

# Framework for a Public Health Emergency Operations Centre

November 2015



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Recognition is also given to authors of materials that were included in the systematic reviews conducted through EOC-NET. List of references are made available on the WHO website:

[http://www.who.int/ihr/eoc\\_net/en/index7.html](http://www.who.int/ihr/eoc_net/en/index7.html)

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## Use of the document

The *Framework for a public health emergency operations centre* (PHEOC framework) document is intended to be used by practitioners of public health; health policy makers; and authorities and agencies responsible for managing emergencies, incidents, or events where the health of populations is at risk. This document provides high-level methodical guidance for designing, developing, and strengthening of public health emergency operations centres.



## Executive summary

An emergency operations centre (EOC) is a physical location for the coordination of information and resources to support incident management activities. Such a centre may be a temporary facility, or may be established in a permanent location.

This document outlines the key concepts and essential requirements for developing and managing a public health emergency operations centre (PHEOC). It provides an outline for developing and managing a PHEOC in order to achieve a goal-oriented response to public health emergencies and unity of effort among response agencies.

### Concept of the PHEOC

A PHEOC integrates traditional public health services into an emergency management model. It supports and is a component of existing national disaster management authorities or entities.

The PHEOC, as a public health oriented EOC, must be part of a comprehensive programme of public health emergency preparedness, planning and capacity building. Such a programme includes, but is not limited to:

1. Prevention and mitigation of hazards<sup>1</sup>
2. Enhancing readiness by planning for and stockpiling response resources
3. Establishing related institutional and technical capacities and capabilities (e.g. laboratories, community clinics, and rapid response teams)
4. Implementing public health surveillance programmes
5. Enhancing environmental health programmes
6. Engaging communities
7. Training staff and validating plans.

### Planning and development of a PHEOC

#### a. Legal authority

To establish a PHEOC, a Member State should develop legislation or an executive directive for the health ministry or public health agency to establish and manage a PHEOC. This mandate will outline the public health agency's roles and responsibilities, its coordination mechanisms with national disaster management resources, and a funding mechanism for the operations of the PHEOC.

The agency/organization responsible for the PHEOC should establish a policy group to provide policy guidance. The policy group should include heads of involved organizations, subject matter experts (including legal counsel and an ethics advisor), government officials, and other executive officers and professionals tasked to provide strategic level leadership.

#### b. Establishing a steering committee

A steering committee should be established for the planning process when developing a new EOC or enhancing an existing one. Such a committee's role is to conduct risk and capacity assessments leading

<sup>1</sup> This should involve other relevant sectors when the hazard has a multi-sectoral impact, e.g. when zoonoses or nuclear threats are involved.



to decisions on the scope and operational structure of the PHEOC, as well as the broader public health emergency management model. The committee must develop clear objectives for the PHEOC to enable effective decision-making and efficient management of resources.

### **c. Emergency response plan**

Larger scale and multi-sectoral public health emergencies require capacities and capabilities not normally found in a health ministry, and which may not be available in the health sector. The responsible health authority may need to work with the national disaster management organization and other agencies, including international organizations, to access those capabilities through an emergency response plan (ERP). The ERP clarifies the roles and responsibilities of involved departments and agencies, and resources that may be utilized, as well as providing a clear authority structure. The ERP will cover periods before, during and immediately following a public health emergency.

### **d. Concept of operations (CONOPS)**

The concept of operations, or CONOPS, describes how and when to engage different branches and levels of government as well as other partners (including international agencies) in the incident management system (IMS). It defines the intended operation of the entire emergency response system and describes:

1. The responsibilities of designated organizations at strategic, operational and tactical levels
2. The structure and organization of the overall response
3. Grading of the event to determine the necessary levels of response
4. The nature of escalating levels of response
5. How the components of the response work together.

The CONOPS is key to detailing how multi-sectoral and transnational coordination will work at the strategic, operational and tactical levels.

## **Incident management system (IMS)**

Applying a common organizational model or framework to all levels of emergency management responsibility within a jurisdiction, from national government to front-line emergency response services, is highly beneficial. In many parts of the world, the incident management system is becoming standard practice.

Within the necessary framework, five essential functions are typically established, with the flexibility to adapt to different incidents, agencies, and jurisdictions. These essential functions are:

1. Management
2. Operations
3. Planning
4. Logistics
5. Finance and administration.

## Core components of a PHEOC

The essential functions of a PHEOC rely on the following core components:

**Plans and procedures:** These include an ERP for the health sector (which includes the intended operation of the IMS and PHEOC), an EOC facility plan and a plan for continuity of operations.

**Physical infrastructure:** the EOC facility can either be purpose-built or housed in a multi-purpose space. It should be physically and environmentally secure, accessible and survivable in any emergency, and with adequate space for its staff. It must contain both open common areas and closed work spaces. A business continuity plan, or continuity of operations plan, should be developed and practiced.

**Information and communication technology (ICT) infrastructure:** ICT enables internal and external telecommunications and all aspects of information management required to carry out the daily operations of an EOC. Telecommunications systems, including but not limited to mobile and satellite telephony with short messaging functionality and high frequency amateur or professional radio capabilities, are necessary to support real-time communications. In addition, workstation computers are required, with connections to a local area network with internet and electronic mail capabilities.

**Information systems and data standards:** The goal of an effective EOC information system is to increase the availability, accessibility, quality, timeliness, and usefulness of emergency operations data. An information system must support all the functions of the EOC and should respect the principles of data security, privacy, and confidentiality.

**Human resources:** successful operation of a PHEOC requires competent, trained staff. A roster should be maintained for each position within the EOC. The roster should have sufficient numbers to maintain PHEOC operations around the clock.

## Training and exercises

The function and staffing of the EOC should be assessed through an ongoing series of training and exercises. This allows for the development and maintenance of critical skill sets, and continuous improvement of the EOC's function based on evaluations through exercises. Exercises should include both internal exercises and those carried out with response partners.

## Monitoring and evaluation

To improve the quality and efficiency of a PHEOC, monitoring and evaluation should be embedded in its plans and activities. All exercises and live activations should be followed by an evaluation (often called an 'after action review'), providing actionable recommendations, identifying areas for improvement and, where necessary, implementing corrective actions.

