TECHNICAL REPORT

Public health emergency preparedness

Core competencies for EU Member States

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Authors
Michael A. Stoto, Elena Savoia, Christopher Nelson, Rachael Piltch-Loeb, Stefano Guicciardi, Judit Takács, Carmen Varela Santos, and Massimo Ciotti

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Abbreviations

ASPHER	Association of Schools of Public Health in the European Region
EPHO	Essential public health operations
ERC	Emergency risk communication
EQF	European Qualifications Framework for Lifelong Learning
FAO	Food and Agriculture Organization (United Nations)
NFP	ECDC national focal point
OIE	Office International des Épizooties (French: International Office of Epizootics; Paris)
PHEP	Public health emergency preparedness
WHO	World Health Organization
IDHI	Infectious disease of high impact
IHR	International Health Regulations (2005)
K	Knowledge statement
S	Skills statement

Glossary

Competencies
are combinations of knowledge and skills that are required to perform a task effectively. The term 'competence' refers to the knowledge and skills that an individual person possesses. 'Competency' on the other hand, refers to an individual's behaviour when they put their competence into practice. Individuals are judged as competent if they demonstrate the knowledge and skills required in their particular profession, role, or task.

Knowledge
is the outcome of the assimilation of information through learning. Knowledge is the body of facts, principles, theories and practices that is related to a field of work or study. Knowledge can be theoretical or factual.

Skills
are the ability to apply knowledge and use know-how to complete tasks and solve problems. Skills are described as cognitive (involving the use of logical, intuitive and creative thinking) or practical (involving the use of methods, materials, tools, and instruments).

Capacities
represent the resources – infrastructure, policies and procedures, knowledgeable and trained personnel – that a public health system has to draw upon.

Capabilities
describe what Member States are expected to achieve during an emergency, and can be described in a consistent way for all countries.

Introduction

The European Centre for Disease Prevention and Control, in order to fulfil its mandate under Decision No. 1082/2013/EU, seeks to identify both the strengths and the areas for improvement of public health emergency preparedness (PHEP) in the European Union Member States. With the eventual goal of developing competency-based training programmes intended to improve PHEP, an initial step towards this goal consisted of the development of an ECDC public health emergency preparedness logic model that focuses particularly on cross-border threats to health in the European context [1]. This logic model provides a structure for assessing preparedness in the Member States and, in its list of public health emergency preparedness capabilities, a language for describing and identifying gaps in the knowledge and skills of public health and preparedness professionals.

This technical report aims to take this work a step further by creating a linkage between the capabilities listed in the logic model for PHEP in the EU Member States (Figure 1) – which apply at the emergency preparedness system level – with competencies for individuals who work in the system by generating a competency-based model. A subsequent phase, to be completed in 2017–2018, will involve the development and pilot testing of competency-based curricula.

Competencies are characteristics of individuals who work in the PHEP system, whereas the capacities and capabilities in the logic model for PHEP in the EU Member States are system-level characteristics. There is an intuitive link between these elements: systems are made of individuals and the resources available to them, with the workforce as the most central element of a system. This report focuses on the linkage between capacities and capabilities in the logic model for PHEP in the EU Member States and competencies for individuals who work in the PHEP system. The Association of Schools of Public Health in the European Region (ASPHER) has taken a similar approach in developing individual competencies [2] related to system capabilities, in their case the Essential Public Health Operations (EPHOs) developed for the WHO European Region [3].

Although informed by public health emergency practitioners, this report is primarily written for educators who will develop competency-based training programmes. It should also be useful for organisations that employ professionals trained in public health emergency preparedness. Public health emergency preparedness is very broad, diverse, and rather complex societal process of preparing and responding to health threats caused by communicable diseases and other cross-border threats to health. Although many educators are knowledgeable about some aspects, they may not be as conversant as practitioners with every dimension of PHEP. By soliciting practitioner input on a logic model to describe public health emergency response at the level of Member States and the workforce competencies needed to support such response, the competency model proposed in this report seeks to bridge the gap between practice needs and curricula development.

ECDC has initiated a medium-term project aimed at designing competency-based training curricula for experts working in preparedness at the national level in the Member States. 'Competency-based' means that training participants acquire knowledge and skills based on a defined set of core competencies they need to best fulfil their job responsibilities. The competency-based approach enhances harmonisation and helps to ensure similar levels of competency throughout the EU, regardless of the background of those working in the field.

These competencies are intended to describe the knowledge and skills needed by experts working in preparedness at the national level such as national preparedness committee members or their equivalent. We recognise that the preparedness and emergency response structures of EU Member States vary, and use the term 'national preparedness committee' generically to describe the group of individuals who work on these issues in any given country. In general, however, public health preparedness is included in the emergency management structures in a country, which are usually led by interior affairs or civil protection staff. When an emergency is of a health nature, then health personnel typically take the lead.

While the PHEP logic model and competencies can be useful in preparedness planning, it is not ECDC's goal to mandate any particular emergency response approach, structure, or capabilities. These are clearly the responsibility of the Member States and necessarily reflect each country's own resources, administrative and political structures, as well as their responsibilities under Decision 1082 and the International Health Regulations (2005) [4]. Similarly, it is not ECDC's intention to specify the knowledge or skills needed by any particular group of preparedness workers. Rather, our goal is to describe the competencies that different groups of professionals need – in addition to the basic knowledge and skills required for their profession – when they are called upon to serve as members of national preparedness committees or teams in order to facilitate an effective national and cross-border response to health threats in Europe.

Public health emergency preparedness capabilities

Member States' preparedness needs can be described and assessed in terms of a public health emergency preparedness *logic model*. Logic models specify the goals and objectives of public health preparedness, as well as the response capabilities and preparedness capacities needed to achieve those goals and objectives [5]. The logic model for PHEP in the EU Member States (Figure 1) incorporates a fundamental distinction between capacities and capabilities that is implicit in Nelson and colleague's definition of public health emergency preparedness [6]: namely,

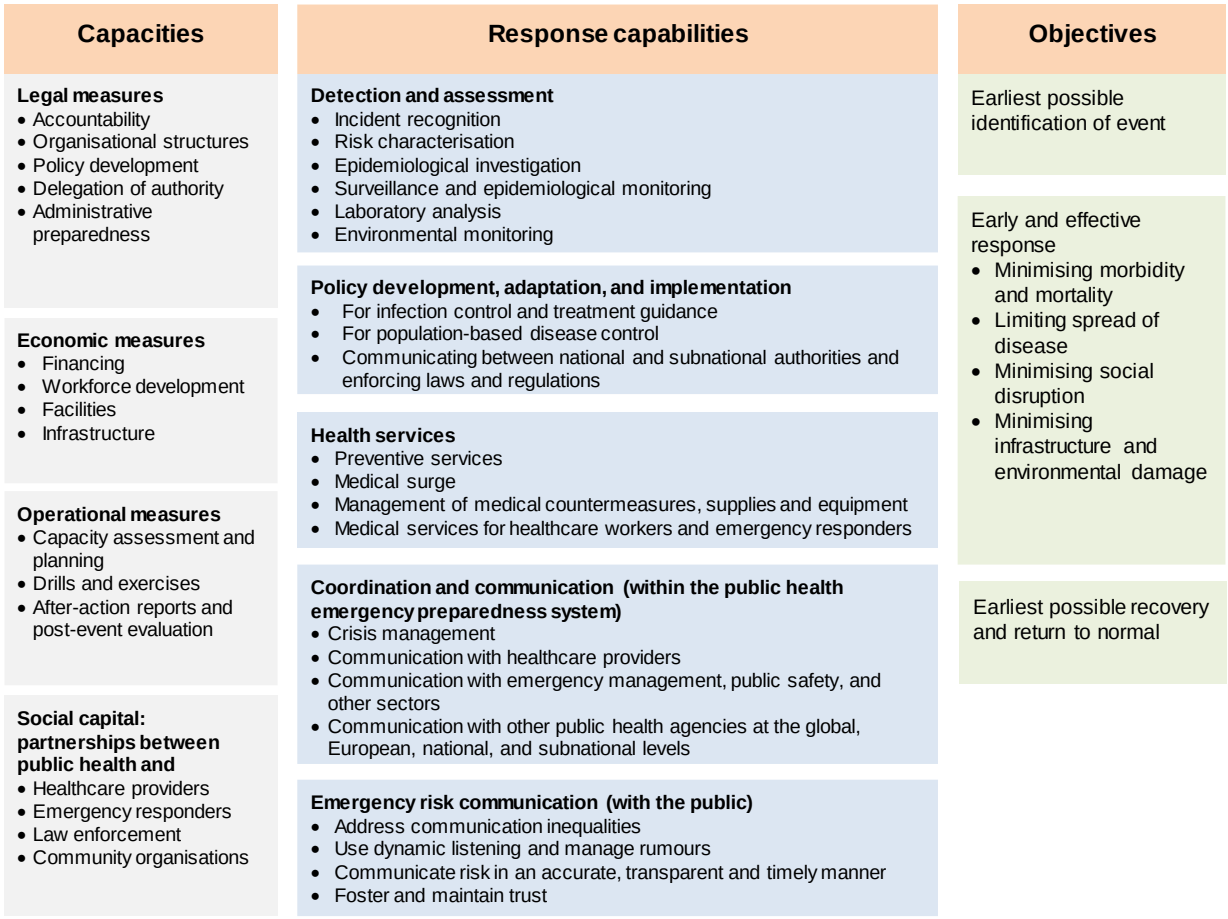
> 'the capability of the public health and health care systems, communities, and individuals, to prevent, protect against, quickly respond to, and recover from health emergencies, particularly those whose scale, timing, or unpredictability threatens to overwhelm routine capabilities. Preparedness involves a coordinated and continuous process of planning and implementation that relies on measuring performance and taking corrective action.'

