reactive vaccination campaigns to deliver OCV.
- The World Health Organization (WHO) has developed six cholera kits to support the investigation and confirmation of cholera outbreaks and the treatment of patients:
  - one for investigation;
  - one with supplies for culture confirmation in a laboratory;
  - three for providing treatment at the community, peripheral and central levels (each treatment kit provides enough materials to treat 100 patients (1–3));
  - one support kit with logistical materials, including solar lamps, fencing, water bladders and taps.

Cholera case definitions

These definitions have been derived from the guidance document *Public health surveillance for cholera*, produced by the Global Task Force on Cholera Control *(2)*.

Suspected case of cholera

- In the absence of a probable or confirmed cholera outbreak this refers to:
  - a person aged ≥ 2 years with acute watery diarrhoea and severe dehydration;

or

- someone who died from acute watery diarrhoea with no other known cause of death.

- In the presence of a probable or confirmed cholera outbreak this refers to:
  - a person with acute watery diarrhoea or someone who died from acute watery diarrhoea.

Confirmed cholera case

- This refers to any person infected with *V. cholerae* O1 or O139, as confirmed by culture (including sero-agglutination) or PCR.

Worksheet

Member State Rapid Risk Assessment Worksheet

Cholera in Tiria

Assessment date: <5 April 2021>

A. Risk framing

Complete this part using section 2.1 of the manual.

What? (Hazard/disease, primary concern)	Cholera (*Vibrio cholerae*), recent upsurge in cases in the context of an ongoing outbreak.	Notes: In this and all other areas of the assessment, keep information short and simple and focus on key findings. This assessment has two geographical strata: (i) the whole of Tiria and (ii) Vard and Lotta regions. The team has selected a forward-looking window of 2 months, taking into account knowledge about the volatility of previous outbreaks in the area plus considerations of the time needed to implement measures. However, if the situation escalates sharply before the 2 months expire, a new assessment will be considered.
Why? (Reason, context, purpose, objectives)	A cholera outbreak was declared, in October 2020. A recent upsurge in cases in two regions of the country, with a significant increase in weekly case numbers, brings about the need for a risk assessment with proposed evidence-based recommendations to mitigate risk.	
Where? (Area of occurrence and impact)	Tiria (national assessment), with an additional focus on the two regions with the highest numbers of suspected cases (Vard and Lotta)	
Who? (Primary population at risk, relevant subpopulations at risk)	The assessment covers the general population (i) at the national level and (ii) in the Vard and Lotta regions.	
When? (Time frame (i.e. forward-looking window) for the risk assessment)	The next 2 months.	
Trigger for considering reassessment	Significant increase in event scale or significant geographical expansion of the event before the end of the 2 months, which may lead to a change in the assessments of likelihood, impact and risk.	
Expertise and input needed	Epidemiology and outbreak investigation expertise from the National Public Health Intelligence team at the Ministry of Health and representatives from the regional health authorities in Lotta and Vard; clinical and laboratory expertise on cholera from representatives from the National Infectious Disease Clinic and National Public Health Institute; regional contextual expertise for the two most affected regions from representatives from the regional health authorities of Lotta and Vard; logistical expertise, especially for vaccines and treatment resources, from the Immunizations and Medical Products Directorate at the Ministry of Health; WASH expertise from the Department of Environmental Health at the Ministry of Health and regional health authorities.	
Risk question (optional)	What is the likelihood of the event worsening in the next 2 months, its potential impact and the overall risk in Tiria associated with the ongoing cholera outbreak?	

B. Likelihood assessment using current response capacities and within the timeline of the assessment

Complete this part using section 2.2 and Annex 1 and Annex 2 of the manual.