## Costing, funding and sustaining a PHEOC

EOC development requires financial planning through known fixed and recurring cost categories. The costing of the EOC should include all the above-mentioned aspects of EOC planning and implementation. The fixed cost categories include but are not limited to costs for physical infrastructure, ICT investments and EOC staffing. Recurring cost categories include but are not limited to meetings, consultant fees, training, equipment, materials, travel and transport, and surge staff costs.

## Checklist for planning and implementing a PHEOC

The framework includes a high-level checklist of actions and requirements necessary for the implementation and enhancement of a PHEOC.

## Abbreviations

AFRO	WHO regional office for Africa
AMRO	WHO regional office for the Americas
CONOPS	Concept of operations
CTI	Information communication technology and infrastructure
EM	Emergency management
EMRO	WHO regional office for the Eastern Mediterranean
EOC	Emergency operations centre
EOC-NET	The public health emergency operations centre network
ERP	Emergency response plan
EURO	WHO regional office for Europe
GIS	Geographic information system
HVAC	Heating, ventilation and air conditioning
ICCS	Integrated communications control system
ICT	Information and communication technology
ID	Identification
IHR	International Health Regulations
IMS	Incident management system
IT	Information technology
IVMS	Integrated video management system
JIC	Joint information centre
LAN	Local area network
MDSS	Minimum datasets and standards
MOH/MoH	Ministry of health
PABX	Private automatic branch exchange
P&P	Plans and procedures
PHEOC	Public health emergency operations centre
PSTN	Public switched telephone network
RFID	Radio frequency identification
SDN	Software-defined networks
SEARO	WHO regional office for South-East Asia
SOP	Standard operating procedure
T&E	Training and exercises
TTX	Table-top exercise
VoIP	Voice/video over internet protocol
VPN	Virtual private networks
WHO	World Health Organization
WPRO	WHO regional office for the Western Pacific

# 1. Introduction

An emergency operations centre (EOC) is a physical location or virtual space in which designated emergency management functions are performed, supported by appropriate legislation and regulations, and designed and resourced with sustainability in mind. EOCs play a vital role in the coordination of information and resources for efficient and effective responses. Such an operations centre may be a temporary facility or may be established in a permanent location.

In 2012, WHO established the Public Health Emergency Operations Centre Network (EOC-NET) in order to identify and promote best practices and standards for public health emergency operations centres (PHEOCs), and to provide support to PHEOC capacity building in Member States for effective response to public health emergencies.

A series of research projects and expert consultations conducted through EOC-NET indicate that there is a lack of guidance and standards for developing and managing a PHEOC for effective response to public health emergencies. Accordingly, in order to develop evidence-based recommendations, WHO conducted a series of activities through EOC-NET for the production of relevant PHEOC guidance documents.

This document outlines the key concepts and essential requirements for developing and managing a public health EOC (PHEOC). The overall approach is generic and based on widely acknowledged elements of all-hazards emergency management. It provides an outline for developing and managing a PHEOC to achieve a goal-oriented response to public health emergencies and unity of effort among response agencies. The document will be revised as necessary. Practical guidance on specific aspects of the PHEOC framework will be developed and published separately.

A public health emergency is here defined as an occurrence, or imminent threat, of an illness or health condition that poses a substantial risk of a significant number of human fatalities, injuries or permanent or long-term disability. Public health emergencies can result from a wide range of hazards and complex emergencies. Experience has shown that timely implementation of an EOC provides an essential platform for the effective management of public health emergencies.

Public health emergencies involve increased incidence of illness, injury and/or death and require special measures to address increased morbidity, mortality and interruption of essential health services. For such emergencies, a multi-agency, multi-jurisdictional response is often required, working with the national disaster management organization. When normal resources and capacities are exceeded, support from outside the affected areas will also be required. External assistance could include national, cross-border, regional or international resources.

In this document, the words "incident", "event" and "emergency" are used interchangeably.

A glossary of terms and abbreviations used in this document is attached in Annex 1.

## 2. About the PHEOC framework

The framework for a Public Health Emergency Operations Centre (PHEOC framework) provides high-level guidance for establishing or strengthening a functional PHEOC. This document is a result of expert consultations [4, 5] and systematic reviews of literature, existing standards of practice, and EOC information systems and related applications. Five systematic reviews have been led by WHO and conducted through EOC-NET since 2012, covering the following topics:

1. Public health emergency operations centres [2]
2. Related plans and procedures [3]
3. Related training and exercises [3]
4. Related communications and technology infrastructure [3]
5. Related minimum datasets and standards [3].

From 29 September to 1 October 2015 WHO's Regional Office for South-East Asia held a regional workshop on strengthening and networking of public health emergency operation centres. At this workshop, participants specifically reviewed the checklist of the first draft of the PHEOC framework document and provided valuable feedback on the relevance, usefulness and further revision of the checklist.

### 3. Concept of the PHEOC

The PHEOC is part of a public health emergency management programme of risk analysis, preparedness, response and recovery. The programme includes but is not limited to:

1. Prevention and mitigation of hazards<sup>3</sup>
2. Enhancing readiness by stockpiling response resources
3. Establishing related institutional and technical capacities and capabilities (e.g. laboratories, community clinics, and rapid response teams)
4. Implementing public health surveillance programmes
5. Enhancing environmental health programmes
6. Engaging communities
7. Training staff and validating plans.

A PHEOC integrates traditional public health services and other functions into an emergency management model, recognizing that public health threats and consequences require coordinated responses. The PHEOC is a component of the network of EOCs under existing national or subnational disaster management authorities or entities. See Annex 2 for an example.

To function properly, the PHEOC must have appropriate plans and procedures in place, reliable and effective information systems, and well-trained staff; and it must be regularly exercised.

Such an operations centre may be a temporary facility or may be established in a permanent location.

EOCs may also be referred to as 'situation rooms,' 'operations centres,' 'command centres,' 'coordination centres,' and other similar terms. In this document, the term 'emergency operations centre' or 'EOC' refers to permanent emergency coordination centres at national, sub-national, provincial, regional and international levels.

The International Health Regulations (IHR 2005) require that States Parties develop, strengthen and maintain their capacity to respond promptly and effectively to public health risks and public health emergencies. A functional PHEOC is an important component of meeting these requirements.

<sup>3</sup> This should involve other relevant sectors when the hazard has a multi-sectoral impact, e.g. when zoonoses or nuclear threats are involved.