Capacities represent the resources – infrastructure, policies and procedures, knowledgeable and trained personnel – that a public health system has to draw upon. Much of what public health preparedness organisations do on a day-to-day basis – planning, training, and acquiring equipment and supplies – is intended to build capacity for future emergencies. Capacities necessarily reflect variations in Member States' government and private-sector organisations. In some Member States, for instance, surveillance is conducted at the national level, whereas in others surveillance and other public health activities are conducted at the local level. Some countries have a national, government-run healthcare delivery system, whereas others have a regional system with significant private-sector involvement. Consequently, it is difficult to specify capacities in a way that applies to all EU Member States.

Capabilities, on the other hand, describe what Member States are expected to achieve during an emergency, and can be described in a consistent way for all countries. Capacities and capabilities are both important for an effective emergency response; however, depending on the context, different kinds of capacities may be needed to achieve the required capabilities. For example, the capability to utilise laboratory results to make informed decisions is necessary in the event of a biological or health event, but having strong laboratories and skilled microbiologists may be insufficient if they cannot be mobilised in a timely manner, and/or if laboratory results cannot be shared with and acted upon by decision-makers. The logic model focuses measurement efforts largely on capabilities, allowing different EU Member States to determine how to best achieve them in their own context. For instance, Member States with widespread integrated national electronic medical record systems might rely on such systems for syndromic surveillance to detect disease outbreaks, but states or regions with less well-developed systems might rely on more traditional surveillance methods.

Box 1 summarises the capabilities in the logic model for PHEP in the EU Member States [1]. The first three categories – (1) detection and assessment, (2) policy development, adaptation, and implementation, and (3) healthcare services – correspond to the core functions of public health [1] and represent what the public health system must accomplish to respond effectively. The fourth and fifth categories represent a series of interrelated functions needed to ensure that the system fulfils its assessment, policy development and prevention and treatment roles; (4) coordination and communication regards information sharing within the public health system, incident management and leadership; and (5) emergency risk communication focuses on communication with the public.

Figure 1. Logic model for public health emergency preparedness in EU Member States



Box 1. Proposed public health preparedness capabilities for EU Member States

Detection and assessment

- Incident recognition. Identifying that a health threat with cross-border potential has arisen, either in one or more of the Member States, or elsewhere in the world that could affect Europe.
- Risk characterisation. For communicable diseases, identifying the (possibly novel) pathogen and its epidemiologic characteristics such as reservoir and potential sources, modes of transmission, risk groups, level and duration of infectiousness, virulence (e.g. case–fatality rate), generation time, available control strategies. Based on this, assess the risk. For other health risks, characterising the current and potential consequences for human health in directly affected and other Member States.
- Epidemiological investigation. Developing case definitions, conducting outbreak investigations and case-control studies to validate and analyse case reports, identify pathogens and sources of exposure, and to aid in risk characterisation.
- Surveillance and epidemiological monitoring. Indicator- and event-based surveillance, including case reporting, and active surveillance, to identify outbreaks, characterise affected population groups, monitor disease trends and monitor the impact of control strategies.
- Laboratory analysis. Technical ability to identify (possibly novel) pathogens, monitor antimicrobial resistance, and to handle large numbers of samples submitted for diagnostic purposes.
- Environmental monitoring. Ability to monitor chemical, biological (including animal), and other contaminants in air, soil, and water.

Policy development, adaptation, and implementation

- Policy development and adaptation for infection control and treatment guidance. Effective treatment and mitigation of an emergency can begin with clear policy directives and informed policymaking. However, policies must be flexible and adaptable to accommodate for an evolving infection and/or emergency.
- Policy development and adaptation for population-based disease control. Authority and practical ability to adapt existing policies and guidance (or develop new if necessary) to prevent spread of communicable diseases; this covers topics as diverse as personal hygiene, social distancing, and border controls.
- Policy implementation: communicating between national and subnational authorities and enforcing laws and regulations. Ability to enforce laws and regulations required for disease control and prevention including the IHR, EU regulations, and Member States' laws and regulations.

Health services

- Preventive services. Ability of Member States to mitigate a potential event and pre-empt the potential spread of disease through strategies including vaccination, personal protective actions, border measures, and medication distribution.
- Medical surge. Ability to provide adequate medical evaluation and care during events that exceed the limits of the normal medical infrastructure of an affected area during an outbreak of an infectious disease of high impact (IDHI) or other public health incident.
- Management of medical countermeasures, supplies and equipment. Ability to procure, distribute, and manage countermeasures, supplies and equipment, including personal protective equipment (PPE), during an incident.
- Medical services for healthcare workers and emergency responders. Ability to provide preventive and medical services to address the physical and mental health needs of healthcare workers and emergency responders.

Coordination and communication (within the public health emergency preparedness system)

- Crisis management. Employing a systematic approach to organise and manage resources and responsibilities for addressing all aspects of emergencies, including continuity of operations, reporting and evaluation.
- Communication with healthcare providers. Communication between public health institutions and healthcare providers, especially regarding surveillance protocols, prevention and treatment guidance, and other matters to ensure coordination of prevention and treatment efforts.
- Communication with emergency management, public safety, and other sectors. Communication between public health and other sectors to ensure coordination of prevention and treatment efforts.
- Communication with other public health institutions at the global, European, national, and subnational levels. Communication between public health institutions at all levels to ensure coordination of prevention and treatment efforts.

Emergency risk communication (with the public)

- Address communication inequalities. Ability to address differences across population groups on how the message is received, processed, and acted upon due to the socio-economic and cultural characteristics of the population affected by the emergency.
- Use dynamic listening and manage rumours. Ability to disseminate messages that are clear and collaborate with other organisations, including health professionals and local leaders to disseminate the message through appropriate channels and messengers.
- Communicate risk in an accurate, transparent and timely manner. Ability to provide information to the public in a timely manner, taking into account the actual risk and the general public's perception of the risk.
- Foster and maintain trust. Ability to deliver messages that foster citizens' trust in how the government handles an emergency.

Development of workforce-specific PHEP competencies

Achieving the PHEP capabilities described in the previous section requires a multi-disciplinary approach, and people who work in public health preparedness systems in the EU Member States have varied backgrounds. The preparedness and emergency response structures of EU Member States vary, but regardless of the structure some of the individuals who work in these roles have a health, or more explicitly, public health background: epidemiologists, microbiologists, veterinarians, health communication experts, and so on. Others may have backgrounds in civil protection, finance, local administration, transportation, environmental science, and other fields. Furthermore, formal education does not necessarily equip public health or other professionals with the knowledge, skills and abilities that are required to perform their jobs effectively. Since training budgets, time, and personnel resources are all limited, PHEP systems need an efficient and practical educational approach to ensure their workforces are able to accomplish preparedness capabilities.

Competency-based education and training is characterised by two key features. First, all learning outcomes – the required competencies – are precisely defined, so as to be measurable. Second, the aim of competency-based education is preparation for specific jobs or professional roles, from which the competencies are derived. In addition, competency-based trainings are typically implemented in a modular format based on level of difficulty and/or specificity. The creation of a competency model may facilitate the standardisation of preparedness education and training across various public health systems while being flexible enough to accommodate differences among Member States' preparedness systems, unique response demands, infrastructural levels and vulnerabilities of specific public health systems and threats, and to be tailored specifically to individuals' developmental trajectories.

Competencies are combinations of knowledge and skills that are required to perform a task effectively. The term 'competence' refers to the knowledge and skills that an individual person possesses. 'Competency' on the other hand, refers to an individual's behaviour when they put their competence into practice. Individuals are judged as competent if they demonstrate the knowledge and skills required in their particular profession, role, or task.

In order to be measurable, competencies are described in terms of individuals' knowledge and skills, which in turn form the basis of a competency-based curriculum. Specifically, we use the following definitions, based on the European Qualifications Framework for lifelong learning [7]:

- **Knowledge** is the outcome of the assimilation of information through learning. Knowledge is the body of facts, principles, theories and practices that is related to a field of work or study. Knowledge can be theoretical or factual.
- **Skills** are the ability to apply knowledge and use know-how to complete tasks and solve problems. Skills are described as cognitive (involving the use of logical, intuitive and creative thinking) or practical (involving the use of methods, materials, tools, and instruments).