B.1 Descriptive assessment and recommendations for the Likelihood dimension

Exposure and susceptibility

1. How likely are individuals from the population to be exposed at this moment and develop illness?

What is known[a]	**What is not known**[b]	**Recommendations**[c]	Notes:
The information available indicates continued circulation of cholera, especially in Vard and Lotta. Individuals may potentially be currently exposed to the hazard in various areas of Tiria due to population movements, the limited access to safe water and the use of open water sources.	Some unknowns remain, including: • true current incidence in all areas, especially outside the affected districts, where surveillance has not been enhanced; • overall susceptibility in the population (i.e. the current level of immunity due to recent infection); • the extent of environmental contamination with *V. cholerae,* especially at major water sources as well as within homesteads.	The likelihood of further immediate exposure of individuals at this moment can be reduced through: • efficient active case-finding and the isolation of identified cases; • increasing the provision of safe drinking water, increasing the distribution of water purification tablets and protecting water sources; • environmental sampling in major cholera hotspots to guide decontamination efforts.	This question focuses on the immediate risk of exposure and illness among individuals in the population. The RRA team has provided descriptive findings for both the national level and for Vard and Lotta. Refer to Annex 1 for guiding questions.

Rate, magnitude, spread potential

[a] Provide the main rationale and key evidence.

[b] Explain critical information gaps, limitations in the data and knowledge, and other sources of uncertainty.

[c] For questions 1 and 2, provide key actions to reduce the likelihood; for question 3, provide key actions to help increase capacity and address key information gaps.

2. How likely is it that the scale of the event will increase within the time frame?[d]

What is known	What is not known	Recommendations	Notes:
While case numbers in many of the regions affected until now are low, case numbers in the Lotta and Vard regions have recently trended upward, which indicates the potential for the scale of the outbreak to increase in these regions. The outbreak could also expand to additional regions due to population movements, especially taking into account the intensified population movement between North and Lotta resulting from the conflict in North region. Once introduced into an area, cholera has a high spread potential, especially in areas with limited access to safe drinking water and inadequate WASH conditions. These risk factors exist in many areas of Tiria. Due to the starting rainy season, climate conditions in the near future are expected to be favourable for cholera spread. Flooding is expected, and it is known to propagate environmental contamination. Among cholera affected regions, based on historical data, Vard is at highest risk of severe flooding.	The irregular epidemiological updates and the potential underreporting of cases mean that the actual scale of the event may be bigger than the reported scale.	Continue the measures aimed at limiting wider spread in affected districts, such as: supplying water purification tablets; improving sanitation conditions, especially among displaced persons; and intensifying other WASH interventions. OCV campaigns should be carried out swiftly in additional hotspot districts in Lotta and Vard to prevent the scale of the event from escalating in these regions and to reduce the likelihood of spread to other regions.	This question focuses on the potential for the scale to increase and on measures that can be implemented to reduce the likelihood of this occurring. The RRA team has provided descriptive findings for both the national level and for the Vard and Lotta regions. Refer to Annex 1 for guiding questions.

Response capacity (to limit exposure and spread)

3. What is the response capacity to limit exposure, and to limit further cases and geographical spread?

[d] An increase in the scale refers to an increase in the number of people or a geographical expansion of the event, or both. The time frame refers to the forward-looking window of the assessment (as described in the When component of part A – Risk framing).

What is known	What is not known	Recommendations	Notes:
The OCV campaign was organized and 901 400 people in three affected districts in Lotta were vaccinated. An additional 900 000 doses of OCV are expected to arrive in the country, indicating there is capacity for further reactive vaccination campaigns in Lotta and Vard. Several response activities are in place in affected districts, such as enhanced surveillance, community awareness, and mobilization and implementation of WASH interventions. However, while measures may have averted an even larger epidemic, cases continue to rise, which indicates that measures have not yet been applied at sufficient scale. Implementing response measures in Lotta in the near future may become more complex as more people move in from North. Response measures in Vard are already carried out against the backdrop of a disrupted road infrastructure, and potential flooding in the area may complicate further efforts.	While the current and expected number of vaccine doses is known, the overall current quantities of WASH supplies are unclear because there are multiple regional stockpiles. There are reports of deaths within the community, showing there are cases that are not isolated in treatment centres. This indicates a gap in case-finding and isolation efforts, which in turn frustrate control efforts.	Data on stockpiles of WASH supplies need to be collected and analysed to better assess regional response capacities, especially in Vard and Lotta, where the number of cases is most likely to increase further. Coordination activities need to take place to ensure there is capacity for continued WASH interventions in current hotspots and capacity to quickly implement emergency WASH interventions in potential new hotspots, especially near currently affected areas. Case-finding and isolation efforts must be enhanced to ensure better management and control of the outbreak.	This question focuses on the potential ability of response capacities to reduce the likelihood of event worsening. Refer to Annex 1 for guiding questions.