## 4. PHEOC planning guidance

A well-designed plan is a prerequisite for the development of an EOC. Developing an EOC is a process that evolves over time. The essential steps to this process are:

1. Establishing legal authority and planning guidance
2. Forming an effective steering committee
3. Developing main objectives
4. Defining essential functions of the PHEOC
5. Developing the core components of the EOC
6. Training and exercises
7. Monitoring and evaluation
8. Costing, funding and sustaining a PHEOC.

### 4.1. Legal authority

Legal authority provided by legislation or a government directive is required for any entity (public health department, ministry or agency) to manage public health emergencies, and is an essential component of a national emergency management framework. Such authority allows an entity to oversee the health emergency management programme and the planning and implementing of a PHEOC; coordinate response policy; access national disaster management resources; and obtain the funding necessary to respond to public health emergencies. This legal authority should outline the public health agency's roles and responsibilities, its coordination mechanism with national and international disaster management resources, and a funding mechanism for the operations of a PHEOC.

#### 4.1.1 Policy group

The agency/organization responsible for the PHEOC will establish a policy group to provide policy guidance to the PHEOC. The policy group includes heads of involved organizations, subject matter experts (including legal counsel and an ethics advisor), government officials and other executive officers, and professionals tasked with providing strategic level leadership.

The policy group provides high-level policy and technical guidance on overall management of the emergency, and facilitates inter-agency and inter-jurisdictional coordination. It is also responsible for endorsing requests for external resources and assistance, and initiating requests for assistance from more senior levels of government, donors, or international aid. For example: a request for human and material resources beyond those available within the response agency or jurisdiction would, where no other superseding mutual aid arrangement had been made with nearby agencies, be processed through the policy group. The policy group may delegate these responsibilities to the PHEOC.

#### 4.1.2 Steering committee

A steering committee should be formed for the planning and development of the PHEOC, with membership usually comprised of key PHEOC stakeholders and users.

Throughout the planning process, the steering committee should follow incident management principles (see Fig 2). The committee conducts risk and capacity assessments, leading to decisions on the scope and operational structure of the PHEOC as well as the broader public health emergency management model. This activity covers, among other things:

1. Prevention and mitigation strategies
2. Preparedness activities
3. Planning for continuity of operations.

The steering committee determines the size, type and scope of the intended PHEOC; develops its principle objectives, essential functions and operational structure; defines how processes will be managed; ensures that core components are in place; develops monitoring and evaluation plans; and develops a costing and budgeting plan for implementing the PHEOC.

The size, type and scope of the PHEOC varies with the magnitude and impact of the event to which it is intended to respond, the scope of the management activities that may occur within it, and the amount of collaboration required with response partners.

## 4.2 Planning

The planning process is driven by an analysis of the hazards, vulnerabilities and consequent risks to which the PHEOC may be required to respond. In addition, it requires an assessment of baseline response capacity. Optimally, there would be a comprehensive risk management programme that recognizes all hazards, is integrated with national and other incident management systems, and involves all relevant agencies.

### 4.2.1 Emergency response plan (ERP)

Larger scale and multi-sectoral public health emergencies require capacities and capabilities not normally found in a health ministry, and which may not be available in the health sector at all. The responsible health authority must therefore work with the national disaster management organizations and other agencies, including international organizations where necessary, to access those capabilities through an emergency response plan (ERP). The ERP clarifies the roles and responsibilities of involved departments and agencies, and the resources that may be utilized, as well as a providing a clear authority structure. The ERP will cover periods before, during and immediately following a public health emergency. It should also clarify the health authority's responsibility for providing technical assistance and guidance in managing the health-related consequences of a broader range of emergencies. The components of an ERP are shown in Fig. 1.

#### Figure 1: Components of an emergency response plan (ERP)

The ERP lays out the concept of operations (CONOPS), and includes:

- Responsibilities of the incident management functional sections
- Procedures for requesting, receiving and coordinating support from partners, and for coordination with other sectors
- Physical and technological aspects of the PHEOC
- PHEOC Staffing and standard operating procedures (SOPs)
- Incident evaluation and categorization or grading
- PHEOC activation and scaling thresholds and processes
- Situation report (SITREP) preparation protocols
- Vertical and horizontal internal communication processes for any event
- Continuity of operations or business continuity plan to be followed if the operations of the PHEOC are interrupted. The ERP plan may include hazard-specific and functional annexes.



### 4.2.2 Concept of operations (CONOPS)

The CONOPS defines the intended operation of the entire emergency response system and describes:

1. The responsibilities of designated organizations at strategic, operational and tactical levels
2. The structure and organization of the overall response
3. Grading of the event to determine necessary levels of response
4. The nature of escalating levels of response
5. How the components of the response work together.

While there are many common elements to different concepts of operations, a CONOPS is unique to a jurisdiction, reflecting its legal, operational and infrastructural mandates and constraints. It also describes how and when to engage different branches and levels of government as well as other partners (including international agencies) in the incident management system. The CONOPS is key to detailing how multi-sectoral and transnational coordination will work at the strategic, operational and tactical levels.

A sample CONOPS is provided in **Annex 2**.

## 5. Management of public health emergencies

All emergencies and their management occur in a particular context, which can be affected by factors including:

- Magnitude, location and impact of the event
- Availability of human and material resources to address it
- Legal and policy environments and mandates
- Strengths and limitations of emergency response and management agencies
- Degrees of resilience in individuals, social systems and health service agencies
- Other factors that contribute to the uniqueness of each situation.

The scope of necessary management activities and the required amount of collaboration with response partners vary across different contexts.

### 5.1 Important planning and operational considerations

There are known points of failure in managing emergencies; but these can be minimized through awareness, appropriate planning, and attention to management processes.

Lack of clarity regarding authority and responsibility can result in flawed or delayed decision-making.

Technical communications failures within the response organization can result in delayed decisions and untimely action, including the inability to produce a common operational picture and shared situational awareness.

Lack of coordination between partners causes inefficient use of resources, avoidable duplication and/or gaps leading to a less-than-optimal response.

Absence or poor use of specialized resources or response assets, including insufficiencies of surge staff, can lead to undesirable outcomes. Public health emergencies often require deployment of significant numbers of specialized personnel, use of large volumes of material, and access to scarce scientific and technical resources.