The focus of the PHEP competencies in the model presented here is the members of national preparedness committees or similar bodies in EU Member States, but as noted above the PHEP systems vary markedly among the Member States. This reflects, among other factors, different governmental structures, resources, and histories. The participants in an emergency response will also depend, to some extent, on the nature of the event – a nuclear or natural disaster requires different response elements than a pandemic or other biological event.

Box 2 describes the preparedness and emergency response workforce categories we used in developing these competencies. It should be noted that the individuals with primary responsibility for the functional areas vary across Member States. In some countries different functions might be combined in a single agency, with one responsible official, whereas other functional areas might not be explicitly represented at all in some countries. Thus, we do not identify a single set of 'core' competencies that every PHEP worker needs. Rather, we anticipate that depending on their own structures and institutions, Member States' national preparedness committees or equivalent body will be composed of individuals who, taken as a group, possess the required competencies for an effective public health emergency system response.

We recognise that the expectations placed on public health workers in each category will vary. Public health epidemiologists and microbiologists, for instance, will need to be able to conduct outbreak investigations and help to characterise the risk, whereas others will only have to know about the importance of these activities and how to interpret and employ the results. The goal at this stage will be to develop the competencies, knowledge, and skills that apply to all members of national preparedness committees in EU Member States. Identifying the proper level of expertise – being able to do vs. know about – will be addressed in the development of training programmes for particular categories of workers. Furthermore, each Member State needs a team or committee of experts to ensure that all of the PHEP capabilities are met. In this respect, the competencies can be used to review the composition of national preparedness committees.

Box 2. Generic preparedness and emergency response workforce categories

- Health officials at the ministry level
- National and subnational public health agency leaders
- Liaison with local public health institutions
- ECDC national focal point for preparedness and response

- Public health epidemiologists
- Public health microbiologists
- Public health physicians and communicable disease control specialists
- Healthcare infection control experts
- Environmental scientists
- Public health veterinarians

- Public-sector healthcare delivery system managers
- Liaison with non-governmental hospitals and health professionals
- Officials responsible for procurement and management of medical products and technology
- Regulatory agency leadership
- Public health legal advisors

- Public health emergency response managers
- Public health emergency preparedness planners

- Risk communicators
- ECDC national focal point for public health communication

- Civil protection agency leadership
- Civil society leadership

Some of the workforce categories in Box 2 require some explanation. Some Member States have a national public health institute; in other countries the equivalent of this institute may be the ministry of health itself. The national focal point (NFP) for preparedness is likely to be a person within the national public health institute, the ministry of health, or a unit in one of these organisations.

The third cluster of workforce categories describes governmental officials who either directly oversee public sector healthcare delivery organisations or who develop policy for or liaise with private-sector hospitals, physicians and other providers, and other elements of a country's healthcare delivery sector. Because the organisation of the health sector varies markedly among, and sometimes within, Member States, the specific officials in each of the workforce categories in this cluster will also vary. Generically, we consider three categories of governmental officials who are responsible for: a) directly overseeing the public healthcare delivery system (including dealing with surge issues), b) procurement and management of medical products, vaccines and technology, and c) liaison with non-governmental hospitals and health professionals.

We use the term 'risk communicators' to describe the public officials who have the responsibility for communicating with the public during health emergencies. In a high-profile event this might be the minister of health or even a president or prime minister. In other events, it could be the public health institute or some other agency. Whatever the level of the spokesperson, though, there are risk communication competencies expected of the staff that support them, including the NFP for communication.

Methods

Building on the PHEP capabilities described in the logic model for PHEP in the EU Member States, the next step was to draft a list of the competencies expected of the PHEP workforce. We drew on three sources of information to prepare a preliminary list of PHEP competencies. First, the capabilities in the logic model for PHEP in the EU Member States were developed by reviewing a series of public health emergencies and identifying the PHEP system capabilities that were called upon. In some cases, these same incidents yielded suggestions about competencies expected of different elements of the PHEP work force. Second, we considered existing competency statements especially those developed by ECDC for public health epidemiologists [8] microbiologists [9] and healthcare infection control experts [10]. Third, we reviewed the scientific literature about PHEP and guidance such as the *Toolkit for assessing health-system capacity for crisis management* developed by the Regional Office for Europe of the World Health Organization [11] and the World Health Organization's (WHO) *Joint external evaluation tool: International Health Regulations (2005)* [12]. For emergency risk communication, we also reviewed a WHO training module [13] and other material [14]. The review of academic literature also included the more general literature on safety science and organisational reliability [15,16,17,18,19]. In this way, we developed a list of competencies and knowledge and skill statements in five categories within each capability.

We then conducted a three-stage consultation process that is described in details in Appendix 1. The resulting list of competencies, knowledge and skills statements can be found in the Results section.

Results

Competencies, knowledge and skills by capability group and workforce

Detection and assessment. As a whole, detection and assessment capabilities enable Member States' preparedness systems to recognise and characterise a threat, monitor its impact on the population, and evaluate the efficacy of interventions to control the threat. Assessment depends on having laboratory and surveillance capacities in place before an event; this includes appropriate legal arrangements. Information flowing from assessment activities must be communicated to all segments of the public health preparedness system, as well as with the public, to support policy development and implementation, prevention and treatment efforts.

Incident recognition. Identifying that a health threat with cross-border potential has arisen, either in one or more of the Member States, or elsewhere in the world that could affect Europe.

Workforce groups: Public health epidemiologists, national public health agency leaders, NFP for preparedness

Competencies

1. Use event-based and indicator-based surveillance systems to detect health threats.
2. Know when case reports or clusters require further investigation, and how to initiate such investigations.
3. Evaluate the implications of national or international public health alerts for own Member State.

Knowledge and skills

a. Know sources of information about potential public health threats from within own Member State. [K]
b. Follow up on reported information about potential public health threats from within own Member State to assess its quality and validity. [S]
c. Critically appraise information about potential public health threats from within own Member State. [S]
d. Evaluate whether a potential public health threat from within own Member State is notifiable under the IHR. [S]
e. Follow chains of communication to notify own Member State's IHR focal point about a potentially notifiable PHEIC. [S]
f. Understand and critically appraise information from event-based and indicator-based surveillance systems. [S]
g. Be familiar with laws on surveillance and reporting of communicable diseases at national, EU, and global levels. [K]
h. Be aware of sources of international public health alerts. [K]
i. Understand and critically appraise international public health alerts to assess the implications for own Member State. [K]

Note: K – knowledge statement; S – skills statement

Risk characterisation. For communicable diseases, identifying the (possibly novel) pathogen and its epidemiologic characteristics such as reservoir and potential sources, modes of transmission, risk groups, level and duration of infectiousness, virulence (e.g. case–fatality rate), generation time, and available control strategies. Based on this, assess the risk. For other health risks, characterising the current and potential consequences for human health in directly affected and other Member States.

Workforce groups: Public health epidemiologists, public health microbiologists, national public health agency leaders

Competencies

1. Identify as rapidly as possible the (possibly novel) agents responsible for a disease outbreak and their epidemiological characteristics.
2. Update estimates of an agent's epidemiologic characteristics as new information becomes available.
3. Characterise the current and potential human health consequences of population exposure to biological, chemical, radiological and nuclear hazards.
4. Perform a risk assessment.
5. Apply the results of international risk assessments to own Member State.
6. Communicate the results and implications of risk assessments for their own Member States to policymakers with different backgrounds.

7. Communicate the results and implications of risk assessments to those responsible for emergency risk communication.

Knowledge and skills

a. Be aware of microbiological characteristics of pathogens of pandemic potential. [K]
b. Be aware of epidemiologic characteristics and available control strategies for major pathogens of pandemic potential. [K]
c. Use epidemiologic principles and tools to characterise the current and potential consequences for human health of population exposure to biological, chemical, radiological, and nuclear hazards. [S]
d. Apply knowledge of epidemiologic characteristics of major pathogens to interpret information on an emerging threat to assess the potential consequences for human health. [S]
e. Identify potential control strategies for emerging pathogens. [S]
f. Identify the use and limitations of diagnostic and typing methods and their interpretation to characterise population health risks. [S]
g. Communicate the results and implications of risk assessments to policymakers with different backgrounds. [S]

Note: K – knowledge statement; S – skills statement

Epidemiological investigation. Developing case definitions, conducting outbreak investigations and case-control studies to validate and analyse case reports, identify pathogens and sources of exposure, and to aid in risk characterisation.

Workforce groups: Public health epidemiologists, public health microbiologists, NFP for preparedness

Competencies

1. Develop case definitions to validate and analyse case reports.
2. Conduct outbreak investigations to identify pathogens and other agents, characterise affected population groups, and sources of exposure.
3. Conduct case-control studies and other epidemiologic studies to test hypotheses regarding sources of exposure.
4. Collaborate with local health officials, healthcare providers, and others to conduct outbreak investigations and epidemiologic studies.
5. Collaborate with international organisations to conduct coordinated multinational epidemiologic studies.