OCV: oral cholera vaccine; RRA: rapid risk assessment; WASH: water, sanitation and hygiene.

B.2 Overall likelihood estimation

If conducting a stratified risk assessment, please copy and complete a table for each stratum (i.e. population group or geographical unit).

B.2.1 National level

Question	Categorical answers (from worst to best scenario)				
1. How likely are individuals from the population to be exposed at this moment and develop illness?	☐ Almost certain	☐ Highly likely	X Likely	☐ Unlikely	☐ Very unlikely
2. How likely is it that the scale of the event will increase within the time frame?	☐Almost certain	X Highly likely	☐ Likely	☐ Unlikely	☐ Very unlikely
3. What is the response capacity to limit exposure, and to limit further cases and geographical spread?	☐ Very weak	☐ Weak	X Moderate	☐ Strong	☐ Very strong
OVERALL LIKELIHOOD (Please consider the answers to questions 1, 2 and 3 and use the guidance provided in section 2.3 of the manual to respond to the question: what is the overall likelihood of the event worsening?)	☐ **Almost certain**	☐ **Highly likely**	X **Likely**	☐ **Unlikely**	☐ **Very unlikely**

B.2.2 Vard and Lotta regions

Question	Categorical answers (from worst to best scenario)				
1. How likely are individuals from the population to be exposed at this moment and develop illness?	☐ Almost certain	X Highly likely	☐ Likely	☐ Unlikely	☐ Very unlikely
2. How likely is it that the scale of the event will increase within the timeframe?	☐Almost certain	X Highly likely	☐ Likely	☐ Unlikely	☐ Very unlikely
3. What is the response capacity to limit exposure, and to limit further cases and geographical spread?	☐ Very weak	☐Weak	X Moderate	☐ Strong	☐ Very strong
OVERALL LIKELIHOOD (Please consider the answers to questions 1, 2 and 3 and use the guidance provided in section 2.3 of the manual to respond to the question: what is the overall likelihood of the event worsening?)	☐ **Almost certain**	X **Highly likely**	☐ **Likely**	☐ **Unlikely**	☐ **Very unlikely**

Notes:
The team elected to do a separate overall assessment for the national level (all of Tiria) and the regions of Vard and Lotta. Thus, they mention key descriptive findings for the national level and for Vard and Lotta in the descriptive assessment in part B.1. They complete the overall likelihood assessment table twice: (i) once for the national level and (ii) once for Vard and Lotta.
The risk matrix was also run twice (as shown in part D).
The team chose the average score approach to assess the likelihood as all three questions are considered to have equal importance in this outbreak.
Refer to Annex 2 for interpretations for each category.

C. Impact assessment taking into account current response capacities, considering the most likely event progression within the timeline of the assessment

Complete this part using section 2.2 and Annex 1 and Annex 2 of the manual.

C.1 Descriptive assessment and recommendations for the Impact dimension

Severity and other effects on cases

4. What is the potential level of negative impact on cases?

What is known[e]	What is not known[f]	Recommendations[g]	Notes:
The overall CFR reported from facilities between October 2020 and 5 April 2021 is 2.0%, which is higher than the CFR of less than 1% expected during a cholera outbreak when timely treatment is available. Vard stands out as the region with the highest CFR reported from facilities in this outbreak (CFR: 3.1%). This has been attributed to cases arriving too late at CTCs and CTUs, and to an insufficient number of oral rehydration points or other community-level treatment.	With suboptimal surveillance, the current CFR estimates for this outbreak are uncertain, including the breakdown of deaths at facilities and in the community. Current CFR estimates come from health-faciilty based surveillance, as community-based surveillance is not established. The predominant reason for the high CFR observed in Vard is unclear, although some hypotheses exist.	Investigate the predominant reasons for late presentation of cases to CTCs and CTUs in Vard, and focus resources based on the findings. Focus investigation on whether community treatment is being provided adequately, and on whether, taking into account road infrastructure obstructions, adequate transportation to CTCs or CTUs is provided for patients in the community or at oral rehydration points. Actions to enhance timely presentation to CTCs and CTUs include: • improving access to treatment in communities by increasing oral rehydration points and ensuring community health workers and those working at the household level are also distributing oral rehydration solutions; • ensuring adequate accessibility of the centres and units by providing transport from the community to the facilities; • enhancing active case-finding efforts; • increasing community awareness to encourage timely health-care-seeking behaviour. The above measures should be maintained and enhanced in all affected areas, with a special focus on the Vard region.	The RRA team has provided key descriptive findings for both the national level and, where relevant, for the Vard and Lotta regions. In this case, Vard is of particular concern due to its higher CFR, and relevant findings on Vard are placed here. Refer to Annex 1 for guiding questions.