Absence of capacity or capability, misuse of resources, and poor management of media relations and public communications opportunities can all result in ineffective public health outcomes.

See Fig. 2 for important principles to support the planning process when developing and operating an EOC.

Management of public health emergencies comprises a range of activities, from direct response at local or field level to high-level policy and logistical coordination by a national government or international agency. These differences in focus distinguish tactical operations from strategic operations to protect public health and safety; maintain or restore essential services; provide emergency relief; and mitigate event-associated risk. During public health emergencies, routine public health functions are augmented, not replaced, by emergency management activities.

### Figure 2: Incident management principles

The ERP lays out the concept of operations (CONOPS), and includes:

- **An all-hazards approach**—i.e. incident management processes and structures, with clear decision making processes, supported by hazard-specific response plans developed in response to a comprehensive risk assessment
- **Modular, scalable or adaptable management structures** that can be expanded or contracted (scaled) to deal with changes in the scope and context of the emergency
- **Support for joint involvement of multiple jurisdictions, sectors, and organizations** in making and implementing joint management decisions (unified management)
- **Clear lines of accountability**, with all personnel in work units of no greater than seven people reporting to only one supervisor, even if working within a matrix of teams within the EOC
- **Clearly defined roles and responsibilities** for staff that are consistent with their established competencies and supported by specific training in EOC functions and operations
- **Clearly articulated authorities, threat thresholds and procedures** for activation, escalation, and deactivation of emergency operations
- **Clearly articulated policies and procedures** for communication between international, national, subnational and local EOCs or event management entities
- **Common terminology, functions and technology** at all levels of the response structure to support interoperability
- **Capacity for integration or involvement with partner and stakeholder agencies including international partners** through joint (unified) management or active liaison
- **Sufficient capacity to manage public communications opportunities**, including through traditional and social media, in culturally suitable ways, to support effective risk communication, social mobilisation and community engagement.

## 5.2 Elements of an emergency management programme

A comprehensive emergency management programme has five commonly recognized elements:

1. **Risk assessment** includes hazard identification, vulnerability or threat assessment, risk estimation and surveillance and monitoring of potential or evolving threats.

2. **Prevention and mitigation** involves the treatment of identified risks so as to prevent them or introduce measures to reduce their impact. It may include disease detection and outbreak prevention and control, vaccination of populations, food and water safety, environmental protection programmes, community education, and social mobilisation.
3. **Preparedness** involves assessment of capacities and capabilities, development of plans, development and maintenance of infrastructure, maintenance of stockpiles, design and implementation of procedures, and training of personnel. It also includes technical capacity building, planning, and training and exercising.
4. **Response** involves utilizing preparedness resources, undertaking activities to react to an event, and managing the event proactively. Response activities may include the situation assessment, mobilisation of treatment and prevention resources, enhanced surveillance, contact tracing, and environmental health intervention and monitoring.
5. **Recovery** refers to the restoration of damaged infrastructure and resources, restoration of routine surveillance and monitoring activities and licensed health facilities, restoration of community infrastructure and resilience, evaluation of response outcomes, conduct of an after action review, and implementation of an action plan to mitigate risks and improve future responses.

Response to public health emergencies requires management processes and structures that support the following:

- Confident and competent decision making and operational execution
- Reliable and rapid processing of data and information into action plans
- Rapid deployment of resources
- Effective human and financial resourcing and accountability.

These capabilities are central to an effective EOC, and are created and maintained through the selection and training of knowledgeable staff as well as coordination with other relevant sectors (e.g. veterinary services for zoonotic diseases).

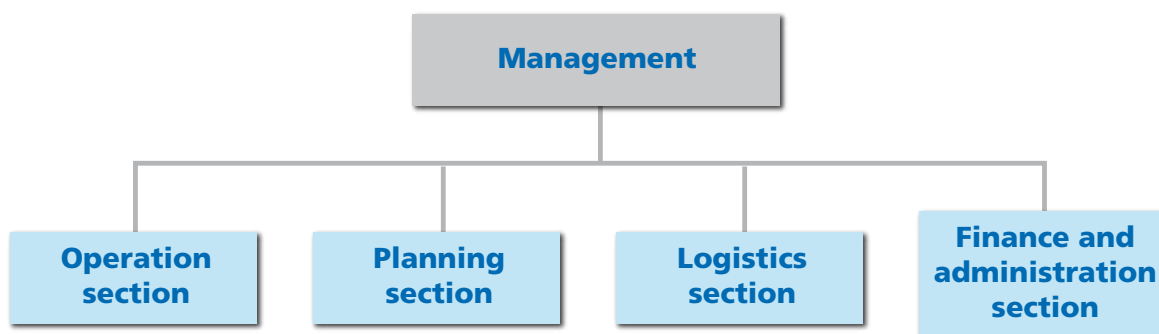
Applying a common organizational model or framework to all levels of emergency management responsibility within a jurisdiction, from national government to front-line emergency response services, is highly beneficial. In many parts of the world, the incident management system (IMS) is becoming standard practice, and is the model on which this framework is based.

### 5.3 Incident management system (IMS)

The IMS is a common organizational model for all hazards and emergencies. EOCs play a vital role in the IMS, as they are focal points or hubs for the coordination of information and resources to support incident management activities. Within an IMS, five functions are typically established:

1. Management
2. Planning
3. Operations
4. Logistics
5. Finance and administration (see Fig. 3).

The management function is an executive, strategic, operational, command and coordination function that involves making decisions and coordinating risk communication.

Figure 3: **IMS Model**

The planning section is responsible for evaluation of the situation (information gathering and analysis), assessment of the options for dealing with it, and keeping track of resources.

The operations section deals with supporting tactical application of resources.

The logistics section deals with acquiring and deploying resources.

The financial and administrative section tracks expenditure, makes payments, and provides administrative services.

This five-function IMS model is flexible and can be adapted to individual events, agencies and jurisdictions, whether local, regional, or national, according to needs and available resources.

## 5.4 Event or hazard-specific response and management plans

Event or hazard-specific plans are best built on an all-hazards basis, recognizing both the commonalities in responses to different kinds of emergencies and the differences in context-dependent response requirements. For example: some public health emergencies require rapid deployment of personal protective equipment (PPE) for responders, or pharmaceuticals for treatment and prophylaxis. The exact type of equipment and pharmaceuticals depends on the specific contaminant or pathogen causing the emergency.

