EUROPEAN CENTRE FOR
DISEASE PREVENTION
AND CONTROL

TECHNICAL DOCUMENT

Handbook on simulation exercises in EU public health settings

ECDC TECHNICAL DOCUMENT

Handbook on simulation exercises in EU public health settings

How to develop simulation exercises for supporting preparedness and response to communicable diseases

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Executive summary

The purpose of this simulation exercise handbook is to support organisations in the public health sector in strengthening their response to events involving communicable diseases, based on effective simulation exercises as a part of preparedness.

This handbook is meant to serve as a guide on:

- how to guarantee strategic-level support of decision-makers in order to set an exercise programme within the preparedness plans of the organisation; and
- how to set all necessary steps in conceptualising, designing, planning, coordinating, conducting and evaluating simulation exercises.

This handbook can best be used by experts within the field of general preparedness that are responsible for putting in place the exercise planning process. With the entry into force of the EU Decision 1082/2013 on serious cross-border threats to health, the handbook comes as a timely instrument to support Member States in the assessment of their capacities and the strengthening of their response planning in areas covered by the new legislation, such as the interoperability of plans or intersectoral collaboration.

It has been divided into six main sections; the first five correspond to one of the five phases of the simulation exercise cycle and the sixth features guidance on scenario building.

The foundation section describes and guides the reader in carrying out the tasks that must be completed to provide the hierarchical support for an effective and successful exercise.

The design and development section builds on the exercise planning process.

The conducting section discusses the activities required prior to launching and during the exercise.

The evaluating section provides guidance for the evaluation process, supporting further improvements to the organisation's way of working.

The improvement section helps to translate lessons identified by the exercise into improvement measures that the organisation can take.

The final section, the scenario-building guidance, provides an overview for developing scenarios.

1. Introduction

The European Centre for Disease Prevention and Control (ECDC) serves as a European Union (EU) source of independent scientific advice, assistance and expertise provided by trained medical, scientific and epidemiological staff, from its own resources or those of recognised Competent Bodies acting on behalf of Member States' authorities responsible for human health.

The Centre's mission is to identify, assess, and communicate current and emerging threats to human health from communicable diseases. In the case of outbreaks of illness of unknown origin that may spread within or to the EU, ECDC is empowered to act until the source of the outbreak is known and then, in cooperation with the relevant competent authorities at the national or EU level, as appropriate[1].

This handbook is the direct result of a need expressed by Member States' Competent Bodies[2] for preparedness within the area of simulation exercises. The need for a handbook originated in October 2008, as a conclusion of a Competent Bodies meeting to define areas of ECDC support for Member States. In cooperation with external experts (see Annex 1), ECDC identified best practices from a wide range of literature. The handbook should be considered as a best practice manual to be used in an EU setting.

Member States have varying capacities and capabilities for emergency preparedness, planning and response, and are at different stages of communicable disease preparedness. Exercises are useful tools for identifying and assessing levels of preparedness and may be used at each stage of emergency preparedness development to test the practicality, adequacy, sufficiency and efficiency of proposed plans and procedures. The following is a list of general considerations that should be taken into account when developing an exercise:

- organisation's present level of emergency preparedness;
- areas (weaknesses, gaps, deficits, etc.) negatively affecting the organisation's performance as identified through prior exercises;
- level of staff experience and knowledge of the organisation's preparedness (plans, roles, responsibilities, procedures, etc.), including emergency preparedness; and
- validity and relevance of objectives in the face of existing and emerging public health issues[3].

The framework presented in this handbook applies to exercises related to communicable diseases, outbreaks and epidemics. The instructions provided throughout the handbook can be tailored to meet the specific needs, circumstances, resources and organisational structure that apply to each Member State at national, regional and local levels or in any other organisational context.

Exercising is about practising, testing, evaluating and improving an organisation's preparedness plans and routines for managing urgent public health events. Public health events of any nature require a coordinated and integrated response based on advance preparedness. Exercises should therefore be considered as an integral component of an organisation's preparedness planning and not merely as isolated events designed to test individual processes, procedures or capabilities.

Public health events that require a major response happen quite infrequently. In order to be well prepared organisations and their staff need to exercise the procedures and skills for these events. More than this, though, simulation exercises provide an opportunity to practice skills and functions and test the level of preparedness in a low-risk and low-consequence environment.

Simulation exercises provide a tool for improving preparedness at the organisational level and among staff. At an organisational level, exercises present an opportunity to identify gaps and weaknesses in resources, planning and procedures and clarify specific roles and responsibilities. As regards staff, exercises provide an opportunity to train staff members to be ready to respond to situations similar to those in the exercise through hands-on practice and experience.

1.1 Handbook objectives

The purpose of this handbook is to provide a generic guide to developing simulation exercises in public health settings. The guidance in it should be used and implemented in a way that is tailored and adapted to the specific needs and prevailing circumstances of each Member State. It is designed to help organisations in the public health sector conceptualise, design, plan, coordinate, conduct and evaluate simulation exercises efficiently. The handbook provides a common terminology for simulation exercises across the Member States and will assist with the

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1 Regulation (EC) No 851/2004 of the European Parliament and of the Council, of 21 April 2004. Establishing a European Centre for Disease Prevention and Control.

2 ECDC's Competent Bodies for Response, i.e. the dedicated counterparts for response activities in the Member States

3 Adapted from the Public Health Emergency Exercise Toolkit, School of Nursing, Center for Health Policy, Columbia University.

simulation planning process and the structuring of an exercise team. It will also provide examples, templates and tips that are useful in the exercise process.

1.2 Target readers

This handbook can best be used by preparedness experts who have some knowledge of public health and are responsible for putting an exercise programme into place. It may also be used effectively by public health experts who have some knowledge of emergency preparedness for the same purpose. It serves as a guide on how to obtain the support of strategic level decision-makers for a preparedness planning cycle that includes a programme of simulation exercises.

1.3 How to use this handbook

Exercises must always be tailored and adjusted to local, regional, national and international circumstances and the specific needs of the organisation and staff involved. This handbook should be considered as:

- a synthesis of current knowledge and expertise on exercise management in public health settings; and
- the result of ECDC's experience from conceptualising, planning, conducting and evaluating exercises.

It also provides guidance on the component functions of exercise planning, the tasks that need to be performed during all phases prior to, and after, an exercise and general advice on how to set up, run and evaluate exercises. The references included in this handbook contain more detailed information on the various components discussed and indicate where selected further literature and best practices can be found.

1.4 Handbook outline

The handbook has been divided into six sections. The first five correspond to the five phases of the simulation exercise cycle[4] and the sixth features guidance on scenario building.

Figure 1. The simulation exercise cycle
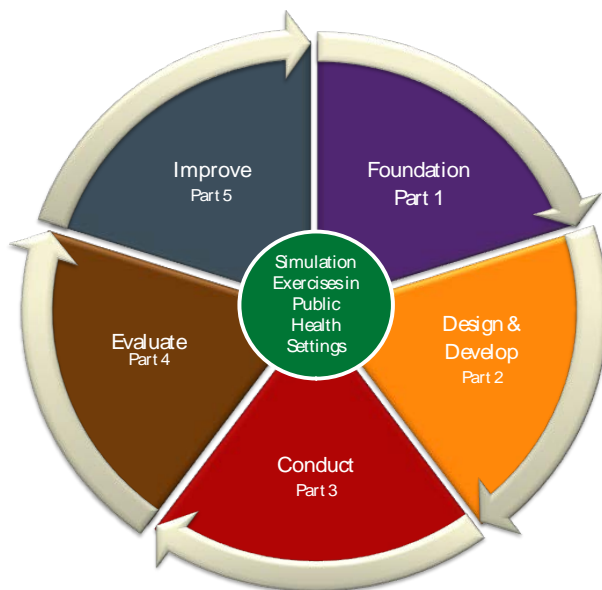
The simulation exercise cycle is based on the following steps:

Foundation: This section of the handbook describes and guides the reader in carrying out the tasks that must be completed to provide the foundation for an effective and successful exercise. This part of the handbook will guide the reader in the early, primarily administrative, steps of the exercise cycle.

Design and development: The design and development section builds on the exercise planning described in the preceding section, and will guide the reader in the design and development phase of the exercise cycle. It focuses on the components of the exercise itself as well as its content.

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4 Adapted from the US Department for Homeland Security Exercise and Evaluation Program (HSEEP) for this handbook.

Conducting: Once the design and development tasks have been completed, it is time for the exercise team to carry out the exercise. This section discusses the activities required prior to launch and during the exercise.

Evaluating: This section provides guidance for the evaluation of the exercise. Thorough and effective evaluation of an exercise demands a considerable amount of planning and work before and after the day of the exercise. The development of the evaluation framework should be initiated as soon as the objectives are established. It should run parallel to and be carefully coordinated with the activities of the 'design and development' and implementation phases of the exercise cycle.

Improvement: The fifth section aims to guide the reader on how to translate the areas for improvement identified by the exercise into measures to be taken by the organisation.

Scenario building guidance: This final section of the handbook provides guidance for developing useful scenarios. In order for a simulation exercise to be successful there are some key factors that need to be considered, such as realistic scenario(s), location and timing.

2. Foundation

2.1 The importance of having a strategy for simulation exercises

Exercises should be used as part of a broader preparedness cycle. Other key elements of this cycle are planning, resources, equipment and training activities, and multi-year plans which take these issues into consideration.

It is recommended that organisations draw up long-term exercise plans (hereafter referred to as exercise programmes) in conjunction with the general strategic planning of their operations. Such an exercise programme should be developed in accordance with the organisation's priorities, as formulated in the organisation's overall strategy. The exercise programme should reinforce such priorities by identifying the capabilities most critical to their achievement. An effective exercise programme uses a combination of exercise types to accomplish exercise-specific aims and objectives[5].

It is thus useful to think of the exercise programme as laying the foundation for each building-block (i.e. individual exercise), with each block building upon the previous one. Each individual exercise project then focuses on specific capabilities in a cyclical exercise process of increasing difficulty, complexity and refinement. Such an approach also takes into account the normal turnover of staff in organisations, with new employees needing training to be ready to participate in more complex exercises or real events.

A durable exercise programme results in the following:

- Turns exercises into a learning process:
    - An exercise programme contributes to institutional as well as individual learning.
- Creates continuity in preparedness and improvement planning process:
    - An exercise programme creates favourable conditions for systematically following up on progress and the implementation of improvement plans and corrective measures.
- Increases the effect while decreasing the cost of exercises (synergies):
    - An exercise programme ensures that each new exercise builds on previous exercises.

Before planning the exercise, it is essential to ensure that it is supported by the appropriate people, both at the strategic level and at operational level within the organisation. This type of support is critical for the legitimacy and mandate that a successful exercise requires. It also helps to ensure that the aims and objectives run in parallel with the overarching emergency management strategy of the organisation.

A simulation exercise competes with other priorities and alternative allocations of resources (for instance, investment in new equipment). Consequently, it is important to be able to argue for the utility and value of the exercise. The benefits and advantages of the proposed exercise should be clearly explained and presented to the organisation's decision-makers. The costs incurred and the time needed to plan and conduct an exercise are not necessarily large. The time and resources that the exercise requires are determined by its aims and objectives. Nonetheless, it is important to remember that all exercises require sufficient time for planning, implementation and evaluation.

In order to carry out a successful simulation exercise, it is crucial that the planning group is granted a clear mandate and the authority to plan, conduct and evaluate the exercise. It is therefore necessary to ensure support from both decision-makers and the organisation as a whole, particularly as regards implementation of the improvements identified during the exercise.