[e] Provide the main rationale and key evidence.

[f] Explain critical information gaps, limitations in the data and knowledge, and other sources of uncertainty.

[g] For questions 4 and 5, provide key actions to reduce the impact; for question 6, provide key actions to help increase capacity and address key information gaps.

Public health and other impacts on the affected population and society

5. What is the potential level of negative impact on the population, taking into account the current and expected number of cases?

What is known	What is not known	Recommendations	Notes:
Given the health system's overall weakness, disruption of normal activities and strain on treatment services for diseases other than cholera are possible within the assessment's time frame. These have already been seen in heavily affected districts, where the repositioning of staff from hospitals to CTCs and CTUs has reduced treatment capacities for other diseases, including COVID-19 (which is currently spreading in the country). Furthermore, COVID-19 also affects the overall response to cholera. The continued spread in already affected districts and into new areas indicates that there is potential for a wider future impact on the population.	It is unclear to what extent treatment services for diseases other than cholera are under strain in affected areas, as data on this is not structured.	Further investigation is recommended to identify communities where treatment services for patients with illnesses other than cholera have been significantly affected. This can guide planning for interventions to mitigate this impact.	This question refers to wider impacts on the general population. Refer to Annex 1 for guiding questions.

Response capacity (to limit impact)

6. What is the response capacity to mitigate impacts on the population, including on cases?

What is known	What is not known	Recommendations	Note:
Cholera kits were prepositioned in all regions, and currently no regions are reporting shortages. CTCs and CTUs have been established in affected districts, as needed. However, there are reports of an insufficient number of oral rehydration points or other community-level treatment in Vard. The response efforts indicate good and flexible coordination capacity to adapt to the ongoing epidemic and provide treatment options for cholera where needed. However, an overall CFR of 2% at the national level and 3.1% in the Vard region indicate a need to increase resources to support the timely presentation of cases to the clinics. In addition, in some hotspots the repositioning of hospital staff to CTCs and CTUs may hinder the treatment of diseases other than cholera.	The current total stock of cholera kits is unknown. The number of kits in the regional stockpiles is being assessed.	Reallocate kits among regions if and as needed after the national assessment to ensure sufficient treatment capacity. Increase resources to support timely presentation of cases to clinics, for example by ensuring adequate accessibility of CTUs and CTCs, enhancing active case-finding efforts, and increasing community awareness to encourage timely health-care-seeking behaviour. Investigate options to increase human resources in hospitals, CTCs and CTUs in hotspots, including temporarily moving staff from unaffected areas to cope with any reductions in staffing, to support the adequate treatment of patients with cholera and other illnesses during the outbreak. Increase resources for oral rehydration points in Vard.	Refer to Annex 1 for guiding questions.

C.2 Overall impact assessment

If conducting a stratified risk assessment, please copy and complete a table for each stratum (i.e. population group or geographical unit).

C.2.1 National level

Question	Categorical answers (from worst to best scenario)				
4. What is the potential level of negative impact on cases?	☐ Severe	X Major	☐ Moderate	☐ Minor	☐ Minimal
5 What is the potential level of negative impact on the population, taking into account the current and expected number of cases?	☐ Severe	☐ Major	X Moderate	☐ Minor	☐ Minimal
6 What is the capacity to mitigate the impacts on the population, including on cases?	☐ Very weak	☐ Weak	X Moderate	☐ Strong	☐ Very strong
OVERALL IMPACT (Please consider the answers to questions 4, 5 and 6 and use the guidance provided in section 2.3 of the manual to respond to the question: What is the potential negative impact of the event on the population?)	☐ **Severe**	☐ **Major**	X **Moderate**	☐ **Minor**	☐ **Minimal**