Event or hazard-specific plans often provide details about particular required processes and resources. These may include the following:

- Threat or occurrence thresholds that trigger alerts and escalating levels of emergency response (event and response grading)
- Technical and scientific capacities that need to be engaged (laboratories, subject matter experts)
- Data collection and processing requirements
- Risk communication messaging, public warning, community engagement, and inter-agency communication processes
- Decision approval processes
- Legal and ethical issues
- Cultural sensitivities
- Material acquisition and deployment processes

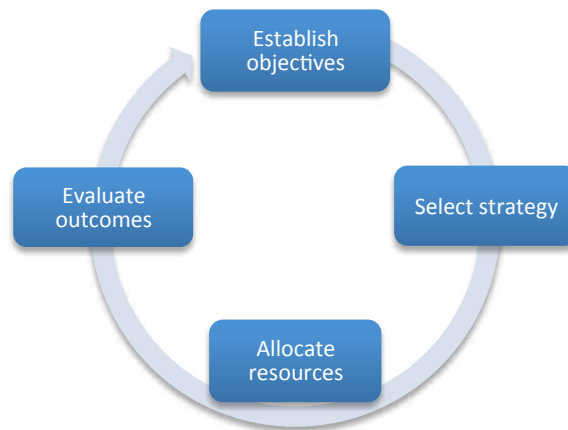
- Key partners to engage
- Special (as opposed to standard) operating procedures.

Pre-established and tested risk and crisis communication messages and distribution plans are a vital part of a hazard-specific plan and must be coherent with other sectors. They enlist the cooperation of key target audiences and mobilise the public to participate in mitigating the impact of an event.

Transitioning from reactive response to proactive situation management and resolution requires management by objectives for the achievement of objectives within limited timeframes. Management by objectives involves four cyclically applied steps (See Fig. 4):

1. Within the context of agency mandate and policy, establish specific, measurable or observable objectives that are realistically achievable with available resources and within a specific time frame
2. From an evaluation of options by which to achieve the objectives, select an appropriate strategy
3. Acquire, and coordinate the use of, resources: identify tactics (activities) appropriate to the chosen strategy and allocate the appropriate resources
4. Monitor and evaluate intervention outcomes to re-initiate this cycle, to identify gaps and constraints, or to achieve the goal of resolving the situation.

Figure 4: **Proactive situation management**



## 6. Implementing a PHEOC

This part of the document provides guidance for the establishment of the PHEOC, describing some important aspects to be considered, namely:

1. Setting the objectives
2. Describing the functions of each functional team
3. Determining the structure
4. Specific roles and tasks for each functional area.

### 6.1 Objectives of a PHEOC

The objectives of any EOC (health or any other response agency) must fit its purpose. Both the outcomes and the costs of managing an event must be considered in setting the objectives. Objectives may include:

- Timely, event-specific operational decision-making using the best available information, policy, technical advice and plans
- Communication and coordination with response partners
- Collection, collation, analysis, presentation and utilization of event data and information
- Acquisition and deployment of resources, including surge capacity, services and material to support all EOC functions
- Preparation of public communications and coordination with response partners to support audience awareness, outreach and social mobilisation
- Monitoring financial commitments and providing administrative services for the PHEOC.

### 6.2 Essential functions of a PHEOC

A PHEOC will function under the guidance of a policy group (see 4.1.1) in accordance with the roles and responsibilities set out in the ERP and the incident management system. An operational structure needs to be established to reflect the essential PHEOC functions; to this end, IMS provides a useful way of thinking about and organizing the processes involved in public health emergency response and management. Within the IMS, five essential functions are typically established, with flexibility to adapt to different events, agencies, and jurisdictions.

The five essential functions of the PHEOC are:

1. **Management** – responsible for overall operation of incidents or events (including coordinating risk communication and liaison with other agencies)
2. **Operations** – at the field level, this function provides direct response to the incident or event; at higher levels, it provides coordination and technical guidance
3. **Planning** – collection of data, analysis, and planning of future actions based on the likely course of the incident and the resources available for the response

4. **Logistics** – this function acquires, tracks, stores, stages, maintains, and disposes of material resources required for the response. It also provides services in support of the response, such as health services for responders
5. **Finance and administration** – cash flow management; tracking of material and human resource costs; budget preparation and monitoring; and production and maintenance of administrative records.

These functions may be activated or deactivated as needed with the evolution of an event.

### 6.3 PHEOC operational structure

The operational structure of the PHEOC is based on the IMS and its five functional areas. These should be modular and scalable, capable of being elaborated on, expanded and adapted to particular types of emergencies, from tactical to strategic level. The amount of time and activity committed to each function, and whether external assistance is required for any function, will vary with the scale, context and type of emergency.

Responses to public health emergencies often require specific public health functions, such as preventive and curative public health interventions and services, and technical guidance. A separate branch for public health function may be established under the operations or planning sections, or attached to the management staff. The assigned location will depend on the focus and scientific and technical input.

The public health function can provide technical advice on novel risks and interventions, or research related to the event, and may cross functional boundaries. Similarly, it is not unusual for parts of the finance and administration function (e.g. procurement) to be combined with the logistics section.

Most small-scale emergencies or incidents are managed at the site of the emergency by the designated person in charge (an incident manager or commander). This person may establish a site-level command post. Most of the activities and decisions taken at the site level are for the direct management of human and material resources to address the situation; this is typically referred to as the 'tactical' level. Although the command post is not strictly speaking a PHEOC, it is part of the EOC system and should follow the EOC five-function model. Often, all of the five functions in such a scenario are carried out on-site by one person, or by a few people working as a small team. In the latter case, the team should be led by the most qualified, senior or experienced person, or by the person with legally designated leadership authority.

In larger emergencies, field-level responders may require additional resources, coordination, guidance or policy direction to support their response activities. A temporary or permanent site-support PHEOC can be activated to provide the necessary management, planning, operations, logistics, finance and administrative support. The site-support PHEOC provides operational support, policy and technical guidance to site-level command posts. It also coordinates and expedites resource requests from field site(s); undertakes strategic planning during long events; and manages off-site activities, including engaging key partners in decision processes. This level is typically referred to as the 'operational' level.