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5 US Department of Homeland Security (2007) HSEEP Volume I: HSEEP Overview and Exercise Program Management, p.6.

2.2 The importance of simulation exercises for emergency preparedness

In the contemporary globalised world, individuals, communities, societies and states are becoming increasingly interdependent. An event directly affecting one group or sector may have significant impact on many other individuals, groups, communities, nations or entire continents.

Existing and emerging health threats are forcing countries all over the world to review, adapt and implement emergency response plans for large-scale health emergencies. Previously, plans were often geared towards managing the consequences of events linked to particular diseases or other threats to health at a more local level. With the appearance of Severe Acute Respiratory Syndrome (SARS) came the possibility of new, previously unknown agents causing mass casualties and enormous economic losses. Extensive flooding and heat waves have demonstrated the impact of environmental threats on health. The possibility of an influenza pandemic is a permanent cause of concern for health authorities all over the world: the 2009 influenza pandemic showed the importance of taking a coordinated approach and having well-defined and fully developed structures and measures[6].

The effects of these contemporary challenges to public health demonstrate the importance of long-term emergency preparedness planning which, by definition, includes associated training and exercises. National ministries and authorities in a range of different sectors as well as managers at local level need to be included in the emergency preparedness planning process. Simulation exercises can be an important tool for fostering their engagement with this process.

Participating in a simulation exercise gives the opportunity to evaluate and improve cooperation with stakeholders, as well as to develop the skills and capacities needed to respond to an unexpected or unusual event.[*]

2.3 Developing an exercise project

Each individual exercise conducted within the framework of the exercise programme requires considerable planning and preparation and should therefore be considered as an exercise project.

The need for an exercise should always be identified at a strategic level since the objectives of the exercise should always correspond—and be directly related—to the long-term objectives of the organisation. For instance, identifying those procedures or measures requiring improvement or practice will be of great importance when defining the objectives of the exercise.

Furthermore, before planning an exercise, it should be anchored at the right level in order to give the planners the appropriate legitimacy and mandate. This will also ensure that the goal of the exercise is in line with the organisation's overall strategy for emergency preparedness and management.

It is important to consider the different levels that are required in an exercise project, from strategic, to tactical to operational. Each level will have its different responsibilities and tasks within the overall simulation exercise project and will involve more or less people, depending on the size of the organisation and the complexity of the exercise.

Figure 2. Levels for developing an exercise project

Exercise planning Strategic level — • Conceptual programme and budget

Exercise planning Tactical level — • Planning of exercise within an existing preparedness plan

Exercise planning Operational level — • Putting the exercise in place

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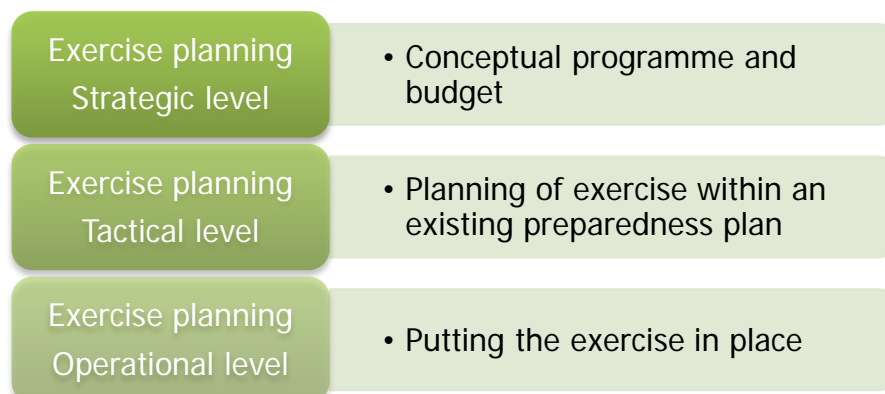
6 European Commission (2009) Strategy for Generic Preparedness Planning: Technical Guidance in Generic Preparedness Planning for Public Health Emergencies. 20091201

* WHO (2006) Exercise Development Guide for Validating Influenza Pandemic Preparedness Plans.

An exercise project broadly involves the following levels:

Strategic level: At the strategic (decision making level), areas and capabilities that need to be exercised will be identified and the overall conceptual framework for exercises will be set. This process should include the establishment of procedures or plans that require practice or improvement. The scope of resources available for exercises will also be set at this level and will act as a basis for setting exercise objectives. Based on the exercise need, the type of exercise and the range of organisations to participate can then be selected at the tactical level.

Tactical level: At the tactical level, those responsible for planning will drive the planning process of the simulation exercise forward within the overall framework developed at the strategic level. The focus at tactical level should be to ensure that the exercise objectives are clear and understood by all. Those participating in the planning process should be granted the appropriate mandate and authority to carry out their responsibilities, including:

- setting a timeline for the exercise planning process;
- defining the purpose, aims and objectives of the exercise;
- identifying specific areas that require practice, training, review or improvement;
- selecting the scenario, according to aims and objectives for the exercise;
- identifying target players, e.g. strategic, tactical or operational staff;
- scheduling meetings and arranging the location, date, time and duration of the exercise;
- defining the exercise team (controllers, observers, evaluators);
- developing the set of events within the scenario;
- identifying logistics resources, tools and equipment;
- preparing all documentation and exercise materials;
- planning the evaluation process.

Exercise planning is the responsibility of those individuals who are ultimately responsible for the design, construction, execution, administration and evaluation of the exercise. The planning coordinators select the members of the exercise team and prepare all documentation and exercise materials needed. To the extent possible, those planning the exercise should not take part in the exercise, as their prior knowledge adds an unrealistic layer of information that distorts the other players' learning.

Operational level: At the operational level, an exercise team must be appointed to run the exercise. The exercise team consists of controllers, observers and evaluators. Depending on the type of exercise selected at the tactical level, the exercise team will require a specific setup and a varying amount of staff. There may be substantial overlap in membership at the tactical and operational levels.

Table 1. Key aspects to consider

Aims and objectives The aims and objectives of the exercise should be developed early on. It is difficult to receive the support of senior decision makers for an exercise that lacks properly considered aims or objectives.	**Questions that need to be asked before initiating the exercise planning process:** • What are the objectives of the exercise? • Why do we need the exercise? • Who should learn from the exercise?
Timetable The timetable of the exercise and the time required of those managing and participating should be estimated and suggested.	• How long will the planning process take? • How much time will the exercise take?
Budget The costs of the exercise, (general costs, expenses and resources) must be established prior to initiating the exercise planning process.	**How much may the exercise cost?** The cost of an exercise will vary depending on the level of ambition (for example a table-top exercise is less costly than a full-scale exercise).
Resources It is important to determine the resources that the exercise will require.	**What resources are available for the exercise and to what extent will they be needed?** Individuals that are to be involved in the exercise, either as participants, or as part of the planning should be informed and motivated early on.

2.4 Setting the aims and objectives of the exercise

As a general rule, it is helpful to focus on the purpose of the exercise when making the preparations. In order to ensure that those planning the exercise focus on the relevant tasks, it is important to clearly define the scope and limits of the exercise. A well-planned exercise is based on the definition of its aims and objectives which leads to relevant results and an efficient allocation of time and resources.

2.4.1 Aims

Aims define the overarching framework for all planning of the exercise and the setting of the objectives (see below). Aims help to define the scope of the exercise and enable the organisation to determine whether the objectives of the exercise have been reached. Have the routines and plans for escalation been tested step-by-step? Have the members of the emergency management team or emergency operators experienced a crisis situation together? Have weaknesses and pitfalls identified in the preparedness planning process been tested? Having an aim should help determine whether or not the exercise addresses the needs of the organisation the exercise.

2.4.2 Objectives

The need for an exercise should be discussed with the managers, experts and other interested parties within the organisation. This will foster understanding and acceptance of the exercise.

An efficient and successful exercise is founded on a specific need. Testing and evaluating the adequacy and relevance of preparedness plans and established routines is just as important as testing and evaluating the capability of the organisation to manage emergency situations. The organisation may, for instance, need an exercise to test a specific set of skills or capabilities such as internal communication or group dynamics in the members of an emergency management team. It may need to try out a response plan, or simply to satisfy the requirements of a policy on emergency management.

The exercise objectives determine all further planning of the exercise. Properly defined, the objectives will facilitate the planning of the exercise in the event of uncertainties. All activities carried out during the course of the exercise should be planned and designed at a level that enables its objectives to be accomplished. The exercise objectives should be simple, measurable and possible to attain. In order to satisfy these conditions, the exercise objectives should be limited in number. In fact, it is preferable to define one overarching objective and prioritise this above the other exercise objectives.

In order to motivate the participants, it is important to clearly formulate and communicate the objectives of the exercise and explain why it is to be carried out.

2.5 Key factors for a successful exercise

The following is a list of key factors necessary for the execution of a successful exercise:

- Support from both senior decision-makers and the organisation as a whole. Everyone involved should understand the utility and value of performing the exercise.
- An efficient exercise is based on a specific need and is constructed around clearly defined objectives. It is important that the organisation builds its exercise experience from the ground up before embarking on more complex simulation exercises.
- The construction of the scenario must be based on the objectives of the exercise. Each of the incidents that comprise the scenario should also be relevant for the evaluation of the aims and objectives of the exercise as a whole.
- In order to maximise the commitment and devotion of the exercise participants, the scenario must be realistic and relevant. It should, however, be made clear to the participants that the scenario is fictitious.
- Successful evaluation of the exercise is just as important as successful implementation of the exercise. Evaluation planning and preparations should begin as soon as the aims and objectives have been decided.
- The quality of the evaluation is enhanced by immediate debriefing. The evaluation should also commence directly after the exercise has been carried out. It is therefore recommended that plenty of time be devoted to such activities.
- Exercise results should be presented to the exercise players, management and other interested parties as soon as possible after the exercise.
- Sufficient time and resources must be dedicated to the planning and organisation of the exercise.

3. Design and development

The steps to follow when planning an exercise are summarised below followed by details of each stage of the planning.

Figure 3. Steps to follow in organising an exercise

- Set objectives
- Identify players
- Choose type of exercise
- Define scenario
- Determine logistics and documentation
- Determine evaluation plan

3.1 Defining the exercise objective

When planning an exercise the first step is to set objectives which will help determine what type of exercise to carry out. The number of objectives depends on the scope of the exercise. Having a few, well defined objectives will ensure commitment from both policy-makers and players. The exercise should test specific measures or processes to be followed in the event of an incident. The person responsible for planning the exercise should identify areas requiring practice, training, review or improvement.

Examples of areas to be tested could include the following:

- situational awareness;
- elements of emergency plans;
- adherence to those plans;
- speed of response;
- decision processes;
- information sharing (internally and externally);
- cooperation (internally and externally) to address the problem; and
- coordination of resources, logistics and support capabilities.

However, this will depend on the scope of the exercise and the number of objectives.

In order to support better decision-making it is important to be aware of the problems that may arise. Examples of critical issues frequently considered in emergency preparedness are listed below[7]:

- 'Funding' issues—lack of clarity when it comes to who or what agency/department is responsible for guaranteeing the funding of preparedness efforts.
- Lack of preparedness and training of response staff.
- Communication failures.
- Excessive number of actors and agencies responding in an unplanned manner.
- Poor use or absence of specialised resources.
- Unplanned, usually negative/damage limitation engagement with media.

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7 WHO (2006) Exercise Development Guide for Validating Influenza Pandemic Preparedness Plans.

3.2 Identify players

The coordinator(s) identifies all exercise participants. The exercise team includes the director, controllers, observers and evaluators. The players are selected according to the aims and objectives of the exercise. The roles and responsibilities of all participants are defined in Section 4.