Knowledge and skills

a. Create a case definition and adjust it as necessary during the investigation. [S]
b. Describe the outbreak in terms of person, place, and time. [S]
c. Generate hypothesis about the cause and/or risk factors of the outbreak. [S]
d. Conduct analytical epidemiological investigation to identify the source. [S]
e. Document pathogen and likely sources and transmission pathways so as to inform evidence-based measures to control the outbreak. [S]
f. Report and present results of an investigation. [S]
g. Write a study protocol using investigation techniques consistent with the public health problem. [S]
h. Report and present results of a study. [S]
i. Be aware of appropriate laboratory methods for pathogens of pandemic potential. [K]
j. Perform evaluation studies of diagnostic test accuracy. [S]
k. Collaborate with public health epidemiologists to established criteria for microbiological input in design and analysis of epidemiologic investigations. [S]
l. Identify what legal issues may influence the channels of dissemination and content of the information being released. [S]
m. Document pathogen and likely sources and transmission pathways to inform appropriate choice of guidelines, plans and other types of guidance documents. [S]

Note: K – knowledge statement; S – skills statement

Surveillance and epidemiological monitoring. Indicator- and event-based surveillance, including case reporting and active surveillance, in order to identify outbreaks, characterise affected population groups, monitor disease trends, and monitor the impact of control strategies.

Workforce groups: Public health epidemiologists, public health veterinarians

Competencies

1. Establish and maintain indicator and event-based surveillance system(s) to detect public health threats.
2. Establish and maintain electronic real-time reporting systems.
3. Interpret information from existing surveillance in order to characterise affected population groups, and to monitor disease trends and the impact of control strategies.
4. Develop and implement plans for border screening for known pathogens of international concern.
5. Conduct timely and accurate disease reporting in accordance with WHO requirements and consistent coordination with FAO and OIE.
6. Collaborate with local public health officials and the healthcare delivery system, initiate active surveillance to identify additional cases during an epidemiologic investigation.

Knowledge and skills

a. Run a surveillance system. [S]
b. Manage surveillance data. [S]
c. Design a new or adapt an existing surveillance system for a newly emerged pathogen. [S]
d. Perform descriptive analysis of surveillance data. [S]
e. Interpret disease and public health events trends from time series analysis. [S]
f. Identify key findings from surveillance data analysis and draw conclusions. [S]
g. Conduct day-to-day surveillance activities. [S]
h. Evaluate the existing surveillance system. [S]
i. Interpret case reports and surveillance data from within Member States and at border testing stations to determine whether it represents a potential PHEIC. [S]
j. Demonstrate knowledge of Member State, WHO, and other protocols for notifying WHO or OIE as appropriate of a potential PHEIC. [K]
k. Use existing protocols to notify WHO or OIE as appropriate of a potential PHEIC. [S]
l. Recognise the need for a new surveillance system. [S]

Note: K – knowledge statement; S – skills statement

Laboratory analysis. Technical ability to identify (possibly novel) pathogens, monitor antimicrobial resistance, and handle large numbers of samples submitted for diagnostic purposes. This capability reflects a Member State's ability to use existing laboratory capacity effectively during an incident in support of the other capabilities listed above under 'Detection and assessment' (page 8).

Workforce groups: Public health microbiologists, national public health agency leaders

Competencies

1. Manage a national laboratory system and effective modern point-of-care and laboratory-based diagnostics.
2. Conduct WHO core tests.
3. Participate in multinational epidemiologic studies.
4. Have the biological, clinical, and epidemiological knowledge needed to characterise (potentially novel) pathogens and other agents responsible for an outbreak disease.

Knowledge and skills

a. Demonstrate knowledge of laboratory methods and analysis. [K]
b. Be aware of microbiological characteristics of pathogens of pandemic potential. [K]
c. Identify the use and limitations of diagnostic and typing methods and their interpretation to characterise population health risks. [S]
d. Arrange and/or coordinate transport of specimens to and from labs within Member States and external reference laboratories. [S]
e. Collaborate with reference laboratories on WHO core tests. [S]

Note: K – knowledge statement; S – skills statement

Environmental monitoring. Ability to monitor chemical, biological (including animal), and other contaminants in air, soil, and water.

Workforce groups: Environmental scientists, national public health agency leaders

Competencies

1. Integrate and interpret information from a variety of local, national, and international sources regarding contaminants in air, soil, and water.

Knowledge and skills

a. Understand the human health consequences of population exposure to biological, chemical, radiological, and nuclear hazards. [K]
b. Interpret and understand the results and implications of existing environmental monitoring systems. [S]
c. Design new or adapt existing environmental monitoring systems for emerging concerns about environmental contamination. [S]

Note: K – knowledge statement; S – skills statement

Policy development, adaptation, and implementation. This section reflects Member States' abilities to adapt existing authorities and policies to the new and emerging circumstances of a cross-border threat to health, and to enforce existing and new laws and regulations needed to implement these policies and regulations. The focus of these capabilities is at the national level, although it is recognised that a lack of consistency within Member States or among bordering Member States, can erode the public's confidence.
All of these activities require communication and coordination with a variety of actors at the global, European, national, and subnational levels, and these supporting capabilities are described below.
The capabilities in this section and corresponding competencies deal with the development and implementation of substantive policies, regulations, and official guidance regarding infection control and disease treatment in clinical settings to population-based disease control activities.

Policy development and adaptation for infection control and treatment guidance. Effective treatment and mitigation of an emergency can begin with clear policy directives and informed policymaking. However, policies must be flexible and adaptable to accommodate an evolving event.

Workforce groups: NFP for preparedness, healthcare infection control experts, public health epidemiologists, public health microbiologists, health officials at the ministry level, public health legal advisors.

Competencies

1. Work with epidemiologists, microbiologists, environmental sciences and others to continuously evaluate evidence on patient treatment and infection control.
2. Regularly assess and, as needed, clarify existing policies and/or recommend/advocate measures and communicate them to health officials at the ministry level, border control officials, and others.
3. Share relevant information with healthcare, infection control, and patient transport experts, and solicit their feedback.
4. Seek and receive advice from public health professionals in making border control decisions and reflect to the public how and why these decisions have been made.
5. Be able to use data products from epidemiologists in providing advice in the development of trade and travel restrictions as tools of population-based disease control.
6. Communicate the necessity of policies calling for personal protective measures to mitigate personal risks for the public health professionals.
7. Aid the transfer of medical and related professionals across borders and facilities through standardised job descriptions of personnel in clinical settings.
8. Provide healthcare workers with clinical guidelines for emerging infections from abroad, especially those that may be carried by travellers and the severely contagious.

Knowledge and skills

a. Be familiar with policies, plans, and frameworks relevant to infection control, clinical healthcare, and other aspects of public health response. [K]
b. Know who the relevant partners are. [K]
c. Have and maintain a basic understanding of the principles of infection control and treatment and their implications for PHEP planning and response practice. [K]
d. Know the basic principles of communicating science-based information to policymakers. [K]
e. Maintain ongoing relationships with key players. [S]
f. Be able to ascertain (on an ongoing basis) partners' key needs and identify gaps. [S]
g. Be able to synthesise scientific information and recognise implications for policy frameworks. [S]
h. Know how to use channels for efficiently communicating with relevant decision-makers. [S]
i. Understand basic data displays and other analytical products from epidemiologists and implications for policy and planning. [S]
j. Understand different levels and triggers of border restrictions. [K]
k. Know who the key decision-makers are for border control. [K]
l. Understand basic instruments of trade restrictions as tools of population-based disease control. [K]
m. Understand the basic principles of responder safety and health, including but not limited to PPE. [K]
n. Understand the regulatory and other instruments that could be used to promote standardisation in job descriptions. [K]
o. Be able to link the requirements of responding to public health emergencies to job requirements. [S]
p. Understand the range of emerging infections that might come to the country and the EU from abroad and likely modes of transmission. [K]
q. Be able to interpret and assimilate scientific information and recognise implications for PPE and other safety control measures. [S]

Note: K – knowledge statement; S – skills statement

Policy development and adaptation for population-based disease control. Authority and practical ability to adapt existing policies and guidance (or develop new if necessary) to prevent spread of communicable diseases; this covers topics as diverse as personal hygiene, social distancing, and border controls.

Workforce groups: National focal points for preparedness and response, health officials at the ministry level, public health legal advisors, public health emergency response managers, public health epidemiologists

Competencies

1. Before the response operation, ensure regular assessments of legal frameworks and propose/advocate measures to address gaps.
2. Before the response operation, assess if the implementation of strategies, plans, and action plans requires any changes in these plans and strategies.
3. Before the response operation, identify which triggers will require key decisions during outbreak response (keeping in mind that triggers may need to be modified to fit specific situations).
4. Review the evidence on current or impending outbreaks; propose and advocate adaptations to policies as needed.