In case of a large emergency that has multi-sectoral impact, the PHEOC is linked to the national EOC under the national disaster management organization (NDMA) and the onsite local disaster management organization (DMA). In some cases an on-site EOC can serve several sectors.



## 6.4 Roles and tasks associated with the functional sections

### 6.4.1 Management staff

The management staff is responsible for:

- Overall operation of the PHEOC
- Determining coordination of response activities and partners
- Liaison with assisting agencies (i.e. those providing their own tactical resources) and cooperating agencies (those providing external support)
- Public communication
- The safety of responders
- Situation reporting to senior organizational leadership and getting direction from senior leadership
- Resource mobilization.

Complex public health emergency management requires consistency and continuity of action and effort among all partners. To that end the management section should promote:

- Understanding of the missions, mandates, capabilities and capacities of participating agencies
- Understanding of the contextual factors of an event for a common operating picture
- Creation of common outcome measures
- A common vision, goals, and objectives
- Coordination of actions.

Essential roles of the management staff include those of incident manager, PHEOC facility manager, and public communication officer. These are detailed below.

#### Incident manager

The responsible agency will appoint an Incident Manager (sometimes called a coordinator, or director) to be in charge of the management section. A public communication officer, a risk manager, a safety officer and liaison officers from cooperating agencies can be positioned to provide direct support to the incident manager. At the site level, the person responsible for the management function is often called the 'incident commander'.

#### EOC facility manager

The responsible agency will also appoint a PHEOC facility manager (as distinct from the incident manager). The facility manager is responsible for the operation and maintenance of the PHEOC, ensuring that all of its functionality, systems, hardware, software and staff support tools are well-maintained and operational when needed, and that designated personnel have access to training to support their effectiveness. A larger, permanent facility will usually have a team of technical personnel working with the PHEOC facility manager and providing management and support for information systems, telecommunications, geospatial information systems (GIS) and security.

### Public communication officer

Public communication is critical in public health emergency management. The public communication officer is responsible for:

- Interaction with a variety of audiences and media
- Advocacy (supporting risk awareness and social mobilisation)
- Developing communication products.

### 6.4.2 Planning section

The planning section is responsible for:

- Aggregating and processing data
- Developing and communicating operational information
- Predicting the probable evolution of events
- Developing objectives, strategies and action plans
- Identifying the technical expertise that is needed.

At site level, much of the planning function is concerned with the assignment of available human and material resources to achieve maximum effect. At an off-site support PHEOC, planning activities tend to be concerned with different issues, such as mapping of capacities and functionality of all health resources, and tasking and deployment of newly acquired resources in order to contain the event.

Responsibility for analysis of data during epidemiological investigations can be placed with the planning or operations sections, in order to develop operational objectives for responders and maintain situational awareness within the PHEOC.

### 6.4.3 Operations section

The operations section is responsible for using resources to respond directly to the event. At a site-support PHEOC level, the operations function is responsible for coordination and technical guidance of all response operations, and for implementing an existing or improvised response plan to support the site-level response. At site level, the operations function is all about direct response activities, such as:

- Vaccination
- Contact tracing
- Triage
- Treating and transporting sick/injured/deceased people
- Decontaminating people and premises
- Conducting disease surveillance and collecting epidemiological data
- Establishing emergency clinics and/or restoring functionality of damaged health infrastructure
- Other public health interventions
- Scaling up community outreach for health promotion and case management.

Response activities vary depending on the type, scale and impact of an event—as does the sub-structure of the operations section.

#### **6.4.4 Logistics section**

The logistics section is responsible for the acquisition, tracking, storage, staging, maintenance and disposition of the tactical and operational resources required to respond to the event. These may include:

- Facilities
- Services (telecommunications equipment, furniture, food services, security, responder support, etc.)
- Monitoring food and water supplies;
- Disposal of solid, liquid and hazardous waste;
- Support personnel (information technology, clerical staff, ground transportation, etc.)
- Equipment (computers, radios, vehicles, personal protection equipment, etc.)
- Surge personnel
- Transportation and disposal services (patient transport, destruction of contaminated materials, removal and management of deceased persons).

These services may also be provided by the operations section.

#### **6.4.5 Finance and administration section**

The finance and administration section is responsible for all financial activities and administrative tasks, which may include but are not limited to:

- Cash flow management
- Tracking of material and human resource costs
- Budget preparation and monitoring
- Production and maintenance of administrative records
- Processing of compensation claims
- Preparation of procurement contracts
- Incentive and insurance payments.

The finance and administration section chief should be routinely present and available in the PHEOC to facilitate operations. Space within the PHEOC should be provided for administrative record keepers. Additional finance and administration personnel may be located outside the PHEOC.

## 6.5 Core components of the PHEOC

Achieving the main objectives and enabling the essential functions of a PHEOC requires the following essential core components (Fig. 5):

### Figure 5: Core components of the PHEOC

- Plans and procedures
- Physical infrastructure
- Information and communication technology (ICT) infrastructure
- Information systems and data standards
- Human resources

Each of these core components is described in the following sections.

### 6.5.1 Plans and procedures

Under the ERP for the health sector, the mission of a PHEOC is to shift from reaction to a public health event to its proactive management, and ultimately to its resolution. The PHEOC provides a management location, but it is implementation of the incident management system and various associated plans and procedures that leads to accomplishment of the mission.

A PHEOC operates on the basis of three types of plans:

1. A PHEOC plan
2. Event or hazard-specific response and management plans
3. An incident action plan.

The members of the PHEOC steering committee or the health emergency risk management programme are responsible for working with their respective departments and agencies to produce and evaluate the initial set of working plans and procedures for the PHEOC. Specifically, before any public health emergency occurs, they must develop a PHEOC Plan.

#### ***The PHEOC plan***

The PHEOC plan describes the structure, functions and procedures for operating a PHEOC. It is the primary resource manual for PHEOC staff, containing necessary forms, role descriptions, CONOPS and standard operating procedures (SOPs).

The plan may include specific and functional annexes, as well as plans for continuity of operations and SOPs. Developed before a public health emergency occurs, a PHEOC plan allows more effective development and implementation of an action plan during the incident or event.

The PHEOC plan is designed to make management of the PHEOC processes routine and predictable, allowing PHEOC personnel to focus on specific or unique aspects of the emergency, improvising as required by the context of the event.