C.2.2 Vard and Lotta regions

Question	Categorical answers (from worst to best scenario)				
4. What is the potential level of negative impact on cases?	☐ Severe	X Major	☐ Moderate	☐ Minor	☐ Minimal
5 What is the potential level of negative impact on the population, taking into account the current and expected number of cases?	☐ Severe	☐ Major	X Moderate	☐ Minor	☐ Minimal
6 What is the capacity to mitigate the impacts on the population, including on cases?	☐ Very weak	X Weak	☐ Moderate	☐ Strong	☐ Very strong
OVERALL IMPACT (Please consider the answers to questions 4, 5 and 6 and use the guidance provided in section 2.3 of the manual to respond to the question: What is the potential negative impact of the event?)	☐ **Severe**	X **Major**	☐ **Moderate**	☐ **Minor**	☐ **Minimal**

Notes:
The team elected to do a separate overall assessment for the national level (all of Tiria) and the regions of Vard and Lotta. They thus mention key descriptive findings for the national level and for Vard and Lotta in the descriptive assessment in C.1., and they complete the overall impact assessment table twice: (i) once for the national level and (ii) once for Vard and Lotta.
The risk matrix was also run twice (as shown in part D).
The team chose the average score approach to assess the impact as all three questions are considered to have equal importance in this outbreak. Refer to Annex 2 for interpretations for each category.
The choice of approach – driving factor versus average score – depends on event considerations. In this specific event, if the team was particularly worried about the fact that CFR is higher than what would be expected given timely treatment, they could also have decided to use the driving factor approach. The

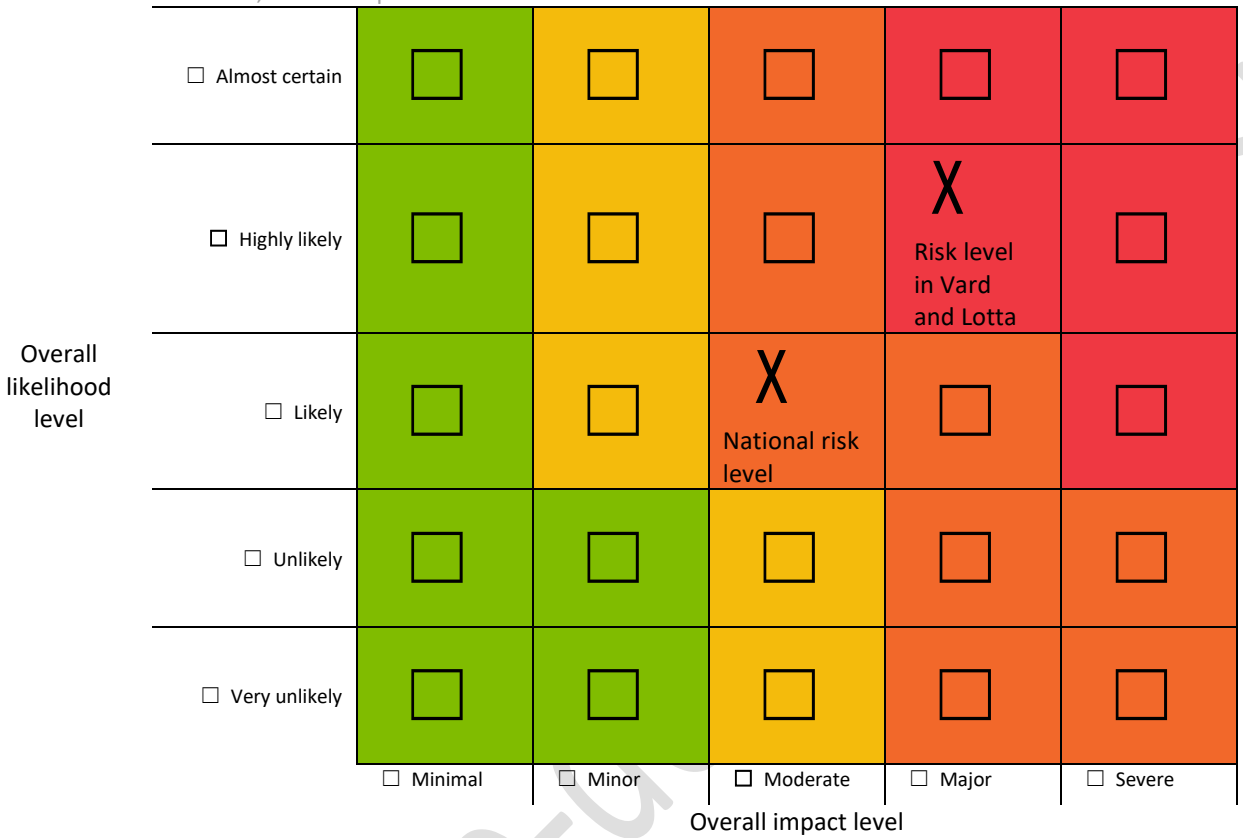
						higher CFR is a concern for cases, and therefore pertains to question 4. If the driving factor approach was chosen, and question 4 was chosen as most important among the three impact questions, then the overall impact at national level (C.2.1) would have been assessed as “Major”)