Players should be selected according to the aims and objectives of the exercise. In general, staff members that are involved in the implementation of the plan, or a part of it, should take part of the exercise and evaluation.[8]

It is important to ensure that the players selected to participate in the exercise are those most in need of the experience and that the number of participants is manageable in relation to the scope of the exercise. While it may be tempting to seize the opportunity to conduct an exercise for a larger target group than necessary, larger groups divert focus from the exercise objectives, making performance and evaluation more complicated. If players do not feel that they are actively participating in the exercise, they will be less motivated to participate in future exercises. The clearly-stated objective of each exercise should govern decisions on participation.

3.2.1 Functions and roles

The players should be identified on the basis of their respective professional functions and roles rather than as individuals. This minimises reliance on the presence of specific individuals on the day of the exercise, enabling it to be carried out even in their absence as their designated function can be transferred to their stand-ins. Exercises should offer an opportunity for backup staff as well as principals to practice key emergency roles and decision-making.

3.2.2 Engage players at an early stage

Exercise players are frequently members of the organisation's senior staff or in other key positions within the organisation. It is therefore important to be certain that these individuals are alerted at an early stage so that they have the opportunity to book the exercise into their schedules (unannounced exercises being the exception). It is important to keep in mind that some individuals may require specific training prior to the exercise in order to be able to benefit from it. New staff members may require a pre-exercise orientation of the organisation's preparedness plans and routines as well as relevant standard operating procedures (SOPs) before they can participate.

3.3 Selecting the type of exercise

Once the aims and objectives—based on the strategic framework—have been formulated, the type of exercise should be selected. This selection will be based on different criteria reflecting the aims and objectives of the exercise but also including factors such as available resources, budget constraints and other circumstances.

The more exercise experience an organisation has, the more advanced exercise objectives it can set, allowing for a more complex exercise. Organisations that are experienced in arranging exercises may find themselves in a situation where the players tend to repeat their actions from previous exercises each time they participate in a new one. For instance, players tend to make the same decisions and place the same calls in each exercise regardless of the specific scenario simulated. If evaluation or prior exercises have determined that this behaviour is correct, repeated exercises reinforce staff behaviour. If evaluation has suggested change, a different type of exercise may be needed to help staff break old habits and learn the preferred responses.

It is advisable that handbook users with limited experience in developing and conducting exercises start with less challenging, manageable exercises (e.g., table-top exercises) in order to develop their knowledge and skills before conducting a full-scale exercise.[*]

3.3.1 Types of exercise

In this handbook, the main types of simulation exercise for public health settings include orientation exercises, table-top exercises, drills, functional exercises and full-scale exercises. Each exercise type is suitable for use at international, national, regional and local level as well as for individual Member States. The following list divides these simulation exercises into two main types (the first two types are primarily discussion-based, whereas the last three are operation-based):

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8 WHO (2006) Exercise Development Guide for Validating Influenza Pandemic Preparedness Plans.

* WHO (2006) Exercise Development Guide for Validating Influenza Pandemic Preparedness Plans.

Discussion-based exercises:

- Orientation exercise
- Table-top exercise

Operation-based exercises:

- Drill
- Functional/command post exercise
- Full-scale exercise.

3.3.2 Discussion-based exercises

Orientation exercise/seminar

Orientation exercises are mainly carried out in an informal discussion forum and are intended to familiarise the players with plans, roles and SOPs, with the emphasis on coordination and responsibility issues. The objective of an orientation exercise is to identify improvements through discussion. Orientation exercises can take the form of seminars or workshops focused on existing processes as well as case studies. Orientation exercises are the least complex and costly and should be regarded as the minimum prerequisite for reviewing and validating existing plans or plans under development.[*]

Table-top exercise

Table-top exercises are carried out as informal meetings, in a conference setting, and the players are challenged with simulated emergency situations without time constraints. The exercise is intended to facilitate discussions with the aim of resolving problems based on existing plans and processes, with elements of ambiguity to trigger creativity among the players. All players are engaged in group discussions and the emphasis is on problem-solving rather than spontaneous decision-making.[9]

The scope and complexity of a table-top exercise can vary greatly, from an informal discussion forum, similar to an orientation exercise, to a more complex exercise, such as a functional exercise but without the operational aspects (assignment of roles, time constraints and in a real-life setting). The time allocation for table-top exercises can vary from a few hours to several days; however the most common format is between a few hours and one full day. While some table-top exercises require comparatively little planning and coordination, larger table-top exercises require more and may need to include facilitators and evaluators in order to be successful.[10]

For an overview of discussion-based exercises, see Table 2.

Table 2. **Overview of discussion-based exercises**

	Example of exercise objectives	**What**	**Where**	**How**
Orientation exercise	To familiarise staff with the organisation's emergency preparedness and response plan.	Familiarising staff with plans, procedures, SOPs in seminar or workshop format.	Ordinary workplace, meeting or conference room.	Learning by thinking/discussing
Table-top exercise	To stimulate discussion on a simulated situation in a relaxed atmosphere.	Discussion of plans, procedures and SOPs, with or without a trigger scenario/narrative.	Meeting or conference room.	Learning by thinking/discussing

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*WHO (2006) Exercise Development Guide for Validating Influenza Pandemic Preparedness Plans.

9 Michigan State University Safe School Initiative definition of exercise activities. Available here: http://www.cj.msu.edu/~outreach/safe_schools/home_grant/element3_def_exer_act.html

10 Michigan State University Safe School Initiative definition of exercise activities. Available here: http://www.cj.msu.edu/~outreach/safe_schools/home_grant/element3_def_exer_act.html

3.3.3 Operation-based exercises

Drill

A drill is an organised, controlled exercise commonly used to test a specific function or process – such as an alert and notification, information flow, activation of an emergency plan or specific skills. Drills are used to train and develop particular skills and cooperation as a limited part of a larger organisational response. Time of performance is often a key objective for a drill.[11]

Functional exercise/command-post exercise

A functional exercise is intended to create a situation as close to an actual event as possible and that will engage players. This form of exercise can be very effective as it reproduces stressful situations under time pressure, which tends to generate more realistic actions from the players. The degree of verification with this type of exercise is therefore high. Equally, though, the exercise is more complex and demands more comprehensive planning and preparation than a discussion-based table-top exercise. During a functional exercise all available tools, technologies and procedures are tested as if it were a real event at the designated facility, thus enabling the evaluation of both strategic and operational issues. The exercise usually covers several different functions of an organisational structure and should test various roles and responsibilities as well as the procedures and competences in a single- or multiple-emergency response or agency. Hierarchies and decision-making chains are usually tested. For this reason, functional exercises are also referred to as command post exercises (military terminology). This type of exercise demands considerable resources in order to achieve the best results.[12]

Full-scale exercise

To test the operational capability of emergency preparedness and response procedures and systems a full-scale exercise is the most appropriate choice. A full-scale exercise is organised in a realistic setting and includes deployment of resources to coordinate and respond to the planned event, without disrupting the infrastructure or putting the general public at risk. This type of exercise generally requires more resources (staff and equipment) than the exercises described above.[13]

Properly executed full-scale exercises usually require more resources for planning, performance and evaluation than any of the other exercise types. In addition, full-scale exercises require more staffing and hence incur operational and insurance costs that are only slightly lower than the costs of mobilising emergency resources and staff in real emergencies.

The following table provides examples of exercise objectives and suggestions for relevant exercise types, their scope, necessary planning resources and cost factors as well as preparation and planning time.

For an overview of operation-based exercises, see Table 3 below.

Table 3. Overview of operation-based exercises

	Example of exercise objectives	**What**	**Where**	**How**
Drill	To test staff training, response time, inter-organisational cooperation, resources and equipment.	Staff training, response time, workforce and equipment capabilities.	Regular work location/office/clinic or designated drill site.	**Learning by doing** Alarm, alert, call tree and physical action (e.g. evacuation)
Functional exercise/command post exercise	To test and evaluate the capabilities of an emergency response system	Test and evaluate the capabilities of an emergency response system.	Emergency operations centre (EOC) or equivalent	**Learning by doing** Testing players' ability to shift to their emergency roles and responsibilities
Full-scale exercise	To test and evaluate a major part of the emergency operations in an interactive manner over an extended period.	Interactive testing of capabilities, procedures and emergency response of the organisation and staff.	EOC and on scene	**Learning by doing** Simulated information conveyed on paper, by phone or through pseudo media and victims, etc. simulated by role-players.

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11 WHO (2006) Exercise Development Guide for Validating Influenza Pandemic Preparedness Plans.

12 WHO (2006) Exercise Development Guide for Validating Influenza Pandemic Preparedness Plans.

13 WHO (2006) Exercise Development Guide for Validating Influenza Pandemic Preparedness Plans.

Selecting the type of exercises can require an overview of different aspects from the point of view of the organisations, resources available and timeline. Table 4 below summarises an overview on how to select the right type of exercise based on the exercises objectives.

Table 4. Selecting the type of exercise according to the exercise objectives

Example of exercises objectives	Organisational maturity	Scope	Planning resources	Planning cost	Cost factors in conducting exercise	Time for preparation and planning	Suggested exercise type
To familiarise staff with the organisation's emergency preparedness and response plan.	Low. No previous experience is needed	Limited	Low	Low cost	Depends on the number of exercise participants.	Limited	**Orientation exercise or seminar**
To stimulate a discussion of a simulated situation, in a relaxed atmosphere.	Low to medium	Medium. This type of exercise can be used as a quick test to ensure that preparations are in line with preparedness plans and general directions as to how the organisation should be developed.	Low to medium	Low to medium cost	A small group of participants (high level) may require much more planning than a large exercise involving lower-level individuals.	Low to medium	**Table-top exercise**
To test personnel training, response time, inter-organisational cooperation, resources and equipment.	Low to medium	Drills include but are not limited to notification, communication, command post and evacuation.	Medium	Low to medium cost	Medium cost if the drill participants are a large representative group from the organisation	Medium	**Drill**
To test and to evaluate the capabilities of an emergency response system.	High	A situation as close to an actual event as possible.	Large amount of resources	High cost	Medium to high cost	Extensive planning and preparation	**Functional exercise or command post exercise**
To test and evaluate a major part of the emergency operations in an interactive manner over an extended period.	High	A situation as close to an actual event as possible.	Large amount of resources	High cost	High cost due to large number of participants involved.	Extensive planning and preparation	**Full-scale exercise**

3.4 Designing and developing the scenario

All exercises, even smaller-scale or drills, require a scenario. The task of designing and developing the scenario is part of the planning process and is based on the exercise concept agreed at strategic level.

The scenario aims to create a plausible script for the players that supports the successful accomplishment of the exercise objectives. Most scenarios require a narrative, which sets the stage for an exercise. The narrative is then based on the scenario and the associated events. The narrative may be presented to exercise players in advance of the official 'start time' in order to create a context for the exercise and to enable players to prepare mentally and practically (e.g., by going over plans and procedures, etc.). Advance information is more often provided for seminar or table-top exercises. For drills and larger exercises, less information is shared in advance of the simulated events.

The scenario consists of a sequence of events designed to guide the players towards achieving the exercise objectives. Each event is subdivided into incidents and each incident is presented to exercise players in the form of injects. This inject may take the form of phone calls, emails, simulated reports and data, simulation system outputs, staff interactions, pseudo media items such as newspaper articles and audio or video clips. For discussion-based exercises, each section or chapter is followed by a series of questions, designed to stimulate discussion and reflection on the organisation's emergency response procedures or SOPs. For operation-based exercises, events are followed by incidents presented through injects, designed to stimulate players to act.

More information and scenario building guidance is provided in Section 7 of this handbook.