Knowledge and skills

a. Understand the most important legal issues related to PHEP. [K]
b. Be familiar with the requirements of the IHR. [K]
c. Understand the different types of public health measures that can be taken against the spread of disease. [K]
d. Understand the basic principles of infection control and treatment and their implications for PHEP. [K]
e. Maintain relationships with subject-matter experts in relevant aspects of public health law. [S]
f. Understand where existing legal and policy frameworks may conflict with the demands of response scenarios. [S]
g. Maintain relationships with key ministerial-level and other decision makers. [S]
h. Synthesise scientific information and recognise implications for policy and planning. [S]
i. Know the basic principles of how to communicate science-based information to policymakers. [K]
j. Maintain relationships with key partners. [S]
k. Synthesise scientific information and recognise implications for PPE and other safety procedures/equipment. [S]
l. Understand epidemiology reports and their implications for travel and trade restrictions control the spread of disease. [K]
m. Understand the implications that recent training courses and exercises may have for preparedness plans. [K]

Note: K – knowledge statement; S – skills statement

Policy implementation: communicating between national and subnational authorities and enforcing laws and regulations. Ability to enforce laws and regulations required for disease control and prevention including the IHR, EU regulations, and Member States' laws and regulations

Workforce groups: Health officials at the ministry level, public health epidemiologists, environmental scientists, public health emergency response managers

Competencies

1. Communicate policy/guidelines, weigh benefits and costs, understand concerns about implementation, and adapt policies related to border control.
2. Continuously evaluate evidence on threats; communicate if border control policies need to be adapted.
3. Share information with response managers and health officials at the ministry level to support decisions about appropriate countermeasures.
4. Before response activities are taken, regularly review, test, and update the standard operating procedures and ensure that a multi-unit task force is available for the coordination and integration of relevant sectors during response operations.
5. Before the response operation, ensure the adequacy of plans for financing and credentialing of staff during emergency situations.

Knowledge and skills

a. Understand different levels of border restrictions and triggers for establishing them. [K]
b. Understand both economic costs and health benefits related to border control. [K]
c. Know who the relevant partners are and know their roles and responsibilities. [K]
d. Understand the basic principles of infection control, treatment, and their implications for PHEP. [K]
e. Understand the basic principles of communicating science-based information to policymakers. [K]
f. Maintain relationships with key partners. [S]
g. Assess partners' needs and gaps. [S]
h. Be able to synthesise scientific information and recognise the implications for border control. [S]
i. Understand epidemiology reports and their implications for travel and trade restrictions control the spread of disease. [S]
j. Use channels for efficiently communicating with relevant decision makers. [S]
k. Be familiar with the relevant incident command structure and related legal frameworks. [K]
l. Maintain relationships with relevant response partners. [K]
m. Operate within incident command structures and with a wide range of partners, under stressful conditions and with short timelines. [S]
n. Be familiar with major cost factors during response operations. [K]
o. Be familiar with processes for cross-credentialing of staff (including cross-border credentials). [K]
p. Understand the challenges faced by specific response partners in sustaining long-term infectious disease response operations. [K]
q. Facilitate discussions with partners to develop workable solutions to administrative conflicts (e.g. billing, staffing). [S]
r. Work with key partners to devise workable financial sustainability plans for long-term response operations. [S]

Note: K – knowledge statement; S – skills statement

Health services. This section addresses prevention and treatment services delivered to individuals by the Member States' health sector. This includes provision of vaccines and other countermeasures to healthcare workers and the general public. In addition, physical and mental health treatment for those affected by mass-casualty or long-running incidents may be required. The medical countermeasures, supplies and equipment needed to provide these services are considered capacities, but procuring, stockpiling, and distributing them on an emergency basis during a crisis are critical capabilities, and thus included in this section. The most effective and efficient means for delivering health services to individuals – whether preventive or therapeutic – will depend on the nature of the threat and on the way that public and private sector is organised, as the organisation of the health sector varies markedly among Member States. Thus, these capabilities focus on what must be accomplished during an event, rather than on how to accomplish it.

Preventive services. The ability of Member States to mitigate a potential event and pre-empt the potential spread of disease through strategies including vaccination, personal protective actions, and medication distribution.

Workforce groups: NFP for preparedness, liaison with local public health institutions, public health emergency response managers, health officials at the ministry level, regulatory agency leadership, public-sector healthcare delivery system managers, liaison with non-governmental hospitals and health professionals

Competencies

1. Before an event, plan for the storage and stockpiling of vaccines and prepare for medical and non-medical countermeasures.
2. Draw upon the work of surveillance networks to identify potential events that may indicate the need for the implementation of preventative services plans.
3. Ensure that plans are in place for mass vaccinations and mass prophylactic medication distribution.
4. Coordinate vaccination plans and criteria for vaccination target groups in the Member States to ensure consistency of practices.
5. Facilitate the approval of vaccines through streamlined processes where available.
6. Address antimicrobial stewardship activities.

Knowledge and skills

a. Understand Member States' needs for vaccine stockpiling, vaccine development, and sharing of vaccines. [K]
b. Understand Member States' needs for vaccines and consider optimal agreements to ensure effective vaccine distribution with partners. [K]
c. Understand the challenges of vaccine distribution in times of scarcity. [K]
d. Document vaccine distribution channels. [S]
e. Plan vaccinations for high-risk and other target groups. [S]
f. Be familiar with agreements with other Member States to facilitate rapid vaccine distribution. [K]
g. Address cross-border issues regarding vaccines in the emergency plans of Member States. [S]
h. Be aware of the public health implications of a PHEIC. [K]
i. Identify key partners to facilitate the speed of approval and dissemination of medical countermeasures. [S]
j. Work with key partners to develop plans for rapid vaccine development. [S]
k. Understand the risk of rising antimicrobial resistance and the need for mitigation. [K]
l. Inform providers of emerging issues in medication resistance or resurgence as they present through established channels. [S]

Note: K – knowledge statement; S – skills statement

Medical surge. The ability to provide adequate medical evaluation and healthcare during events that exceed the limits of the normal medical infrastructure of an affected area during an outbreak of an infectious disease of high impact (IDHI) or other public health incidents.

Workforce groups: NFP for preparedness, liaison with local public health institutions, public health emergency response managers, health officials at the ministry level, regulatory agency leadership, public-sector healthcare delivery system managers, liaison with non-governmental hospitals and health professionals, healthcare infection control experts

Competencies

1. Prior to an event, work in tandem with clinicians to develop medical surge plans for various threats.
2. Ensure that plans across the continuum of care have been communicated to the clinical staff to effectively manage surge needs.
3. Plan for combining resources at national and local levels (e.g. cross-border sharing of clinicians if a hospital reaches capacity).

4. Establish processes for staffing related surge issues including credentialing, paying staff, channels of authority, extended crisis interventions, and livelihood protection at home.
5. Establish reliable systems for disseminating case definitions to standardise both the diagnosis and the reporting of case numbers (e.g. confirmed, suspected, probable, or possible cases).
6. Assess laboratory capacity on an ongoing basis and train public health scientists in rapid testing procedures to ensure adequate surge capacity.
7. Create a hospital-based unit for critical, contagious patients at select facilities known to medical evacuation teams.

Knowledge and skills

a. Understand the needs created by medical surge in a given Member State. [K]
b. Be familiar with plans for medical surge at the national level, including how to address 'concerned citizens', how to manage biological contamination, how and where to deploy staff, and what are the criteria to request help from other Member States. [K]
c. Create a basic plan (template) which can be adapted by health facilities in the event of medical surge. [S]
d. Understand Member State communication channels for reporting a potential PHEIC to the national level. [K]
e. Use existing protocols to report a potential PHEIC to Member State representatives. [S]
f. Understand the capacity at healthcare facilities in Member States, including availability of beds and isolation units. [K]
g. Understand pre-existing cross-border plans for the transfer of patients (medical evacuations). [K]
h. If no contingency plan exists, develop one if a Member State cannot cope with medical surge. [S]
i. Engage in cross-facility, cross-border drills and simulation exercises to test plans. [S]
j. Create a case definition and adjust it as necessary during the investigation of an acute outbreak/incident. [S]
k. Communicate case definition to healthcare facility staff as the event evolves. [S]
l. Be aware of epidemiologic characteristics (modes of transmission, risk of infection, virulence, intergenerational time, etc.) and available control strategies for major pathogens and symptoms of IDHI potential. [K]
m. Utilise knowledge of epidemiologic characteristics of critical, contagious vectors to plan for ways to mitigate the impact on healthcare facilities and the spread of disease. [S]
n. Understand the Member States' needs for laboratory capacity in the event of a PHEIC; prepare an inventory of facilities, personnel, etc. [K]
o. Be aware of microbiological characteristics of pathogens with a pandemic potential. [K]
p. Develop a plan for continuously assessing laboratory capacity at the Member State level; this should include the monitoring of specimens, a staff overview, and a list of specific staff capabilities. [S]
q. Apply plans developed for infectious diseases of high impact. [S]

Note: K – knowledge statement; S – skills statement

Management of medical countermeasures, supplies and equipment. The ability to procure, distribute, and manage countermeasures, supplies and equipment – including personal protective equipment (PPE) – during an incident. Some of the competencies in this area require activating pre-existing policies, procedures, agreements and other capacities, so the knowledge and skill statements are contingent on the existence of these capabilities in the MS.