### ***Hazard-specific response and management plans***

Hazard-specific response and management plans should be based on the prioritized list of threats and hazards determined in the threat assessment process. They should take into account the regional, national and local regulations or mandates that may apply to specific threats. They may be included as Annexes to the PHEOC Plan.

### ***Incident action plans***

Based on assessment of the scale and impact of the public health emergency and the availability of resources and capacities, action plans result in a more effective response. A written or oral incident action plan describes the specific objectives that must be accomplished in succession in order to achieve larger event management goals. Incident action plans are developed within the planning section, and provide all PHEOC supervisory personnel with directions for current and future actions.

Incident action plans also form the basis for defining operational periods. Operational periods reflect the time required to achieve specific objectives identified in the action plan, and to plan in advance for required resources. The length of operational periods varies according to the needs of particular events, often from a few hours to 24 hours.

## **6.5.2 PHEOC physical infrastructure**

The PHEOC facility can either be housed in a dedicated, purpose-built space, or set up in a multi-purpose space. It must, however, be physically and environmentally secure, and accessible and survivable in the event of a threat or disaster. The PHEOC should be able to survive the most probable hazards identified through a tailored risk assessment.

In the case of potential technological and other failures, alternate options should be available, and a back-up physical location should be ready in case the primary PHEOC becomes unusable. A business continuity plan, or continuity of operations plan, should be developed and practised.

A PHEOC must be easily accessible for users, with adequate parking for private vehicles, adequate security, and reasonable proximity to designated lead and partner agencies.

### ***Facility***

The PHEOC should have adequate space for its staff, and must contain both open common areas and closed workspaces suitable for meetings, conference calls and small group activities. External venues are also necessary for media briefings, interviews, press conferences, and coordination of external partners. The facility should be of sufficient size to accommodate all its functions in reasonable comfort. It must have adequate sanitary facilities, rest areas and food amenities for the personnel who may on occasion be employed there for considerable periods.

Configuration of the space should provide both meeting areas and relatively quiet working spaces.

Cost tends to be a dominant consideration in most jurisdictions, but planners are encouraged to try to fit the costs to the structural requirements rather than the reverse.

Dedicated, purpose-built PHEOCs tend to be more common at regional, provincial and national government level, where they may often double as meeting room spaces. Most common is the dual or multi-purpose PHEOC, where the space is routinely used for some other purpose, such as training, and is converted to a PHEOC when required. This can be advantageous, since it means the space is likely to be in the location from which many of the PHEOC staff will be drawn, and the ICT equipment (see **Annex 3**) is more likely to be routinely used and maintained. Key considerations when contemplating the use of space that is routinely given to other purposes are provided below:

- It should be possible to vacate, convert and activate the space to a PHEOC in less than one hour, and this conversion should be routinely practiced.
- The location must be secure, or it must be possible to install appropriate security measures within the timeframe of the conversion to a PHEOC.
- The space/facility should meet the basic requirements of disaster survivability and access, and must be able to sustain operations during a natural disaster by virtue of robust structure, secure water and food supply and an emergency source of electricity.
- While it may be crowded, there needs to be sufficient space to accommodate the personnel and the equipment required to run it. Most PHEOCs have a mix of open and closed workspace, with much of the work being done in open areas. Some closed spaces are needed for meetings, group work activities and teleconferences.

Often health and safety standards are compromised in seldom-used PHEOCs, because the facilities are only in use for short periods of time; but it is important that form follows function. While the functions are standard, the scale of emergency events (and hence their staffing, space and technological requirements) are unknown, and need to be estimated from pre-development risk analysis in order to identify the possible or probable events with the greatest impact that will require management through the PHEOC.

### **Security**

A PHEOC processes large amounts of information that is often sensitive, frequently on open displays. The working environment is also frequently pressured and intolerant of distractions. Media conferences and photo opportunities should therefore be held off-site or be staged at a time convenient to PHEOC staff, and when sensitive information is not visible.

All electronic linkages should be encrypted and password protected, and computer networks should be protected from external threats, including network attacks, power surges and outages.

On-site provisions are required to ensure protection and security of the facility, resources and personnel from routine hazards and possible attack. These may entail measures such as closed circuit television surveillance systems, perimeter protection, and/or access/entry controls. Maintaining security of the PHEOC data and the systems that process and store it requires routine use of firewalls; encryption; password protection; up-to-date antivirus software; and redundancy of data (and, to some extent, redundancy of hardware) to support rapid service recovery in the event of a security breach.

### **Redundancy**

A PHEOC should be able to survive the probable hazards identified in a pre-development risk assessment. It is necessary to have back-up plans for technological failures within the PHEOC, and to have an alternate site for the PHEOC in circumstances that make the designated facility unusable or unsuitable.

Depending on the magnitude and impact of emergencies contemplated, it may be possible to use an alternate site that does not fully satisfy all the requirements of a PHEOC and which might therefore rely on moving some equipment, along with personnel, from the primary site (a 'warm' site). A permanent PHEOC that is continuously, or often, in use should have an alternate location that can be activated with full functionality within minutes (i.e. a 'hot site').

All PHEOCs should have practised continuity of operations or business continuity plans to address operational/ business interruptions, including a succession plan for planned or unexpected losses of key personnel.

### ***Virtual PHEOC***

A virtual PHEOC should be considered where there is a need to create more operational flexibility or a backup capacity for a physical PHEOC. A virtual PHEOC may be created to compliment the physical PHEOC, and depends on networked computers and telecommunications workstations for EOC personnel, linking them from multiple locations to a common virtual workspace.

Key considerations for the virtual PHEOC include the reliability of telecommunications and information technology infrastructure; the potential for other workplace pressures to distract personnel from the mission of the PHEOC; and the loss of the valuable face-to-face interaction that occurs in a shared physical location.