3.5 Logistics and documentation

3.5.1 Logistical support

A logistics coordinator/team may be appointed to gather all supplies, materials, equipment, services and facilities required for the exercise[14].

The materials, equipment and facilities required will be determined by those planning the exercise as they develop the scenario. The logistics coordinator/team should, ideally, be responsible for:

- Ensuring that materials, equipment, facilities, and services required during the exercise are properly identified in advance. Time may be needed to develop some of the tools, especially if potentially complex software tools or other advanced equipment are required.
- Providing exercise controllers with all materials along with any potential training sessions and rehearsals (to ensure familiarity with material and/or advanced equipment, etc.) to ensure that everyone is ready and well prepared[15].

Table 5. Exercise logistics

Discussion-based exercises	- Facility and rooms - Food and refreshments - Audio/visual requirements - Supplies - Badges, name tags, table markers - Registration - Rest rooms
Operations-based exercises	- Videotaping - Props and devices - Site security - Communications - Safety - Badging and identification - Role-players - Exercise control and simulation facilities - Food and refreshments

3.5.2 Exercise monitoring tools

When carrying out large-scale exercises, it may be helpful to use specifically designed simulation software to:
- input scenario information into the exercise play;
- monitor the on-going exercise; and
- support evaluation; in essence, to record the observations and reports of players[16].

As events, injects and evaluations are fed into a simulation exercise tool, all users of the system can follow the exercise, adapt incidents accordingly and receive feedback on their own activities. Upon conclusion of the exercise, all information will have been properly stored to facilitate professional reviewing and reporting.

3.5.3 Exercise documentation

Exercise control plan (Master event list/script)
The exercise control plan serves as instructions for the facilitators or controllers (i.e. the exercise team). It provides sequential guidelines and directives on how and when to inject the next sequence of events from the scenario (e.g. using pseudo media, simulated telephone calls, announcements by the facilitator, etc.). The plan and related support documentation also provide guidance on how intended interaction between the players will be brought about and facilitated.[17]

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14 Public Health Emergency Exercise Toolkit, School of Nursing, Center for Health Policy, Columbia University.

15 ENISA (2009). Good Practice Guide on National Exercises – Enhancing the Resilience of Public Communications Networks

16 WHO (2006) Exercise Development Guide for Validating Influenza Pandemic Preparedness Plans.

17 WHO (2006) Exercise Development Guide for Validating Influenza Pandemic Preparedness Plans.

Exercise instructions

Before the exercise begins all players should receive written instructions, which should contain an overview detailing scope, aim, type of exercise, date and time schedule, location, evaluation process, 'rules of engagement' and, if appropriate, a short description of the scenario.[18] A careful decision must be made about how much information to include in the instructions for distribution in advance, and what to build into the exercise itself as information to which the players must respond.

3.6 Evaluation planning

The evaluation is part of the overall design and development phase and should go hand-in-hand with the initial aims and objectives. All exercises, including smaller orientation and table-top exercises include some kind of evaluation. For exercises with limited scope and complexity the evaluation may be carried out by an experienced note-taker in cooperation with the facilitator. Together they observe the process and produce an evaluation report.

More complex exercises with broader scope require several knowledgeable evaluators.

As the scope and complexity of the exercise increases, so too does the need for multiple evaluators. These evaluators must work as a team to produce the exercise evaluation report. To be effective evaluators need to be knowledgeable about the expected responses to issues raised through the scenario. They are often provided with checklists for each scenario, enabling them to record whether the input and expected action would produce the desired outcome.

The exercise evaluation must address each objective written for the exercise. The evaluator should list each exercise objective and provide comments to answer questions such as:

- Were the aims and objectives of the exercise achieved?
- If yes, what were the results?
- If no, what improvements to plans or performance are required in order to achieve the exercise aims and objectives?

It is important to remember that the evaluation planning starts in the planning process and that enough time should be allowed to orient/train all evaluators so that they will take into consideration the objectives of the specific exercise.

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18 WHO (2006) Exercise Development Guide for Validating Influenza Pandemic Preparedness Plans

4. Supervision

The exercise will need to be centrally managed, with an exercise director or team controlling and coordinating all activities of the exercise team. The selection of functions needed and general setup of the exercise team will have been specified in the planning phase. These functions are discussed here as they come into play during the exercise[19]. The exercise team will be organised in accordance with the type and scope of the exercise.

Before the exercise begins, there should be a run-through to ensure that all members of the exercise team receive the same initial information. This review should be brief and contain only information needed to ensure participants play their role in the exercise. The lead evaluator should be a participant in this process. It is also vital that a similar run-through should take place with the control team to ensure that injects and scenario changes are synchronised and the director's guidance is implemented as the exercise proceeds. If the exercise is to run over a number of days this must be done on a daily basis as a minimum.

4.1 Before performing the exercise

4.1.1 Exercise run-through

Before the exercise, the planners should meet to go through all planning preparations, materials and any other technical or logistics issues that require last-minute adjustments. A check-list should support the planners in going through the exercise life-cycle. This usually requires between one and two hours to ensure that all the main areas have been considered. At these briefings, inconsistencies in the scenario are often detected which can be remedied prior to the live exercise.

The following subjects should always be covered in the exercise planners' joint review:

- aims and objectives of the exercise;
- review of players (functions);
- review of team members and their respective roles and functions;
- communications during the exercise, with players and internal communication among members of the team;
- brief walkthrough of the scenario, including the narrative; and
- safety arrangements during the exercise.

For larger, more complex exercises, a technical review should be carried out prior to launch in order to ensure that technical aids and equipment function properly and that logistical arrangements have been made according to the plan. The technical review encompasses the following activities:

Testing: Equipment such as projectors, computers, internet access, and proper functioning of all other technical systems. Test these different devices and determine whether they are adequately dimensioned and calibrated. Communication (radio/phone) systems should also be tested.

Preparation: All paper and other materials required during the exercise in the correct number of copies.

Ensure that all necessary supplies have been ordered (drinks, coffee and food) and verify that they will be served to participants at the right times.

Check accessibility, such as possible login details (usernames and passwords) and ensure access to all electronic material to be used in the exercise.

4.1.2 Participants' briefing

To enable players to maximise their gain from the exercise experience, they should be given a preparatory briefing before the exercise starts. The briefing can be done on the same day but it is preferable to do it a few days before in order to engage people and allow them to mentally prepare for the exercise, unless its objectives include rapid response to an unexpected challenge. In this case, the briefing should take place right at the beginning of the exercise or when the players have assembled.

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19 ENISA (2009). Good Practice Guide on National Exercises – Enhancing the Resilience of Public Communications Networks

The most important points to be covered and understood by the players in this preparatory briefing are:

- aims and objectives of the exercise;
- value and purpose of participation (increases the players' motivation);
- the function of the exercise control team and its relation to the players and other participants;
- rules of play/engagement;
- communication during the exercise (use of phones, exercise phone catalogues, etc.);
- safety during the exercise;
- expectations (if the scope, content or pace of the exercise is not consistent with the player's expectations there is a risk that they will not fully embrace the exercise or will disagree with the outcome), including the expectation that routine work is to be set aside;
- details of exercise instructions;
- written information that will remind players of specifics, if necessary; and
- making it clear that the scenario is fictitious.

4.2 Conducting the exercise

The facilitator/controller/exercise director initiates the exercise by reviewing the key points of the exercise plan, highlighting the objectives and rules of play/engagement. It is often desirable to briefly summarise the nature of the situation being addressed. If participants do not fully understand the nature of the situation they might use the exercise to evaluate the effectiveness of their generic response and preparedness plan in dealing with specific issues raised by the scenario.[20]

4.2.1 Launching the exercise

It is important that the exercise director clearly announces the start of the exercise so that it is evident to all participants that the exercise has started and that it is time to get into their roles.

Some techniques that can be used to announce the start of the exercise include:

- the exercise director gathering all participants in a room and announcing that the exercise has now begun;
- players gathering to see/hear a fictional newscast (pseudo media item);
- players sitting at their usual desks and receiving a text message saying that the exercise has now started;
- one of the players receiving information that is then disseminated to the others (very useful if the objective is to practice information flow through an agency); or
- the exercise starting at a predetermined and published time and being initiated by injects or interactions.

To ensure that all participants understand that the scenario is fictitious and that it is an exercise, the players should:

- remain isolated during the exercise, enabling them to act realistically in the simulation;
- be very clear that any phone calls or written messages during the exercise are exercise materials. This is best done by starting all telephone calls by saying 'exercise, exercise, exercise' and by writing 'exercise, exercise, exercise' at the beginning of all email messages or other written injects
- gather all telephone numbers for actors and participants in an exercise telephone list. The players are informed that only those on the list may be contacted during the course of the exercise.
  - Have controllers and players use functional email boxes specifically created for the exercise.

4.2.2 Roles and responsibilities of the exercise team

There are a number of aspects that are especially important with regard to the specific roles/functions in the exercise team.

Facilitator
During a discussion-based exercise, the facilitator is responsible for keeping the discussions on track and in line with the exercise's design objective. This includes making sure all issues and objectives are explored as thoroughly as possible within the time available.

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20 WHO (2006) Exercise Development Guide for Validating Influenza Pandemic Preparedness Plans.

The main tasks of the facilitator are to:

- draw on the existing knowledge of the exercise participants;
- help the group of people understand their common objectives and assist them in achieving these without taking a particular position in the discussion; and
- assist the group in achieving a consensus on any pre-existing disagreements so that it has a strong basis for future action.

The facilitator's role is different from a trainer with subject expertise. A trainer will take a group through an agenda designed to transmit a body of knowledge or a set of skills to be acquired.

It is recommended that facilitators ask control questions, preferably in the form of open-ended questions (i.e. who, why, where etc., to provoke more thought and discussion) at any point in the exercise if players appear to falter. Closed questions (those answered by one or two words or yes/no) are less effective and not recommended unless necessary. Open questions place high demands on players so, in order to help them along, the facilitator can also ask a few closed questions (yes or no answers).

During discussion-based exercises, the facilitator in charge presents each section or chapter of the scenario and the scheduled time allocated for reflection. There are various methods the facilitator can choose for delivering the scenario injects, such as hand-outs for each section, pre-recorded media news, reading aloud or acting in a theatrical simulation. The preferred and most common method is delivery of printed hand-outs, augmented by oral instructions if necessary. Following each session the participants go through the scenario questions in groups based on their previous experience and knowledge and according to current plans and processes in their organisation. The facilitator should always encourage the participants to summarise the important points for the evaluator(s). [21]

Exercise director/controller(s)

Controllers plan and manage the exercise play, and set up and operate the exercise. Controllers direct the pace of exercise play. They provide key data to players and may prompt or initiate certain player actions and injects to the players, as described in the scenario to ensure continuity. Controllers issue exercise materials to players as required, monitor the exercise timeline and ensure the safety of all participants. Controllers are the only participants who should provide information or direction to players.

Operation-based exercises follow the same basic structure and procedure as above, except that players act on each inject instead of discussing each inject. In operation-based exercises, the controller does not introduce each event directly to players. The players receive the injects through pseudo media, telephone calls, printed articles, etc. as these are introduced by the role players.

It is recommended that the exercise director/senior controller delegates tasks to other members of the exercise control team, if possible. The senior exercise director/senior controller is often very busy during an exercise and it is important that his/her attention is not diverted from the main task—to steer the exercise towards its objectives. The exercise director/senior controller should communicate with the role-players through the senior role-player rather than contacting the role-players directly. This helps to maintain coherence and consistency in the conducting of the exercise, thereby ensuring, where possible, that the exercise unfolds according to plan.