Workforce groups: NFP for preparedness, public health emergency response managers, health officials at the ministry level, regulatory agency leadership, officials responsible for procurement, and management members of medical products and technology

Competencies

1. Work with health personnel to identify the best medical countermeasures based on risk and threat; relay the results of these conversations.
2. Ensure flexible policies and procurement strategies among Member States including how to allocate resources in the event of a shortage.
3. Ensure there are adequate levels of human resources (e.g. experts) and laboratory capacity available in the Member States.

Knowledge and skills

a. Understand the Member States' needs for medical countermeasures and procurement procedures; ensure optimal agreements to guarantee the effective deployment of countermeasures. [K]
b. Activate pre-established Member State governing bodies that can make surge-related decisions in the event of a health emergency. [S]
c. Solicit input from healthcare personnel within medical facilities when developing plans. [S]

d. Train key personnel on countermeasure procurement and worker deployment policies. [S]
e. Understand Member States' needs for medical countermeasures and procurement and consider optimal agreements to ensure effective countermeasure deployment. [K]
f. Deploy regional and international personnel sharing agreements such as WHO-GOARN. [S]
g. Activate agreements with other Member States such as regional countermeasure sharing agreements [S]
h. Engage in annual practice of deployment of staff and countermeasure procurement. [S]
i. Activate procedures for mass dispensing including alternate modalities. [S]
j. Determine locations for medical countermeasures dispensing to the public and establish memorandums of understanding to access necessary facilities. [S]
k. Activate pharmaceutical procurement agreements in the event of supply plain disruption or shortage. [S]

Note: K – knowledge statement; S – skills statement

Medical services for healthcare workers and emergency responders. The ability to provide preventive and medical services to address the physical and mental health needs of healthcare workers and emergency responders.

Workforce groups: NFP for preparedness, public health emergency response managers, health officials at the ministry level, public-sector healthcare delivery system managers, liaison workers for non-governmental hospitals, and health professionals

Competencies

1. Use standardised approaches across Member States to engage with all personnel who may serve in field operations on the use of PPE.
2. Before a response operation, relay to healthcare workers the importance of their role in public health emergencies and support their personal preparedness and that of their families.
3. Establish ways to procure PPE for medical professionals and emergency responders across Member States.
4. Plan for the demobilisation and recovery of the healthcare workforce after a response operation.

Knowledge and skills

a. Identify key professional functions of potentially deployable personnel. [K]
b. Understand workforce strategy at the Member State level. [K]
c. Solicit input from professionals who have previously been involved in regional or international response operations. [S]
d. Be aware of, and continuously update, professional standards for deployable personnel. [S]
e. Train staff members so they can share responsibilities and tasks in emergency situations. [S]
f. Be aware of questions and concerns from healthcare workers. [K]
g. Educate health professionals about safety measures, medical countermeasures, and vaccines; also cover ways to mitigate personal risks. [S]
h. Solicit input from professionals who were previously involved in regional or international response operations. [S]
i. Draw on trusted communication channels and messengers, preferably those identified by professionals. [S]
j. Facilitate discussions with healthcare workers so they can voice safety-related questions or concerns about vaccines or other medical countermeasures. [S]
k. Be aware of personal and professional standards for persons involved in public health emergencies. [S]
l. Maintain a feedback mechanism on training procedures to ensure continuous improvement. [S]
m. Engage in annual drills and exercises of deployment of staff and countermeasure procurement. [S]
n. Develop and deliver just-in-time educational and training programmes for healthcare workers on personal preparedness, PPE, demobilising, and recovery. [S]
o. Activate processes to credential and manage medical and non-medical volunteers. [K]

Note: K – knowledge statement; S – skills statement

Coordination and communication (within the public health emergency preparedness system). This section covers important aspects of communication that relate to the coordination and management of the public health emergency preparedness system during a cross-border threat. The competencies and capabilities described are not ends in themselves, but rather describe how the Member States can achieve these ends and what must be accomplished during a crisis. Effective leadership and governance structures are clearly important for crisis management, but because these factors vary across Member States, the focus here is on key aspects of coordination and communication.

Crisis management. Employing a systematic approach to organise and manage resources and responsibilities for addressing all aspects of emergencies, including continuity of operations.

Workforce groups: NFP for preparedness, public health emergency response managers, public health emergency preparedness planners

Competencies

1. Continuously create and update an incident management plan that adapts existing policies to the situation at hand.
2. Continuously inform public health emergency response managers about the threat so that the incident management plan can be updated.
3. During the response operation, anticipate resource needs and communicate them to relevant decision makers.
4. Before the response operation, practice and test the ability to make decisions under uncertainty.
5. Participate in the implementation of plans which ensure the continuity of operations.
6. Communicate with political decision makers to mobilise needed resources, communicate current knowledge and uncertainties, and solicit guidance.
7. Before the response operation, identify key assumptions behind plans, identify untenable assumptions, and advocate changes as needed.
8. Develop protocols and test/exercise processes for health emergency operations and their activation.

Knowledge and skills

a. Be familiar with the principles of incident management. [K]
b. Know which key partners are involved in developing and implementing incident management plans. [K]
c. Understand the basic principles of infection control and treatment and their implications for PHEP. [K]
d. Collect information from epidemiologists and disease surveillance experts and other partners in order to adapt the incident management plan as needed. [S]
e. Understand the basic principles of communicating science-based information to policymakers. [K]
f. Use communication mechanisms for efficiently communicating with a full range of response partners. [S]
g. Know key response partners and the primary roles and responsibilities in a response. [K]
h. Communicate continuously with key response partners to identify current and potential resource needs. [S]
i. Use administrative mechanisms for transferring or sharing resources among partners. [S]
j. Be familiar with the basic principles of simulation exercises and drills. [K]
k. Be able to select exercise/drill formats appropriate for testing decision-making competency under uncertainty. [S]
l. Be familiar with the basic principles of planning for the continuity of operations. [K]
m. Be familiar with non-emergency operations, which may become necessary during a medium to long-term response operation. [K]
n. Work with key partners to identify strategies for maintaining important routine operations during medium-to-long term responses. [S]
o. Know who the key political decision makers are and the kinds of decisions they might need to make during a response. [K]
p. Be familiar with response plans. [K]
q. Understand all aspects of emergency plans, e.g. resources, personnel, material, and other requirements. [K]
r. Synthesise and communicate information to decision makers who have the authority to redirect resources as needed. [S]
s. Communicate the importance of joint training and joint simulation exercises to key decision makers. [S]

Note: K – knowledge statement; S – skills statement

Communication with healthcare providers. Communication between public health institutions and healthcare providers, especially regarding surveillance protocols, prevention and treatment guidance, and other matters to ensure the coordination of all prevention and treatment efforts.

Workforce groups: NFP for preparedness, public-sector healthcare delivery system managers, liaison with non-governmental hospitals and health professionals

Competencies

1. Before the response operation, establish rapid communication channels within national disease surveillance and healthcare professionals.
2. Before the response operation, establish trust with healthcare providers through feedback loops and two-way communication.
3. For incident communication, draw on clinical personnel trained in risk communication or people involved in the incident, such as doctors or other clinicians.
4. Provide training; include healthcare providers in drills and exercises to test communication lines and avoid communication problems.

Knowledge and skills

a. Understand sources of information about potential public health threats from within own Member States. [K]
b. Understand key personnel for a particular incident within country based on a workforce strategy. [K]
c. Know how to convene key personnel in the event of a public health emergency. [K]
d. Use electronic information systems if possible; use websites. [S]
e. Maintain transparency and consistency when communicating with health professionals. [S]
f. Identify trusted channels of communication and messengers to the professional health community. [S]
g. Know key response partners and key response plans. [K]
h. Organise meetings and facilitate communication with healthcare providers. [S]
i. Engage in dynamic listening (refers to processes related to understanding the public's concerns and reactions) to reduce the potential for rumours; raise awareness among health providers of the potential for rumours. [S]
j. Understand the basic principles of simulation exercises and drills. [K]
k. Identify elements of the response plans that should be used for exercises/drills; provide feedback after training activities have concluded. [S]

Note: K – knowledge statement; S – skills statement

Communication with emergency management, civil protection, and other sectors. Communication between public health and other sectors to ensure the coordination of prevention and treatment efforts.