CFR: case fatality rate; CTC: cholera treatment centre; CTU: cholera treatment unit; RRA: rapid risk assessment; WASH: water, sanitation and hygiene.

D. Assignment of the risk level (optional)

D.1 Indicative level of risk based on the risk matrix (optional)

Mark the overall likelihood, overall impact and the resultant indicative risk level in the matrix.



D.2. Final level of risk (optional)

Final level of risk at the national level	**☐ Very high**	**X High**	**☐ Moderate**	**☐ Low**
Final level of risk for Vard and Lotta regions	**X Very high**	**☐ High**	**☐ Moderate**	**☐ Low**

E. Assignment of the confidence level

Mark the overall confidence level for the assessment, as well as the rationale, (i.e. the factor or factors supporting the choice), using Annex 3 of the manual.

Level of confidence in the risk assessment	☐ Low	X Moderate	☐ High	Notes: Refer to Annex 3 for further guidance on assigning the level of confidence.
Rationale	• **Critical data gaps** Current data allow for adequate risk characterization. However, the surveillance system is suboptimal and missing or lagging surveillance reports are an issue that hampers analyses and timely resource allocation. Collecting and analysing information about cholera kits and the availability of WASH supplies at the regional level and about the reasons behind late presentation of cases to clinics will enhance knowledge to allow for more accurate assessment of capacities and efficient, targeted resource allocation. • **Agreement among experts** No disagreement among experts has been noted during the process. • **Inherent variability** Cholera is epidemic-prone and potential entry into new areas may lead to additional sharp surges in case numbers, affecting the assessments of likelihood, impact and risk.			

WASH: water, sanitation and hygiene.

Output sheet

Member State Rapid Risk Assessment summary

Cholera in Tiria

Assessment date: 5 April 2021

	Overall Likelihood	Overall Impact	Overall risk
National level	☐Almost certain ☐Highly likely ☒Likely ☐Unlikely ☐Very unlikely	☐Severe ☐Major ☒Moderate ☐Minor ☐Minimal	☐Very high ☒High ☐Moderate ☐Low
Vard and Lotta regions	☐Almost certain ☒Highly likely ☐Likely ☐Unlikely ☐Very unlikely	☐Severe ☒Major ☐Moderate ☐Minor ☐Minimal	☒Very high ☐High ☐Moderate ☐Low

Note:
Because the assessment includes two geographical strata, results for both are presented.

Event information

The country of **Tiria** experiences recurrent cholera outbreaks. On 12 October 2020, 6 months after the end of the previous outbreak, a cholera outbreak was once again declared in the country, due to the identification of suspected cases from the Yastos region (near the capital city, Waem). Since then, the outbreak has affected 6 of the 10 regions of Tiria, with the highest numbers of cases reported from the Lotta and Vard regions. From February 2021 onwards, there has been an upward trend in the weekly number of reported cases, which has surpassed 600 in each of the past 2 weeks. This trend is driven by cases reported from Lotta and Vard. Between 12 October 2020 and 5 April 2021, a total of 4335 cases, including 87 facility deaths (case fatality rate [CFR]: 2.0%) were reported from health facilities in the six affected regions. This CFR is higher than the CFR of less than 1% expected during a cholera outbreak when timely treatment is available. As of 5 April 2021, the Vard region stands out as having the highest CFR (3.1%) compared to other regions, according to health facility-based surveillance. Based on experiences shared by local doctors and nurses working in the cholera treatment centres and units (CTCs and CTUs), the higher CFR may be related to patients reaching health facilities too late which may be connected to an insufficient number of oral rehydration points or other community-level treatment, or to inadequate transportation (complicated by road obstructions in Vard).