It is also recommended that the exercise director/senior controller collaborates closely with the evaluator or head of the evaluation team. The evaluator has an important role in documenting the decisions that have been made and activities that have been performed during the exercise. Collaboration is crucial to ensuring that important information reaches the exercise director so that the exercise progresses in the desired direction.

The responsibilities of the exercise director include the following:

- Managing the set-up and dismantling of the exercise environment;
- starting and ending the exercise;
- acting as the central point of contact for questions and problems arising in the course of the exercise;
- making ad hoc changes to the plans or calling a premature halt to the exercise in the event of serious complications which cannot be resolved;
- facilitating table-top exercises;
- managing the scenario and approving changes to it;
- coordinating supplies for the exercise participants (e.g., catering); and
- other related duties.

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21 WHO (2006) Exercise Development Guide for Validating Influenza Pandemic Preparedness Plans.

Observer(s)

Observers are invited guests who have no official role in the conduct of an exercise, although they may be asked to submit their observations. Observers can include individuals from organisations relevant to the scope of the exercise but that are not actively participating in the exercise. There can be various reasons for wishing to invite observers, for example to boost awareness of emergency preparedness in senior officials or community leaders. Observing an exercise has proven to be a great way to spark interest for future participation. It is important to consider who to invite during the planning phase so as to ensure that observers have a chance to attend. However, it is suggested that observers deliver their observations to the evaluators after an exercise.

It is also important not to underestimate the requirements for managing observers and the potential need for an observer programme/briefing. For instance, it is always of great value to educate observers about programme background, scenario, schedule of events, observer limitations and other miscellaneous information.

It is common to invite observers who have operational and/or strategic interest in the outcome to attend the table-top exercises. The facilitator should ensure that the observers understand they should participate passively and not interfere with the management of the exercise or player performance, especially where full-scale exercises present a safety hazard.

In the case of exercises at all levels, it is common to allow a number of individuals with professional, operational or policy interest in the exercise outcome to participate passively as observers. Caution should be taken to ensure that the presence of observers does not interfere with the conduct of the exercise and the performance of players, or (in the case of functional and full-scale exercises) present a safety hazard.[22]

Evaluator(s)

Evaluators are involved in evaluating the exercise and may include some or all of the staff and organisations who participated in planning and/or the exercise itself. Not every decision made and act performed during the exercise can be documented. Therefore evaluators must direct their focus to the important events that are related to the specific objective of the exercise. The exercise plan and exercise director must clarify the role of evaluators to the players, so that they are not inhibited in their decisions and actions by the evaluators' presence and do not expect evaluators to answer questions from the players or control the exercise. In addition to notes (organised in advance to match the specific exercise) the evaluation team should collect all additional materials such as decision logs, including information that has been stored electronically.

Role-players

Role-players are individuals who act out key roles in the exercise but are not players – for example 'consulting epidemiologist', 'concerned citizen', 'member of the media'. One role-player may fill several parts. As a role-player, it is important to be flexible and ready to improvise as it is difficult to predict exactly how the players will respond to all events. It is important that role-players keep track of their own activities and follow up on the players' responses and reactions to events and injects. In order to keep a check on what has been said to whom and when, the role-players should keep individual logs. This can be done easily by providing all role-players with a log or a journal in which each individual call taken, question received and answer provided can be recorded during the course of the exercise. The use of logs or journals also helps to ensure that questions are not dropped, information or updates missed, and that the information communicated to players is coherent and consistent.

Finally, if there are multiple role-players, offer brief but regular updates; follow-up and conduct harmonisation sessions to ensure that all role-players are up to date on developments, and keep track of events unfolding during the course of the exercise.

During the exercise, the task of the director, controllers and facilitators include the following:

- managing the overall scenario;
- receiving information on decisions made and actions taken by the players;
- determining the effects of those decisions and actions on the scenario and players (individuals, teams, organisations); and
- determining how new injects affect the unfolding scenario.

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22 WHO (2006) Exercise Development Guide for Validating Influenza Pandemic Preparedness Plans.

Table 6. Functions and tasks of exercise team

Function	Tasks	Types of exercises
Exercise director/ controller	Responsible for exercise project management, including delegation of responsibilities. Responsible for briefings, budget and schedules. Instructs the players and is a passive participant in the conduct of the exercise, responsible for injects during the exercise and ensuring that the exercise runs smoothly	Operations-based exercises Discussion-based exercises
Facilitator	Responsible for keeping participant discussions on track and in line with the exercise objectives. This includes making sure all issues and objectives are explored as thoroughly as possible within the time available.	Discussion-based exercises
Evaluator	Develops evaluation criteria, logs exercise activity, evaluates exercise activity, analyses results, writes exercise report.	Operations-based exercises Discussion-based exercises
Role-player	Simulate the 'real world', play all roles of the outside world	Operations-based exercises
Observer	Observes and documents exercise activity for own learning or to provide general feedback	Operations-based exercises Discussion-based exercises
Player	Participates as a player in the exercise.	Operations-based exercises Discussion-based exercises

In smaller exercises, one person may have multiple functions, but players can never fulfil exercise supervision or evaluation roles.

4.3.3 If something goes wrong

A general tip for exercise directors and controllers is to be extremely clear on the objectives from the very beginning so that players are made aware of the reason for the exercise. If problems are encountered during the exercise, it is always best to go back to the aims and objectives to formulate a solution based on these. The more complex the exercise the more likely that modifications will be needed during its course.

It is important that the exercise controller realises that, to some extent, exercises take on a life of their own. Once the exercise has begun, events tend to unfold in a manner that cannot fully be controlled. The players will, to some extent, steer the exercise through the decisions they take and the resulting actions. The exercise plan that has been prepared carefully in advance may well need to be modified during the exercise. The controller must be prepared to continuously modify the exercise plan. Preparedness for such modifications can be ensured by:

- preparing alternative events and sequences of events to follow from the probable alternative decisions and courses of action that players are expected to take as a result of a planned event; and
- mentally preparing for deviations from the plan (i.e. being prepared to be flexible and creative).

4.3.4 Wrap-up: ensuring good closure to the exercise

Just as it is important that the exercise is properly launched, it is equally important that it is terminated appropriately and clearly for all those involved. Individuals who participate in an exercise can be affected by a scenario which to some extent may resemble a real life situation. It is therefore recommended that the exercise be terminated with a final event to 'close the loop'. For instance, some inject or an announcement stating that the emergency situation is over. Directly after the closure of the exercise, immediate reactions (the 'hot debrief' discussed in the next section) should be collected along with exercise evaluation forms from all participants, if they are being used. It is also a good idea to invite all participants for a short meeting to give feedback and discuss the way forward.

5. Evaluation

It is important that the organisation understands why an exercise has produced a certain result. By analysing observations from the debriefings, interviews and questionnaires, the evaluators can create this understanding. As a minimum the analysis should include a description of what happened and why, rather than what was right or wrong.

Before an exercise, there is often an expectation that everything will go well and that players will act according to the 'rules'. Yet players sometimes fail to address the crisis. When this happens, it is important to remember that the objectives of the exercise can be achieved even if the players do not take an optimal course of action.

All exercises (as well as real-life events) should be followed by a debrief, providing an opportunity for all participants to comment on how well the response met the planned objectives and to share any lessons learnt from the exercise. How a debrief is organised will depend on the size and complexity of an exercise. In addition to recording comments made during a debriefing meeting, exercise planners are encouraged to develop brief written evaluation tools to be distributed/collected from all participants immediately after the exercise. Debriefs to be considered include the following:

Hot debrief:

- Hot debrief meetings are held immediately after an exercise is complete, which gives participants the opportunity to share learning points at the tactical level while the experience is still very fresh in their minds.
- It is crucial that the hot debrief receives strong commitment from planners and participants, as this type of immediate evaluation ensures that lessons are learned and weaknesses and interdependencies identified and communicated back to participants. This enables them to devise improvement plans and corrective measures.

Cold debrief:

- Cold debrief meetings are held days or weeks after an exercise, when participants have had an opportunity to consider the exercise and think about how effective the plans or processes were.
- Cold debriefs aim to identify lessons and give feedback at the operational and/or strategic level.

5.1 Evaluation of discussion-based exercises

The evaluator should begin by compiling a chronological narrative of the discussions that occurred during the exercise. The evaluator should then focus on the discussions and decisions most relevant to the exercise objectives. This information will then be considered and weighted in order to demonstrate both strengths and areas for improvement.

Based on the narrative the evaluator should ask the following questions:

- Were the objectives of the exercise achieved?
- Did the discussions show that all staff would be able to complete their tasks successfully in the event of a real crisis?
- Did the discussions show that all staff were appropriately trained to manage the activities that they would have to perform in a live situation?
- Was any resource deficit or gap identified that might impede on the ability to perform a task?
- Do existing plans, policies and procedures support the players' behaviour?
- Is there a need for extra staff from other units or organisations to cooperate in order to carry out an activity? If so, are there agreements or relations that support the necessary coordination of such activities?
- What are the main lessons learned from this exercise?
- What strengths were identified?
- Which areas were identified for improvement?

5.2 Evaluation of operation-based exercises

The evaluators' notes and observations of what occurred during the exercise should be compiled into a chronological narrative with a clear timeline. The narrative should then be complemented with the results from any interviews and surveys relating to the exercise, as well as any eventual comments/observations/interpretations made by exercise control. There is often some discrepancy between the exercise players and the exercise control's perception and interpretation of events. Exercise players generally tend to look more favourably on their own behaviour. Collecting player evaluations in writing provides key information for the evaluation team.

The process of reconstructing the events of the exercise can take anywhere from a few hours to days or weeks, depending on the size and scale of the exercise and the amount of evaluation data collected. The schedule for evaluation should be established when planning the exercise and evaluators held to the schedule. This work can be likened to the reconstruction of the events made by most organisations after an actual incident, emergency or crisis has occurred. The final product should be a timeline that captures all the main points relating to the areas and skills that have been exercised. Decisions, discussions and activities during the exercise should be inserted in the timeline.

Based on the timeline, the evaluators should answer the following questions:

- What did the evaluators observe during the exercise?
- What should the evaluators have observed, had the exercise players acted in accordance with policies, plans and procedures (measurement points)?
- Is there a difference? If yes, why?
- What are the consequences of these differences?
- What improvements should be made or what best practice should be introduced?

Table 7. **Tips for a successful evaluation**

Use the exercise players	A mutual exchange of information between the players and the evaluators is an important part of the evaluation process.
	Both in order to take advantage of knowledge as well as to create a sense of ownership among the players.
Timing is important	The evaluation should be completed as soon as possible after the exercise whilst the memory of the exercise is still fresh.
Be specific with the problems, but not too harsh	Highlight both good and less good aspects in the evaluation. Always take the players' training and experience into consideration when evaluating their performance. Avoid personal attacks and focus on improvement opportunities.
	Let participants leave the project with a sense of having succeeded.
	Ask questions about what happened, why and how things could be done differently next time – this is a less harsh way of obtaining the necessary information.
Establish good contacts with the receivers of the exercise evaluation	Present findings and recommendations in the format agreed in advance. This increases the chances of any proposed measures being implemented successfully.
Focus on the essentials	It may suffice to present improvements in 5–10 bullet points.

5.3 Lessons identified

After an exercise, it is important that debriefs and reports are carried out to capture issues identified, recommendations to be implemented and planning assumptions to be reviewed.

The main purposes of the 'lessons identified' process include:

- gaining a clear understanding of all problems noted in the exercise evaluation; and
- deciding on the appropriate corrective measures.