Workforce groups: NFP for public health preparedness, health officials at the ministry level, national public health agency leaders, public health emergency response managers, public health emergency preparedness planners, civil protection agency leadership

Competencies

1. Before the response operation, ensure that key partners are familiar with applicable laws, key roles, resources, information needs, and planning assumptions.
2. Before the response operation, ensure adequate preparations for implementing health screening at borders; also ensure that response measures to a public health emergency can be taken right at the point of entry.
3. Advocate the development of plans for joint task forces or other entities which can share information across disciplines.
4. Advocate regular multi-discipline exercises to improve communication with staff and partners.
5. Before the response operation, review mutual aid agreements (where relevant), identify gaps, and propose/advocate solutions to address gaps.
6. Before the response, train staff members in confidentiality policies, chains of evidence, and security issues relating to the exchange of information between partner organisations.

Knowledge and skills

a. Understand the basic principles of infection control and treatment, as well as their implications for PHEP. [K]
b. Understand response plans well enough to find the right partners for the job. [K]
c. Be able to communicate with response partners about key roles, responsibilities, and risks. [S]
d. Know key response partners and plans. [K]
e. Organise meetings and facilitate communication between partners across different disciplines and organisations. [S]
f. Understand the basic principles of simulation exercises and drills. [K]
g. Identify elements of response plans that should be used for exercises/drills. [S]

h. Know who your key partners are and which mutual aid agreements exists. [K]
i. Be able to identify preparedness gaps and propose solutions. [S]
j. Propose solutions for balancing confidentiality and transparency. [S]

Note: K – knowledge statement; S – skills statement

Communication with other public health institutions at the global, European, national and subnational levels. Communication between public health institutions at all levels to ensure the coordination of prevention and treatment efforts.

Workforce groups: NFP for preparedness; health officials at the ministry level, national public health agency leaders

Competencies

1. Identify key partners and develop a common understanding of roles, resources, planning assumptions, risks/vulnerabilities, and information that should be shared during response operations.
2. Develop strategies to communicate with professionals who have different skills and knowledge levels; develop strategies to communicate with partner organisations to ensure a coordinated response.
3. Advocate regular multi-country exercises to improve the ability to communicate with partners.
4. Assess the quality of the microbiology networks.
5. Assess the adequacy of mutual aid mechanisms and multi-disciplinary taskforces.

Knowledge and skills

a. Be familiar with plans and key response partners and their most important information needs. [K]
b. Know response plans well enough to participate in drills and exercises. [K]
c. Be aware of differences in knowledge and skill levels in partner organisations. [K]
d. Communicate with professionals with different knowledge and skill levels. [S]
e. Know how public health surveillance and microbiology networks function. [K]
f. Use health surveillance and microbiology networks to share information. [S]
g. Know key response partners and their information needs. [K]
h. Know about mutual aid mechanisms and how to activate them. [K]
i. Work with relevant partners to ensure that key coordination mechanisms are understood. [S]

Note: K – knowledge statement; S – skills statement

Emergency risk communication (with the public). Emergency risk communication is the real-time exchange of information, advice and opinions between experts and/or officials, and people who face a threat to their survival, health, economic or social well-being. The focus of this section is on communicating with the public during a crisis, ensuring that everyone, especially members of vulnerable and hard-to-reach populations, receive the information that they need to protect themselves.

Address communication inequalities, i.e. the ability to address differences across population groups on how a message is received, processed, and acted upon due to the socio-economic and cultural characteristics of the population affected by the emergency.

Workforce groups: Health officials at the ministry level, national public health agency leaders, NFP for communication, risk communicators, civil society leadership

Competencies

1. Address cultural and societal barriers in the cognitive processing and compliance with recommended behaviours.
2. Use most appropriate content and trusted channels of communication across population groups.
3. Identify strategies to overcome linguistic barriers, e.g. request local assistance.

Knowledge and skills

a. Be aware of social and global self-identity in a culturally sensitive manner. [K]
b. Understand social mobilisation, health promotion and other population engagement mechanisms that could be leveraged for an emergency risk communication strategy. [S]
c. Interpret information on the distribution of vulnerable population groups. [S]
d. Understand factors (e.g. socio-demographic, religious, cultural) that may influence compliance with recommended behaviours; suggest policy changes to address such issues. [S]
e. Distinguish between the informational needs and the use of communication channels of different population groups. [S]
f. Identify and use the most appropriate channels of communication and public engagement methods based on audience needs. [S]
g. Understand locally relevant mechanisms for public communication and test them. [K]
h. Identify and engage local leaders, if needed, who may help deliver your message. [S]
i. Create messages that are clear, complete and understandable by the target audience. [S]
j. Understand how to seek advice on the creation and validation of messages across languages and cultures. [K]

Note: K – knowledge statement; S – skills statement

Use dynamic listening and manage rumours. The ability to disseminate clear messages is essential. Collaborate with other organisations, health professionals and local leaders to disseminate your message through appropriate channels and messengers. 'Dynamic listening' refers to processes related to understanding the public's concerns and reactions, which is necessary for disseminating messages that address these concerns.

Workforce groups: Leaders of national public health institutions, NFP for communication, risk communicators, professional journalists, civil society leadership

Competencies

1. Identify data gathering mechanisms to understand and monitor the informational needs of the population.
2. Prevent and counter misinformation.
3. Proactively address the needs of the news media and the general public.

Knowledge and skills

a. Describe the information environment. [K]
b. Understand the application of various data gathering methods (i.e. surveys, focus groups, interviews, media and social media monitoring) to assess the effectiveness of the emergency risk communication strategy. [S]
c. Understand and interpret the results of evaluation data and integrate them into the response. [S]
d. Identify methods to learn from the response to critical incidents. [S]
e. Coordinate and collaborate with credible sources and influencers. [S]
f. Identify major conflicting information. [S]
g. Develop strategies to correct inconsistencies and manage rumours. [S]
h. Identify opportunities to repeat your messages. [S]
i. Identify methods to monitor information released by the news media. [S]
j. Understand media needs. [K]

k. Utilise multiple media outlets based on target audience and influential groups. [S]
l. Familiarise yourself with TV interviewing techniques. [K]
m. Identify strategies to build relationships with journalists. [S]
n. Produce press releases, websites and social media postings, and disseminate information tailored to other channels. [S]
o. Organise press conferences. [S]
p. Evaluate the effectiveness of communication actions and identify needs and opportunities for the repetition of your message. [S]

Note: K – knowledge statement; S – skills statement

Communicate risk in an accurate, transparent and timely manner. The ability to provide information to the public in a timely manner taking into account the measurement of actual risk and populations' risk perceptions.

Workforce groups: Ministerial-level health officials, national public health agency leaders, public health epidemiologists, public health microbiologists, NFP for communication, risk communicators, professional journalists, civil society leadership

Competencies

1. Integrate the results of the risk-assessment process in the messages
2. Manage and assess situational information received by the organisation
3. Anticipate questions from the public and develop appropriate answers
4. Understand and implement the principles of risk communication
5. Identify strategies to facilitate the release of information (i.e. review outgoing messages in a timely manner)
6. Understand laws and regulations related to ERC

Knowledge and skills

a. Understand how risk is measured and the risk assessment process [K]
b. Integrate risk assessment results into the risk communication strategy/plan [S]
c. Personalize risk data by using anecdotes that make technical data come alive [S]
d. Understand the impact of uncertainty and risk perception on behaviours [S]
e. Create messages that fill the gap between the actual risk and population risk-perception [S]
f. Understand the institutional process in place for approval of information release [K]
g. Identify strategies to facilitate the operationalisation of ERC strategy/plan [S]
h. Identify credible sources of information [S]
i. Compare and summarize the information received [S]
j. Create scenarios on how the situation may evolve and what message to provide [S]
k. Identify mechanisms to monitor risk perceptions [S]
l. Identify mechanisms to monitor rumours [S]
m. Draft and revise messages by the use of simple language and images as needed [S]
n. Understand the psychology of ERC [K]
o. Understand what mental stress the population will be experiencing [S]
p. Identify what legal issues may influence the channels of dissemination and content of the information being released [S]
q. Identify sources of information on guidelines, plans and other type of guiding documents (e.g., infection control guidance, treatment guidelines, PPE guidelines) [S]
r. Manage and assess situational information received by trusted/reliable sources [S]
s. Apply the principles of risk communication [S]
t. Understand how to acknowledge uncertainty, anxiety, anger and fear [S]
u. Learn how to apologize to express sincerity and transparency regarding any errors or misunderstandings caused in the communication [S]

Note: K – knowledge statement; S – skills statement

Foster and maintain trust. The ability to deliver messages that foster citizens' trust in how the government handles an emergency.

Workforce groups: Health officials at the ministry level, national public health agency leaders, NFP for communication, risk communicators, civil society leadership

Competencies

1. Provide information to the public on the roles and responsibilities of the various organisations involved in the response operation; try to understand the public's perception of the emergency.
2. Identify strategies to engage with government leaders in order to integrate government priorities and community interests; address concerns that surface during the emergency response.