Surveillance activities have been strengthened in affected districts, but surveillance reports from some regions are still delayed. Rapid diagnostic tests (RDTs) are available in all regions and the National Reference Laboratory is able to perform confirmatory testing.

CTCs and CTUs have been established in affected districts, as needed. There is concern that in some hotspots, the repositioning of staff from hospitals to CTCs and CTUs creates human resources issues in terms of treating people with

Notes:
Key event information is summarized here for stakeholders. Keep it short and simple, but include key information about time, place and person, as well as important response information.

diseases other than cholera (including COVID-19, which is circulating in the country). Cholera treatment kits were prepositioned in all regions, and no regions are reporting shortages. However, the current total stock is unknown, and there is an ongoing assessment of the national cholera kit stockpile.
The first round of an oral cholera vaccine (OCV) campaign was completed in three health districts in the Lotta region on 10 February 2021, reaching 89% coverage. An additional 900 000 OCV doses are expected to arrive from the global stockpile within 1 week to be used for a first-round OCV campaign in additional hotspot districts in Lotta and Vard regions.
Water, sanitation and hygiene (WASH) activities are being carried out as per standard operating procedures. The overall current quantities of WASH supplies are unclear. Awareness-raising in the community is ongoing, although some overstretched areas find it hard to allocate human resources for communications activities.
Tiria has a dense network of rivers, prone to environmental contamination, which are a main source of drinking water for many households. April is the beginning of the rainy season and large cholera outbreaks are common during the rainy season. In addition, during this season, flooding can happen.
Historically, Vard is prone to severe flooding. The region has yet to recover from a severe flooding last year, which disrupted the already sparse infrastructure, with repairs still incomplete in April 2021. Lotta has a relatively better organized healthcare system, but is currently facing an influx of displaced people, fleeing conflict in North region.

Risk statement

This assessment aims at establishing the likelihood of the event worsening during the next 2 months, its potential impact and the overall risk in Tiria associated with the ongoing outbreak, with additional focus on the Vard and Lotta regions.

At the national level (i.e. for the country), it is **likely** that the event will worsen during the next 2 months, taking into account continued circulation of *V. cholerae*, contextual factors that contribute to spread (e.g. suboptimal WASH activities, population mobility, rainy season). The potential negative impact is estimated to be **moderate** as the system has largely adapted quickly to the outbreak, providing treatment where needed. The overall risk level for Tiria is **high.**
In the regions of Vard and Lotta, it is **highly likely** that the event will worsen, taking into account the current surge in case numbers, disrupted roads in Vard, the increased risk of flooding in the next months, and the influx of displaced people into Lotta. The potential negative impact is estimated to be **high** due to reports of overwhelmed health facilities in hotspots and the resultant inability to provide adequate treatment for people with diseases other than cholera as human resources are shifted to CTCs and CTUs. The overall risk level for the Vard and Lotta regions is estimated to be **very high.**

Notes:
Use the guidance from section 2.5 in the manual and the example sentences in section 3.2 in the blank Output sheet to craft the sentences in this section. The first sentence here is derived from the overall risk question (formulated in the Worksheet in part A – Risk framing).

Limitations and confidence level

The overall confidence in this assessment is **moderate.**
While the current data available allow for adequate risk characterization, some uncertainties due to data limitations exist, including:

Note:
The statements here are adapted from the Worksheet part E –

- suboptimal communications networks leading to irregular epidemiological updates, the potential underreporting of cases and uncertainties around the CFR estimates;
- incomplete data about cholera kits and the availability of WASH supplies; Currently, there are no reported shortages in the regions, but shortages may appear in the near future, and enhanced knowledge about regional capacities is needed to ensure the ability to implement targeted interventions, especially if the event worsens rapidly;

In addition to data limitations, the confidence level is affected by uncertainties due to the inherent variability of this event. Cholera is epidemic-prone, and potential entry into new areas may lead to additional sharp surges in case numbers, affecting assessments of likelihood, impact and risk.