Identifying lessons is:

- fundamental to generating institutional knowledge;
- useful for measuring the effectiveness of the operational endeavour;
- a form of quality control ('are we doing the right thing?');
- a form of assessment (adequacy of resources, procedures, capabilities, training, etc.); and
- a form of organisational change that is responsive to issues raised.

5.4 Presenting results and recommendations

The analysis should result in recommendations on corrective measures that the organisation can take in the short, medium and long term. Recommendations should be presented to the players, those who planned the exercise and other stakeholders as soon as possible afterwards. Recommendations must be structured around the overall exercise objectives and their related evaluation criteria.

If the evaluation criteria are too broad or vague to constitute a sufficient basis for analysis, the evaluator may have to supplement the criteria with explanations. These should cover any eventual gaps and illustrate why a particular assessment has been made.

6. Improvement

The final part of the handbook aims to provide guidance on translating the areas for improvement identified into corrective measures to be taken by the organisation. The purpose of an effective and successful exercise is ultimately to identify areas for improvement in the organisation. Testing and evaluating the adequacy, validity and relevance of preparedness plans and established routines is just as important as testing and evaluating the capability of the organisation to manage the situation simulated in the exercise.

Important insights can be gained into how the organisation can work to successfully address future emergencies. If an exercise does not achieve its objectives, the exercise control should consider whether it is necessary to repeat it or run a similar exercise. By identifying the root of the problem, improvements can be made based on the cause rather than its consequences.

6.1 Improvement of overall organisational planning

An improvement plan contains specific steps that will be taken by the organisation or the individual after the exercise to address the issues discussed in the report. The improvement plan should be circulated as widely as possible because the most important product that any exercise programme can generate is measurable, positive change or improvement. Participants may quickly lose interest in the exercise programme if they do not see it leading to specific improvements in preparedness. Therefore, it is very important to publicise the changes and improvements that result from exercises and drills to sustain interest in the exercise programme[23].

Improvement planning should thus be regarded as an integral and continuous process within the organisation. As regards exercises more specifically, improvement planning is the process by which the findings of the exercise evaluation are processed into distinct areas for improvement.

Essentially, the improvement planning process strives to identify, develop, prioritise and follow-up on corrective measures to be implemented in the organisation. However, it is important to note that the improvement planning process actually begins much earlier as a component of exercise programme management. Improvement planning is initiated during the exercise planning phase, as it provides the basis on which to develop the exercise aims and objectives.

6.1.1 Identifying areas for improvement

Using the exercise evaluation as the point of departure, the first step in the post-exercise improvement planning process is identification of areas for improvement. The identification process involves reviewing the degree to which the exercise objectives were attained in the exercise, differences between actual and expected performance, evaluation of expected performance and its adequacy, major observations and the recommendations recorded to address observed caveats and weaknesses.

The most effective approach to identifying areas for improvement is posing a series of questions, such as the following:

- What happened?
- Why did it happen?
- What was the actual course of events and what would have been a desired course of events/result?
- What measures need to be taken in order to achieve the desired result?

6.2 Implementation and follow-up

Improvement can be made only when the organisation goes from identifying corrective measures to implementing them. In order to facilitate implementation, the proposed corrective measures should be formulated as clearly as possible. Avoid vague formulations that allow for interpretation.

Some examples of clearly formulated corrective measures:

- creating a contingency routine and a tutorial for the handling of laboratory samples; and
- appointing alternates to each function in the emergency response team and ensuring that they receive training and the opportunity to take part in exercises.

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23 Harvard School of Public Health, Center for Public Health Preparedness (2006) Harvard Toolkit to Assist Public Health in Conducting Preparedness Exercises: Introduction & Overview.

The evaluator should propose a person, office or agency responsible and a deadline for when each measure should be implemented. This final decision on organisational changes is made by those at the strategic level responsible for exercises, as they are able to commit the required resources. If too many changes or corrective measures are proposed they may not always be implemented. Implementation and follow-up should always be in accordance with the organisation's ordinary routines.

6.3 Preparing future exercises

All exercise projects should be evaluated to avoid repeating mistakes and to ensure that future exercises are more successful. Before launching into the next exercise, it is important to 'close the circle' and, if needed, adjust plans, SOPs, etc.

If external resources have been employed, these should also be evaluated to ensure that they have delivered good results. Questions for evaluation of the exercise project:

- Were the overall aims and objectives of the project achieved?
- Did the exercise have any impact on the organisation's performance over the long term?
- Did the exercise present an opportunity for the exercise players to act in a way similar to what would be expected in real life?
- Did the exercise result in any improvement in performance for the organisation, unit or individual?

Any materials used in the exercise should be archived and added to a knowledge bank to be used in future exercises. Any proposals from players regarding scenarios, plans and injects should also be added to the knowledge bank. Finally, it is critical to share and promote best practices learned and/or observed regarding the tactics, techniques or procedures that can benefit others during similar future exercises or real-life responses. Sharing lessons learned is a valuable way to build teamwork and prevent similar pitfalls at other organisations.

6.4 Methods for sharing lessons identified

A workshop/seminar can be conducted when the participants have had time to digest their first impressions. At the seminar, the evaluators should present their preliminary conclusions and offer the participants the opportunity to give feedback and comments.

An exercise report should be written as soon as possible after the exercise. The main purpose is to create a simple medium for knowledge dissemination and management. The exercise report should focus primarily on the lessons learned from the exercise and evaluation, and can consist of anything from a short memo to a more comprehensive analysis with information on:

- the background of the exercise;
- exercise participants;
- purpose and objectives
- type of exercise and scenario;
- results and recommendations;
- responsibilities for implementation; and
- evaluation of the exercise project.

The evaluation can be formally handed over at a workshop where the evaluators submit the measures identified for follow-up to those who will be responsible for their implementation.

7. Scenario-building guidance

The scenario is the foundation of an effective exercise. It lays the groundwork for the development of exercise objectives and selection of public health emergency exercise types. A scenario is the description of the emergency event/public health situation around which the exercise is designed. Scenarios depict previous actual events, potential future events or fictive real-world events to which exercise participants respond.

When developing a scenario it should be realistic and careful attention must be paid to timing and logistics. However, before considering potential scenarios, the objectives of the exercise should be defined. Scenarios should be chosen with a view to ensuring that an exercise meets its objectives.

It is very important to remember that the purpose of the exercise is for the players to learn from mistakes made in a simulated environment in order to avoid making the same mistakes in a real-life situation.

Scenarios are narratives of alternative environments in which today's decisions may be played out. They are not predictions or strategies. They are more like hypotheses that ask 'what if', forcing reaction to new and unforeseen opportunities or challenges.

Prior to initiating the development of the scenario, it may be useful to consider the aim of the exercise and ask certain questions, such as:

- Do we want to exercise a weakness in our current emergency response?
- Do we want to exercise a capability or process that is important for us to know and perform well in?

There are a number of factors that should also be taken into consideration when developing a scenario: level of realism, type of event, location and date and time for the simulation exercise.

The scenario should help facilitate the achievement of the objectives underlying the exercise. The scenario should always be constructed so as to support the aims and objectives of the exercise. A properly developed scenario should create an event and incidents with consequences which force actions and reactions.

A properly constructed scenario should fulfil the following criteria:

- facilitate the unfolding of events or test the aims of the exercise;
- encourage discussion and/or action in response to the event's consequences; and
- be realistic.

Table-top exercises, whose purpose is educational and developmental rather than to test a certain capability, can be constructed around a set of 'issue areas' rather than around a scenario. Simulation exercises, however, require a more comprehensive scenario as their purpose is to provoke players to behave in the same way as they would in a real situation.

Inspiration for a scenario construction should be encouraged by the following concepts:

- Be inspired by real life events and incidents. Browse real newspaper articles, newscasts and pictures for inspiration.
- Make use of internal knowledge and creativity by consulting individuals who will not participate as exercise players. There is frequently a large amount of knowledge within the organisation. Asking individuals responsible for key operational areas about what seriously concerns them can generate many interesting and relevant scenarios.
- Recycle material from earlier exercises—both internal exercises and those carried out within other organisations/entities.
- Take the entity's capability and exercise experience into account when constructing the scenario. The level of difficulty of the scenario should always be adjusted to the capability and experience of the organisation(s) and staff members performing the exercise.

Before the scenario is developed in any detail, it should be checked by a specialist (i.e. someone who is knowledgeable on the issues raised in the scenario). The purpose of such a check is to ensure that the scenario is in line with the aims and objectives of the exercise and to ascertain that it is realistic. To this end, a scenario concept should be developed to delineate the content of the scenario and to show how the scenario supports the aims and objectives of the exercise.

> The scenario concept should be based on the following guidelines:
>
> - Background information showing how the scenario will lead up to the event/emergency forming the exercise. Parts of the background information can be distributed to the players during the 'information phase'.
> - Immediate consequences of the scenario event. A large accident with mass casualties would, for instance, have considerable impact on local hospitals. All such consequences should be checked against the exercise aims and objectives to ensure that they are feasible.
> - Location of the scenario. Consequences will differ depending on where the scenario plays out. A power shortage in a country's capital has different consequences to a power shortage in a small rural town.
> - Date and time of the exercised event. Access to facilities and personnel differs greatly between weekdays and weekends, day and night and other special occasions. These factors can affect the expected action/reaction of exercise players and is therefore an important aspect of the scenario.

The scenario specialist(s) should be involved in the development of the scenario to ensure that the assumptions made are accurate and realistic. A scenario that has been subject to this sort of quality assurance grants the exercise a higher degree of legitimacy in the eyes of exercise players which, in turn, allows them to focus on the exercise objectives rather than the realism of the scenario.

It is advantageous to use experts with a wider knowledge of the organisation as role-players or evaluators during the exercise. Moreover, the engagement of external experts to contribute to the exercise planning can be useful for obtaining objective advice and new perspectives on the scenario development process.

7.1 Structuring the scenario

The scenario must be structured in a logical manner so that it is readily accessible to exercise players. This type of systematic structure is usually achieved by constructing the scenario on three levels: events, incidents and injects.

Figure 4. Scenario structure
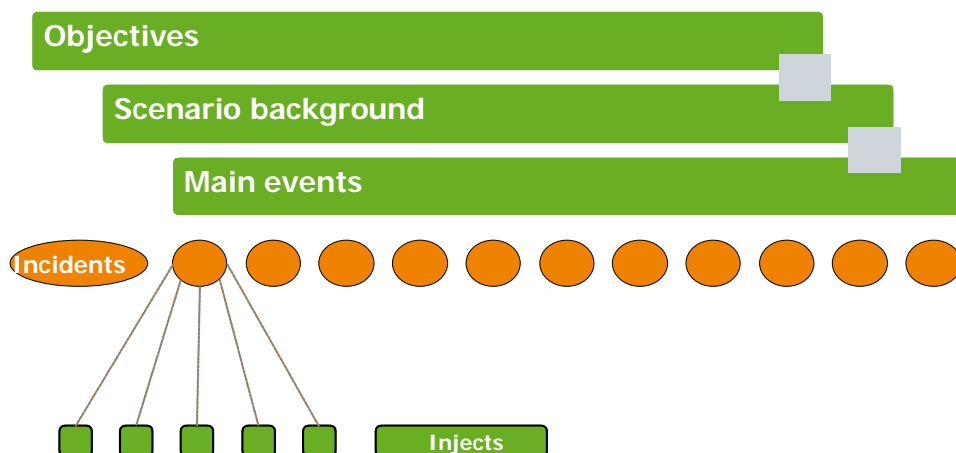
Events

Events describe the contents of the scenario, providing a general overview. Depending on the type of exercises, scenarios can contain either several independent events or one single event. Simulation exercises are usually constructed around one scenario comprised of one or two larger events (e.g. a *Salmonella* outbreak). In tabletop exercises several independent scenarios can be applied, focusing on particular issues for players to discuss.