3. Identify communication mechanisms that are trusted by the public, partners, and community influencers.
4. Empower the public to participate in open discussions; involve the public in decisions relevant to public health threats.

Knowledge and skills

a. Understand the roles and responsibilities of various organisations (e.g. NGOs) involved in the response. [K]
b. Understand how the expectations of the public on the role of various organisations may affect communication and how such expectations can be influenced. [S]
c. Identify opportunities to educate the public on the role of the various organisations. [S]
d. Understand economic, political, social, religious and cultural barriers to emergency risk communication. [K]
e. Understand laws and regulations of the context in which emergency risk communication is implemented. [K]
f. Understand the government priority areas and how to influence them. [K]
g. Identify opportunities to contribute to discussions on responsibilities, resolutions and adequacy of the response. [S]
h. Understand the placement of emergency risk communication functions in the organisational leadership function and response cycle of public health emergency preparedness and response (PHEPR). [K]
i. Identify trusted channels of communication, messengers and influencers. [S]
j. Understand how to maximise empathy and compassion. [K]

Note: K – knowledge statement; S – skills statement

Conclusions

In order to fulfil the mission laid down in the Founding Regulations [20] and to implement the ECDC Public Health Training Strategy [21]. ECDC is developing competency-based training programmes intended to help EU Member States improve public health emergency preparedness. The first stage of this work consisted of the development of a logic model for PHEP in the EU Member States that focuses particularly on cross-border threats to health in the European context [1]. With its list of public health emergency preparedness capabilities, the logic model for PHEP in the EU Member States provides both a structure for assessing preparedness in the EU/EEA countries and a language for describing and identifying gaps in the knowledge and skills of public health and preparedness professionals.

This report advances ECDC's efforts by creating a linkage between the capabilities listed in the logic model for PHEP in the EU Member States – which apply at the system level – with competencies for individuals who work in the PHEP system, by creating a competency-based model. Starting from a review of existing competency statements in related areas and other documents, and incorporating input from 53 individuals from EU Member States and other countries who participated in a consultation process, we have identified 102 competencies and 258 knowledge and skill statements.

The competency and knowledge and skill statements in this report can form the basis for training programmes aligned with the logic model for PHEP in the EU Member States. In addition to specifying the appropriate content for this training, the reference to a common logic model can also help to standardise terminology and approaches, and contribute to better communication and coordination among Member States in future public health emergencies.

Appendix

The consultation process

Stage 1: Presentation and discussion at the joint meeting of the ECDC coordination committees for preparedness and response, communication and public health training

We presented a draft of the competencies, knowledge, and skill statements at the joint meeting of the ECDC coordination committees for preparedness and response, communication and public health training in September 2016 in Stockholm, Sweden. Seventeen representatives from 12 EU/EEA countries participated in the discussion and provided feedback on the draft.

Stage 2: Review of draft competencies, knowledge and skill statements

For the second stage we consulted with a group of practitioners with experience in emergency preparedness and response who volunteered to complete an online modified DELPHI process by the use of the platform EUSurvey, a freeware online application developed by the Commission of the European Union. Over 200 practitioners were invited to comment on one or more of the five areas, depending on their expertise and experience. No incentive was provided. Invitations to participate in the consultation process were sent out to ECDC's national focal points (NFPs) for preparedness and response, NFPs for public health training, NFPs for communication, to their alternates and the national coordinators of the ECDC's competent bodies, the European Commission's contact point for the ECDC, the WHO Regional Office for Europe, the European Programme for Intervention Epidemiology Training (EPIET), the Training Programs in Epidemiology and Public Health Interventions Network (TEPHINET), and to an internal list of ECDC experts; registered participants of the European Public Health Conference 2016, Preconference Workshop on Competencies for Strengthened Public Health System Preparedness were also invited. Additionally, invitation leaflets were distributed among participants of the 2016 European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE).

A total of 28 individuals participated in the second phase of the consultation. Each capability area was reviewed by at least seven participants, and a total of 53 questionnaires were returned. The participants included representatives from international organisations, ministries and departments of health, academia, and other organisations. Their experience and professional roles are described below. Overall, the participants worked in 10 EU Member States and 32 other countries.

The second phase of the consultation started on 15 November 2016 and was completed by 10 February 2017.

Participants in the consultation were presented with the draft lists of competencies, knowledge and skills statements and asked whether they (a) agreed, (b) agreed upon inclusion of a suggestion provided in the comments and revisions box, (c) disagreed, or (d) were not sure the statements should be included in the competency model. An opportunity for comments, revisions and suggestions was provided. Participants were also asked about the professional roles they identified as the target workforce for each group of competencies, knowledge and skills statements. Those who participated were only a fraction of those who were invited; consequently, the goal was not representativeness but rather ensuring that all relevant points were considered. Many of the participants gave extensive comments, and some key points were reiterated by multiple participants, which qualitative researchers regard as evidence of 'saturation'.

After this consultation period was finished, we reviewed the results, met to discuss areas of disagreement, addressed specific comments, and discussed the overall approach to the dissemination of the model. We then incorporated the participants' suggestions into a revised version of this technical report including the detailed competencies, knowledge, and skill statements. In some cases, the participants' comments led to changes in wording to clarify the concepts. In other cases, the participants' input led to knowledge and skills statements being combined where there was overlap, or dropped when there was substantial disagreement among participants.

Stage 3: Review of draft technical report

In the third stage of the consultation process, we sent a draft of this technical paper including the revised list of competencies, knowledge and skills statements to a small group of the original participants who were specifically engaged in the second phase and all of the ECDC national focal points for preparedness and response, and public health training for additional review. We received detailed comments from 13 individuals, and incorporated them into this report.

Organisations in which the participants worked

National and subnational governmental organisations

Belgian Federal Public Service of Health
County of San Diego Health and Human Services Agency
Cyprus Military Command
Italian Institute of Health
Italian Ministry of Health
Greek Ministry of Health
Greek General Secretariat of Health
Maryland Department of Health and Mental Hygiene
Malta Health Departments
Missouri Health Department
Norwegian Institute of Public Health
North Carolina Department of Health and Human Services
Robert Koch Institute
Texas State Health Department
US Air Force
US Air National Guard
US Agency for International Development
US Centers for Disease Control and Prevention
US Department of Health and Human Services
US Department of Homeland Security

National focal points for preparedness and response

Belgium, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Lichtenstein, Malta, Netherlands, Norway, Portugal, Spain, Sweden, United Kingdom

National focal points for public health training

Denmark, Estonia, Finland, France, Germany, Ireland, Italy, Netherlands, Norway, United Kingdom

International organisations

World Health Organization (WHO)
European Centre for Disease Control (ECDC)
European Food Safety Authority (EFSA)
European Public Health Association (EUPHA)

Other organisations

European University Cyprus
Netherlands Institute of Health Services Research
Oslo University Hospital
RAND Corporation
Saint Louis University
University of Turin
US National Academy of Sciences
Several US hospitals

Participants' professional areas of expertise

- Medical and scientific competencies (acute and emergency medicine, critical care, military health, epidemiology, veterinary, laboratory analysis, neurosciences, nursing)
- Surveillance and prevention (social media monitoring before and during emergencies, infectious diseases surveillance, prevention, and control, outbreaks assessment)
- Crisis and incident management (coordination between organisations and health offices)
- Communication (campaigning, risk and emergency communications to healthcare professionals, journalists, media, ministers and top officials in health and public health)
- Preparedness (bioterrorism, development and evaluation of preparedness plans, guidelines, exercises and training)
- Health policy and law (institutional advising and consulting, policy planning and development of regulations)

Participants' background in emergency response

Participants in the consulting process have first-hand experiences with the following diseases, emergencies and outbreaks:

Anthrax attacks, Bastrop wildfires, BSE, Ebola, food- and waterborne zoonoses, A(H1N1), hurricanes and weather emergencies, meningitis, ricin poisonings, SARS, STEC outbreak (*E. coli* O104:H4), Texas fertilizer plant explosion, Utøya shootings, water and IT system supply failures in a Norwegian hospital, West Nile virus, Zika virus.

Countries where participants have worked as experts

EU/EEA: Belgium, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Liechtenstein, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, United Kingdom.

Other countries and regions: Armenia, Cambodia, Canada, Chile, China, Cyprus, Democratic Republic of Congo, Georgia, Honduras, India, Indonesia, Jamaica, Jordan, Laos, Liberia, Moldova, Nepal, Niger, Oman, Thailand, Philippines, Trinidad and Tobago, Tunisia, Turkey, Pakistan, Senegal, Sudan, Qatar, United States of America, Vietnam, Western Pacific (Oceania), and Zimbabwe.

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European Centre for Disease Prevention and Control (ECDC)

Postal address:
Granits väg 8, SE-171 65 Solna, Sweden

Visiting address:
Tomtebodavägen 11A, SE-171 65 Solna, Sweden

Tel. +46 858601000
Fax +46 858601001
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