Assignment of the confidence level.

Recommendations

Public health interventions for prevention, response and recovery

(i) Case detection, laboratory confirmation, epidemiological investigation and surveillance

- Continue current enhanced surveillance activities and provide support to ensure improved timeliness of reports.
- Ensure efficient active case-finding and isolation of identified cases, and continue measures aimed at limiting wider spread, such as supplying water purification tablets, improving sanitation conditions, especially among displaced persons, and intensifying other WASH interventions.

(ii) Clinical management and access to treatment

- Reallocate cholera kits among regions if and as needed after the national and regional stockpile assessment to ensure sufficient treatment capacity.
- Increase resources that will support timely presentation of cases to health facilities.
- Investigate options to increase human resources in hospitals, CTCs and CTUs in hotspots (including temporarily moving staff from unaffected areas to help with reduced staffing levels elsewhere) to support adequate treatment of patients with cholera and other illnesses in affected areas during the outbreak.
- Investigate the predominant reasons for the late presentation of cases to CTCs and CTUs in Vard, and focus resources based on the findings. Focus investigation on whether community treatment is being provided adequately, and on whether, taking into account road infrastructure obstructions, adequate transportation is provided for patients.
- Actions to enhance timely presentation to CTCs and CTUs include:
  - improving access to treatment in communities by increasing oral rehydration points and ensuring community health workers and those working at the household level are also distributing oral rehydration solutions;
  - ensuring adequate accessibility of the centres and units by providing transport from the community to the facilities;
  - enhancing active case-finding efforts;
  - increasing community awareness to encourage timely health-care-seeking behaviour.

The above measures should be maintained and enhanced in all affected areas, with a special focus on the Vard region.

Notes:
The statements here are adapted from the Recommendations column of the Worksheet in part B.1 –Descriptive assessment and recommendations for the Likelihood dimension and part C.1 – Descriptive assessment and recommendations for the Impact dimension.

(iii) Implementation and maintenance of relevant control measures, including vaccination

- Continue implementing measures aimed at limiting wider spread in affected districts (i.e. WASH interventions).
- Swiftly implement OCV campaigns in additional affected districts in Lotta and Vard to prevent further increases in the scale of the event in these regions and reduce the likelihood of spread to other regions.
- Collect data about stockpiles of WASH supplies to better assess regional response capacities, especially in Vard, Lotta and neighbouring regions.

Collaboration and coordination, including across sectors

- Coordination activities need to take place to ensure the continued availability of resources for case management and WASH interventions in current hotspots, and the capacity to quickly allocate resources to new hotspots.
- In addition, coordination activities may be needed to investigate potential options for reallocating human resources to hotspots, especially by sending doctors and nurses to support hospitals and CTCs and CTUs.
- Ensure that logistical and other coordination mechanisms to distribute OCVs to hotspots are in place.

Risk communication and community engagement

Enhance efforts to increase community awareness and encourage timely health-care-seeking behaviour among cases, especially in Vard.

Reassessment

The risk assessment team will review new evidence and evaluate the need for reassessment in 2 months (i.e. in June 2021). Reassessment can be considered before then if the situation escalates sharply.

Note:
The statement here is adapted from the Worksheet, part A – Risk framing – from the rows that When (the forward-looking window) and Trigger for considering reassessment.

References

1. Ending cholera: a global roadmap to 2030. Geneva: Global Task Force on Cholera Control; 2017 (https://www.gtfcc.org/wp-content/uploads/2019/10/gtfcc-ending-cholera-a-global-roadmap-to-2030.pdf, accessed 3 February 2025).

2. Public health surveillance for cholera: guidance document 2024. Geneva: Global Task Force on Cholera Control; 2024 (https://www.gtfcc.org/wp-content/uploads/2024/04/public-health-surveillance-for-cholera-guidance-document-2024.pdf, accessed 3 February 2025).

3. Cholera: key facts. Geneva: World Health Organization; 2024 (https://www.who.int/news-room/fact-sheets/detail/cholera, accessed on 3 February 2025