The number of events depends on the aims and objectives of the exercise. In some cases, especially with longer-duration simulation exercises, several independent events are required to achieve the aims and objectives of the exercise. However, too many independent events decrease the realism of the scenario and should therefore be avoided as it will make it difficult for players to fully identify with the scenario.

Incidents

Each event entails a number of consequences, referred to as incidents. A confirmed *Salmonella* outbreak could, for instance, lead to symptoms such as nausea and vomiting. The *Salmonella* outbreak is therefore considered to be an incident.

An event can lead to several simultaneous incidents. These, in turn, can affect one another. It is therefore helpful to construct a simple impact analysis to try and predict the actions/reactions of the players. This can be used to predict the likely course of the exercise and to minimise the risk of it spinning out of control.

The number of incidents should keep exercise players busy but not overwhelmed. Depending on the players experience with exercises, the exercise can be constructed so as to place more or less pressure on the individual players. A certain degree of pressure may be necessary in order to evaluate the aims and objectives of the exercise.

It should be possible to use each incident contained in the exercise to evaluate one or more of the exercise objectives. If the correlation between objective and incident is unclear, then the incident should be changed or removed altogether. To evaluate the exercise and the extent to which the objectives have been met, measurable evaluation criteria need to be developed.

Table-top exercise
An extended description of the event, or a number of incidents, ought to provide players with enough information to trigger a vivid discussion for a productive table-top exercise.

Simulation exercise
A simulation exercise requires a larger number of specific and realistic incidents.

During the exercise, it is not uncommon for particular incidents or individual injects to become either irrelevant or unsuitable. In such cases it is useful to have a list of extra incidents and injects that can be inserted. The exercise team must be prepared to improvise and produce new material during the course of the exercise, if necessary.

It is always a good idea to end the exercise with a final and unambiguous outcome; for instance, 'all patients have been cured, the disease has been curtailed and the situation is now under control'.

Injects

Injects are the means by which the events and incidents in the exercise are communicated to the players. It is through inputs that players gradually absorb the events and incidents of the exercise. Injects provide players with information and problems to solve, limit their behaviour and put pressure on them to act and take decisions.

A frequent mistake is to plan for a large number of incidents without developing any injects. Without injects, players cannot take part in the unfolding of events in the scenario or react to them. Injects can take the form of emails, phone calls, or pseudo media items such as simulated newspaper articles, Tweets or radio clips. A single incident can be communicated to players through one or several injects. In a table-top exercise, injects usually consist of information or a series of questions posed to players.

It is important that the means by which incidents are given to players are realistic and correspond to the ways in which the organisation, and indeed the world in general, works in real life. This is especially true for simulation exercises. If injects are unrealistic, the exercise will fail to fulfil its purpose, which is to prepare players for a real life situation.

When developing injects it might be useful to bear in mind the following questions:

- Which action is to stimulate a reaction?
- Who is acting? Who is reacting and how?
- Should alternative injects be developed in case players react in an unexpected or inappropriate manner?

Figure 5. Scenario layout
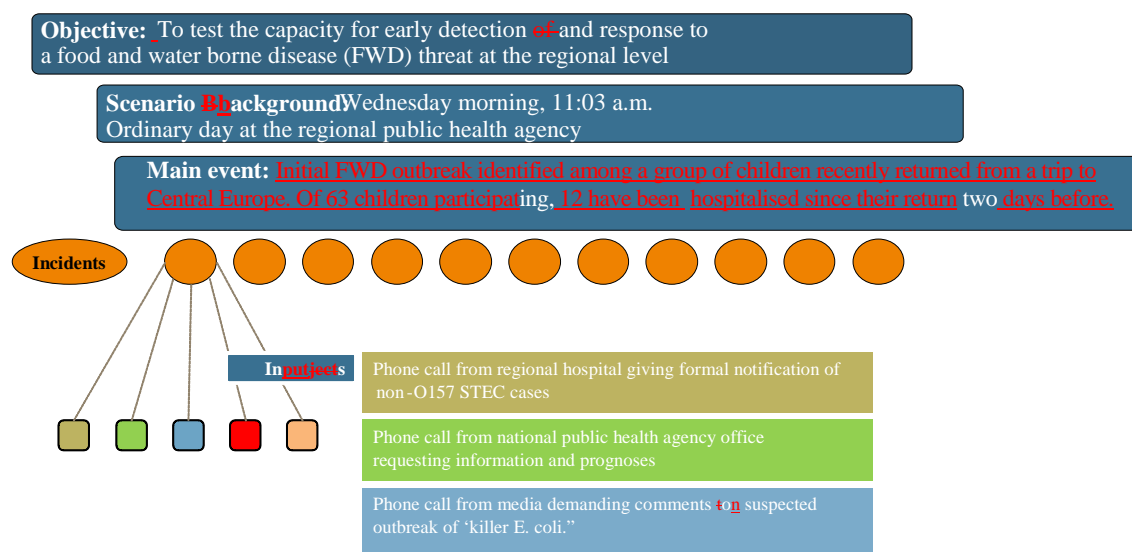
7.2 Make the scenario real for exercise players

Large-scale emergencies rarely affect most public health bodies, so scenarios simulating major events may not be perceived as realistic by exercise players.

There are, however, some measures that can increase the likelihood of players accepting and being absorbed by the scenario and taking on the exercise.

7.2.1 Piecing together the puzzle

During an exercise, it is important that planned incidents occur in the right place and at the right time. It is of utmost importance that no incidents contradict one another, appear in the wrong sequence or are forgotten. A clear structure is particularly important for simulation exercises in which several incidents are conveyed simultaneously (and by several individuals) to players. Such a distinct structure can be achieved with the help of an exercise schedule/flowchart. The exercise schedule is prepared by the exercise planners and serves the following purposes:

- establishes the sequence of incidents and injects;
- Determines the timing of incidents and injects;
- provides the exercise team with a script to follow; and
- sets the pace and direction of the exercise.

7.2.2 Create a realistic time perspective

The scenario frequently contains information that, in reality, would be available to players prior to the occurrence of a real life emergency. The use of an 'information phase', where players receive information about the scenario before the exercise begins, is a good way to make the exercise more realistic. An information phase prevents a sense of suddenness for players at the start of the exercise. For instance, it may be perceived as unrealistic that a flood with extensive and severe consequences could hit without prior warning. If the scenario is meant to create a surprise effect among players, a sudden or rapidly escalating scenario should be selected.

7.2.3 Noise

In order to increase the sense of realism, incidents can be complemented by 'noise' incidents that have no meaning or relevance to the exercise, but can be perceived as having some meaning or being of value to the players at the time. Just as would be the case in a real situation, players are forced to prioritise the various injects (i.e. incoming information).

7.2.4 Details

Seemingly small flaws in the scenario (such as the use of an old name for an EU institution or a government agency) can, in some cases, undermine the credibility of the exercise or confuse players so that they lose focus. It is therefore recommended that extra time be invested in checking the facts of the scenario and the local routines of the entity undertaking the exercise, so that such disturbances can be avoided.

7.2.5 The temporal dimension

Being able to handle the temporal dimension of the scenario is part of the exercise development phase. Some exercises require that time is 'compressed' (i.e., that the scenario does not unfold in real time). For instance, an unfolding of events that in real life would require a 48-hour time span may have to be compressed to six hours to achieve the objectives of the exercise. While some exercises require events and incidents to be compressed in time, others have objectives whose achievements require the exercise to play out in real (or even extended) time. The time span of the exercise is determined by its aims and objectives.

The temporal dimension of the exercise is critical and should be taken seriously and properly planned. An excessive compression of time might considerably decrease the realism of the exercise. Some leaps in time may be necessary for exercises simulating the unfolding of events over a longer time span. Experience shows that such time leaps do not affect the players' sense of realism, provided that the scenario is realistic in all other aspects.

7.2.6 Announced and unannounced exercises

If the exercise is advertised in advance, exercise players have the opportunity to prepare mentally beforehand. An unannounced exercise is launched without prior warning. Exercise players are then unprepared and expected to put their regular tasks aside to participate. Unannounced exercises should only be considered for public health entities with exercise experience as they tend to be difficult to manoeuvre and control.

7.2.7 The perfect scenario

There is no such thing as a perfect scenario. There is no scenario that is perceived as optimal by all players. There will always be some individuals who will consider the scenario to be weak and others who will be of the opinion that the scenario is too advanced or unrealistic. However, most criticism and discontent can be avoided by rigorous planning and quality assurance of the scenario.

The following is a list of scenarios to avoid:

- Excessively detailed scenarios causing the focus of the exercise (aims and objectives) to be lost. Highly detailed scenarios requiring rigorous quality assurance.
- Complex scenarios risk impeding the actions of players and may lead to a diversion of focus from the aim and objectives. Scenarios should always strive to be realistic, reasonable and challenging, and avoid to overwhelm the players. The complexity of the scenario can be increased successively with exercise experience.
- 'All inclusive' scenarios may divert focus from the aims and objectives of the exercise. If, for instance, the exercise aims to test alarm and escalation routines, there is no need to test emergency communications, long-term decision-making or personnel management. Exercises with too many objectives are difficult to evaluate.
- Sensitive scenarios (like overly complex exercises) divert focus from the aims and objectives of the exercise. Therefore any real names, places and incidents should be replaced with fictitious ones.
- Scenarios that are dependent on the actions of the players should be avoided as they require players to act exactly as expected in order for the next incident to be input and this renders the exercise highly ineffective.

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Appendix 1. Further reading

Table 16. **Websites for further reading**

Organisation	Website
Centers for Disease Control and Prevention, Atlanta, USA	http://www.cdc.gov/
Columbia University School of Nursing: Role of Exercises and Drills in the Evaluation of Public Health in Emergency Response	http://pdm.medicine.wisc.edu/Volume_21/issue_3/gebbie.pdf
ENISA—European Network and Information Security Agency	http://www.enisa.europa.eu/act/res/policies/good-practices-1/exercises/national-exercise-good-practice-guide
ECDC—The European Centre for Disease Prevention and Control	http://ecdc.europa.eu/en/Pages/home.aspx
FEMA—Homeland Security Exercise and Evaluation Program	https://hseep.dhs.gov/pages/1001_HSEEP7.aspx http://www.fema.gov/prepared/train.shtm
Harvard School of Public Health	http://www.hsph.harvard.edu/hcphp/products-and-training/exercises-and-drills/
John Hopkins School of Public Health	http://www.jhsph.edu/preparedness/training/online/ph_prep_exercises.html
Michigan State University	http://www.cj.msu.edu/~outreach/safe_schools/home_grant/element3_def_exer_act.html
National Institute for Public Health and the Environment	http://www.rivm.nl
NYC Health—Bioevent Table-top Exercise Toolkit for Hospitals and Primary Care Centers	http://www.nyc.gov/html/doh/downloads/pdf/bhpp/bhpp-train-hospital-toolkit-01.pdf
Rand Corporation	http://www.rand.org
UK Cabinet Office	http://www.cabinetoffice.gov.uk/ukresilience/preparedness/exercises/whyexercise.aspx
World Health Organization—Fact Sheets	http://www.who.int/mediacentre/factsheets/fs208/en/
RIVM - Centrum Infectieziektebestrijding The Netherlands – list of national exercises	http://oefenbank.infectieziekten.eu/
Health Protection Agency UK- Department of Health exercises	http://www.hpa.org.uk/EventsProfessionalTraining/HPAExerciseProgramme/

Appendix 2. Master event list

The title of this document is the [Exercise Name] master event list (MEL).

Exercise aim and objectives

Overall aim of the exercise:

Overall objectives of the exercise:

- Objective 1;
- Objective 2;
- etc.

Master event list summary

The following is a summary of the MEL. This is a high-level view of MEL injects in chronological order.

Event #	Event time	Event description	Responsible controller	Recipient player(s)	Expected outcome of player action
	[Time]	Start of Exercise			
01	[Time]				
02	[Time]				
03	[Time]				
04	[Time]				
05	[Time]				
06	[Time]				
07	[Time]				
08	[Time]				
09	[Time]				
10	[Time]				
11	[Time]				
12	[Time]				
13	[Time]				
14	[Time]				
15	[Time]				
16	[Time]				
17	[Time]				
18	[Time]				
22	[Time]				

Master event list (expanded)

In the following you will find examples of detailed MEL incidents and injects. In an actual MEL, every line within the summary would have a corresponding detailed incident and inject. These would be distributed to controllers who are responsible for delivering the respective injects.

Event #	[#]	Event time:	[Time] (expected)	[Time] (actual)
Via:	[Inject method]	Objective(s):	[Insert appropriate related objectives]	
Who delivers?		[Controller]	Recipient player(s):	[Recipient name(s)]
Event description:				
[Incident description]				
Inject:				
[Insert inject detail]				
Expected action(s):			Notes	
[Insert Expected Actions]				
Expected outcome:			Notes	
[Insert expected outcome]				

Appendix 3. Hot wash up

[Hot wash up date]

[Date and location] hosted the [Full name of exercise] on [Date]. Attendees included representatives from:

- [List agencies and organisations]

At the exercise's conclusion, exercise controllers, evaluators, and players can meet briefly to discuss the exercise. Discussion primarily focused on player expectations, exercise outcomes, and issues for improvement.

Discussion points

Expectations: Players identified their expectations concerning the exercise:

- [List expectations]

Aims and objectives: If the exercise reached the aims and objectives:

Outcomes: The following positive outcomes of conducting the exercise were identified:

- [List outcomes]

What went well and should be kept?

Issues: The following issues were raised by the exercise:

- [List Issues]

Suggestions for changes: The following suggestions for changes were raised:

- [List suggestions]
- Goes back to the strategic level

Other: The planning group also noted the following:

Appendix 4. Final report on the exercise

Summary aims and objectives	Observations: What went well? Improvements?	Recommendations	Action plan	Primary responsible agency	Start date	Completion date

Appendix 5. Glossary

Concept
The concept is the general idea about how the exercise and its components will be structured and the process for achieving the intended objectives.

Controllers
In an operation-based exercise, controllers set up and operate the exercise by planning and managing the exercise play. Controllers direct the pace of play by providing information to players. They may prompt or initiate certain player actions and injects to the players, as described in the scenario to ensure exercise continuity. Controllers issue exercise materials to players as required, monitor the exercise timeline and the safety of all exercise participants. Controllers are the only participants who should provide information or direction to players.

Debrief
A debrief is a forum for planners, facilitators, controllers, and evaluators to review and provide feedback after the exercise is held. It should be a facilitated discussion that allows each person an opportunity to provide an overview of the functional area they observed and to comment both on strengths and areas for improvement they observed. A debrief is different from a hot debrief, in that a hot debrief is intended to capture feedback from players.

Design and development
Building on the exercise foundation, the design and development process should identify capabilities, tasks, and objectives; design the scenario; create documentation; coordinate logistics; plan exercise conduct and select an evaluation methodology.

Desktop exercise.
See table top exercise.

Discussion-based exercise
Discussion-based exercises are normally used as a starting point for an organisation that wishes to exercise and include orientation and table-top exercises. These types of exercises typically highlight existing plans, policies, and procedures and are exceptional tools to familiarise agencies and staff with current or expected capabilities. Discussion-based exercises typically focus on strategic, policy-oriented issues, whereas operations-based exercises tend to focus more on tactical, response-related issues. Facilitators and/or presenters usually lead the discussion and keep participants on track to meet exercise objectives.

Drill
A drill is used to develop and maintain skills in a single response chain, such as alert and notification, transfer of critical information, or activation of emergency resources. Drills are also used to practice specialised emergency skills that constitute one or more components of an emergency plan. They are limited in scope and should have a procedural focus to train and support specific skills and interactions as part of a larger organisational response.

Emergency operations centre (EOC)
An EOC is a central command and/or coordination facility that carries out management and/or coordination functions during emergencies. The preparedness plan should specify procedures for activating the EOC and allocating appropriate staff to it during an emergency. An EOC will typically need to operate extended hours, or even 24 hours a day 7 days a week, during an emergency.

Emergency plans
Emergency plans are documents that describe how an organisation will address an emergency. They typically include components on mitigation or prevention, preparation, response management and recovery.

Evaluation
Evaluation is the cornerstone of the exercise process. The evaluation identifies strengths and opportunities for further improvement in an organisation's preparedness. Evaluations are conducted through player observation and the use of evaluation criteria.

Evaluation plan
The evaluation plan describes what and how the exercise will be evaluated and by whom. It should describe the evaluation criteria as well as the tools and procedures the evaluator(s) will use.

Evaluator
Evaluators selected from participating organisations are chosen based on their expertise in the functional areas they will observe. Evaluators use evaluation criteria to assess performance, identify which aspects of the plan worked well and which could be further improved. They should pay particular attention to observing and recording the extent to which procedures and tools provided under the emergency plan were followed and whether they facilitated or hindered the response to the emergency. Evaluators have a passive role in the exercise and only note the actions and decisions of players without interfering in the exercise flow.

Event

Within the scenario, an event is an expected action that is anticipated to take place during an exercise.

Exercise director

The exercise director oversees all exercise functions and is assigned overall management responsibility and authority for an exercise. During exercise conduct, the exercise director oversees and remains in contact with the controllers and evaluators, debriefs controllers and evaluators following the exercise and oversees the setup before the exercise. The exercise director may also assume additional roles within the exercise structure and process depending on his/her skills and the size (scope) of the exercise. In a small exercise it is possible for the exercise director to also be the sponsor, facilitator and/or an evaluator.

Exercise team

The exercise team is the team that will run/conduct the exercise. The exercise team consist of controllers, observers, players and evaluators. The exercise team will require a specific setup and a varying number of staff depending on the size and complexity of the exercise to be conducted.

Exercise rules of play/engagement

Exercise rules of play are the parameters that exercise participants must follow during the exercise. Exercise rules of play describe exercise DOs and DON'Ts and define expected and appropriate exercise behaviour.

Exercise programme management

Exercise programme management consists of the functions required for an organisation to sustain a variety of exercises targeted towards preparedness priorities. The programme management function should be cyclical. The cycle should typically include exercises at increasing levels of complexity and annual reviews of programme objectives to ensure they are being met.

Facilitator

During a discussion-based exercise, the facilitator is responsible for keeping the discussions on track and in line with the exercise objectives. This includes making sure all issues and objectives are explored as thoroughly as possible within the time available.

Field exercise

See full-scale exercise.

A field exercise is one form of full-scale exercise, focusing on more specific capacities, such as for instance, procedures for identifying microbiological agents or other sample-gathering and analysis routines.

Full-scale exercise

Whereas a functional exercise concentrates on the policy and interactive elements of emergency response, a full-scale exercise focuses on operational capability. Typically, this will include the actual deployment of resources required for coordination and response in as realistic setting as possible without risking the safety of the public and staff. For example, this could involve setting up an emergency treatment centre and conducting triage of simulated patients.

Functional exercise (command post exercise)

A functional exercise strives to create a situation as close to an actual event as possible. This form of exercise can be very effective as it enables the practicing of stressful situations under time pressure, which tends to generate realistic actions from the exercise players. The degree of verification with this type of exercise is therefore high. Equally, though, the exercise is more complex and demands more comprehensive planning and preparation than a discussion-based table-top exercise.

Hot debrief

A hot debrief is a facilitated discussion held immediately after an exercise among players from each functional area. It captures feedback about any issues, concerns players may have about the exercise and registers proposals for improvements.

Improvement plan

The improvement plan identifies specific corrective measures, assigns them to responsible parties and establishes target dates for their completion.

Injects

Injects are messages, or information about the next stage or events in the scenario. Injects are handed out by controllers or simulated by role-players and include directives, instructions and decisions. Injects are given to exercise players to drive play towards the achievement of specific objectives. Injects can be written, oral, televised, and/or transmitted by any means (e.g., fax, phone, e-mail, voice, pseudo media).

Logistics
The logistics section provides the supplies, materials, facilities and services that enable the exercise to function smoothly without outside interference or disruption.

Narrative
The first part of an exercise scenario is called the narrative, which is intended to provide necessary background information and set the stage for the storyline developed in the scenario. Small, simple exercises usually have a one or two statement narratives. Large complex exercises will often have lengthy narratives that detail a sequence of events leading up to the exercise scenario. Narratives are often derived from real events, to create a sense of realism for the exercise.

Objectives
Objectives should be stated in such a way as to be observable and where possible, measurable, in order to support the exercise evaluation process. Exercise objectives should be established for every exercise. Well-defined objectives help the exercise planning process as they provide a framework for scenario development, guide individual organisations' objective development and inform exercise evaluation criteria. Objectives should reflect specific capabilities that the organisation regards as priorities, and the tasks associated with those capabilities. Objectives should be simple, measurable, achievable, realistic and task-oriented. Planners should limit the number of objectives to enable timely execution and facilitate design of a realistic scenario.

Observer
Observers are not exercise participants; rather, they observe selected segments of the exercise as it unfolds. They do not interact with the players and may be asked to remain within a designated observation area during the exercise.

Operation-based exercise
Operations-based exercises are a category of exercises characterised by actual response, mobilisation of apparatus and resources and commitment of staff. They usually take place over an extended period of time. They include drills, functional exercises, command post exercises and full-scale exercises. Operations-based exercises can be used to validate plans, policies, agreements and procedures. They are used to clarify roles and responsibilities, identify gaps in the resources needed to implement plans and improve individual and/or team performance. These exercises often follow and validate the lessons learned from discussion-based exercises.

Orientation exercise
An orientation exercise takes the form of an informal discussion designed to familiarise participants with plans, roles and SOPs. They focus on questions of coordination and delegation of roles and responsibilities. Typically, such orientation exercises are conducted by those who planned the exercise and/or the author(s) of the plan, with the support of a logging function to keep track of the discussions. Orientation exercises are the least complex and costly of the exercise types.

Role-player
Role-players are typically volunteers from the exercising organisation whose task is to simulate the outside world in a simulation exercise. Role-players are vital to the creation of a realistic scenario and can play the roles of individuals and agencies not actually participating in the exercise.

Scenario
The scenario is a description of a series of hypothetical, but plausible, events that tell a story designed to make the players in an exercise take actions to respond. The scenario is designed to tests the preparedness plan along with the procedures, systems and SOPs linked to it.

Scope
The scope is the size of an exercise as determined by the extent of the plans being validated and the number of agencies and organisations participating. Scope levels include local, regional, national, EU level and international.

Seminar
See orientation exercise

Simulation
Simulation is an imitation of the conditions of reality.

Table-top exercise
A table-top exercise is, as the name indicates, conducted with players sitting around a table or a desk. By exchanging points of view, each player has the problem illustrated to them and knowledge is exchanged among the players. This type of exercise can be used as a quick test to ensure that preparations are in line with preparedness plans and general directions on how the organisation should be developed. This form of exercise has a primarily educational focus.