### **6.5.3 Information and communications technology infrastructure**

Daily PHEOC operations rely on a variety of information and communication technology (ICT) infrastructure. There are no set standards for equipping a PHEOC, or for the systems that should be installed. Requirements will depend on numerous factors, including but by no means limited to the type or types of incident anticipated, the geographic location, and the number of staff. PHEOC technological solutions incorporate hardware and software systems, internal and external telecommunications, and all aspects of information management, including:

- A telecommunications system or network comprising a variety of choices depending on available connectivity options. Within the PHEOC, personnel will require workstation computers with internet connections and either a mobile or a hardwired telephone.
- For remote locations, radio or satellite telephony may be the only options.
- For all levels of PHEOC, the ability to conduct teleconferences is a key capacity, which optimally includes video conferencing.
- Large screen video displays support visual representation of the status of the event and its contextual aspects that influence decision-making. In addition, media monitoring capacity (television, radio, etc.) is required. It is useful to have video recording and playback capability.
- In addition, a PHEOC is an office with all of the usual office requirements: computers, printers, copiers, document scanners, a fax machine, application hosting and data storage server(s), office supplies, forms designed to provide paper-based backups, in case of technology failure, etc.

Despite their inherent utility, the technologies that support telecommunications, data analysis, event information management and visualization of operational information are evolving rapidly and can be prone to failures. Consequently the information that the systems contain requires frequent, routine backup to mitigate the potential impact of a technological failure resulting in a loss of data. All equipment should be covered by warranty or a maintenance contract.

To the extent practicable, technologies utilized in a PHEOC should be compatible with those routinely in use in the rest of the facility and in host and partner agencies. As the needs of the PHEOC change over time and the facility matures from basic to mid-range to optimum capability, with the rapid advancements of technology it is beneficial to consult experts on hardware acquisitions, and to provide expert on-site ICT support within the PHEOC. An indicative list of systems and infrastructure requirements of a PHEOC is attached in Annex 3. Items in this list are categorised as 'basic' (i.e. the minimum requirement); 'general' (the normal requirement)' and 'optimal.'

Personnel working in the PHEOC must be trained to use and maintain its ICT tools (see also section 7 of this document, Training and exercises).

#### 6.5.4 Information systems and standards

The goal of an effective PHEOC information system is to increase the availability, accessibility, quality, timeliness, and usefulness of emergency operations information for public health action.

Such an information system should support all the functions of the PHEOC, and have the capacity to:

- Ensure data security, privacy, and confidentiality
- Ensure uninterrupted operation of systems
- Adopt data and information technology standards, to ensure interoperable PHEOC information systems that integrate seamlessly with other relevant national health information systems.

The PHEOC information system must be seamlessly integrated with other relevant national information systems. Development and improvement of a PHEOC information system should follow general approaches, principles and processes for strengthening health information systems in the country.

A PHEOC information system includes six components:

1. Resources (leadership, policies, financial and human resources, infrastructure)
2. Indicators (e.g. morbidity, mortality, environmental risks, health resources availability and readiness, vaccine coverage)
3. Data sources (e.g. common operational datasets, health facilities data, reports from subnational health management teams and coordination meetings, health workforce, human and animal surveillance, laboratories, data on stockpiles of medicines and commodities, financial data, etc.)
4. Data management (e.g. collection, storage, quality assurance, processing, compilation, analysis, and visualization of data, and geospatial information presentation)
5. A collaborative platform for information sharing
6. Information products (e.g. situation reports, 3Ws (who does what, where and when), case summary statistics, media/communication reports, financial reports, health workforce distribution reports, etc.)

#### *Principles*

Guiding principles for the developing and implementing a PHEOC include:

- Country leadership and ownership of all aspects of the information system
- The information system must respond to country needs and demands



- The information system must be built upon existing initiatives and systems
- The development and implementation of the information system must be achieved through stakeholder involvement leading to consensus
- Implementation of the PHEOC information system should be a gradual, incremental process guided by a long-term vision.

The implementation of a PHEOC information system must be phase-based:

Phase 1 is about leadership, coordination and assessment. This phase involves all key stakeholders. It clarifies the governance and coordination mechanisms of PHEOC information systems, and assesses needs, goals and objectives.

Phase 2 must articulate a clear vision for the information system, with a strategic plan for implementation (including an action plan and budget).

Phase 3 involves actual implementation of the PHEOC information system, including ICT capacities, human resources, training, etc.

A continuous evaluation and quality improvement programme must be put in place to ensure that the system is effective.

### ***Data and standards***

There are three general types of data that need to be routinely captured, processed and displayed in a PHEOC:

- **Event specific data:** what, how many, where, who, how quickly and current status (e.g. clinical and epidemiological data)
- **Event management information** organized for the functional domains in the PHEOC: human and material resources on hand, status of interventions, partner activities, resource deployments, expenditure, progress on achievement of objectives
- **Context data:** geographic information mapping, population distribution, transportation links, locations of fixed and temporary facilities, availability of clean water, climate, weather and any other significant contextual information.

Within these general types there will be varying levels of detail that should be tailored to the needs of the event and the responsible jurisdiction (see Fig 6).

Figure 6: PHEOC data/Information Types

Timely processing of data and communication of information is central to the purpose of an EOC		
Event-specific data	Event management information	Context data
<ul style="list-style-type: none"> <li>• What</li> <li>• How many</li> <li>• Where</li> <li>• Who</li> <li>• How quickly</li> <li>• Current status</li> </ul>	<ul style="list-style-type: none"> <li>• Human and material resources</li> <li>• Status of interventions and partner activities</li> <li>• Resource deployments</li> <li>• Expenditure</li> <li>• Progress in achieving objectives</li> </ul>	<ul style="list-style-type: none"> <li>• Mapping population distribution</li> <li>• Transportation links</li> <li>• Location of fixed and temporary facilities</li> <li>• Availability of clean water</li> <li>• Climate and weather</li> </ul>

Standardization and interoperability of data systems, including software applications, are crucial to the functions of PHEOC. The designing of an effective information system must be unambiguous in identifying the components and relevant interoperable standards for data exchange. Data standards for collection of PHEOC data must be adopted as part of an interoperable information system.

There is a well recognised need for structured data, in the form of standardized data elements, that allows aggregation, reporting and sharing of healthcare information—not only within a country’s public health system but also between different systems. This applies particularly to PHEOCs and other EOCs involved in public health emergency management. An example of a PHEOC dataset is provided in **Annex 4**, and a figurative representation of a minimum dataset for PHEOCs is provided in **Annex 5**.

***PHEOC software characteristics***

Potential PHEOC software applications include a variety of tools, some available pre-packaged and off-the-shelf, some proprietary, and others open source and free of charge.

General purpose EOC software addresses the component functions listed earlier in this document. In addition, health-specific PHEOC software may provide functions such as predictive analysis and modelling; health surveillance alert and warning; contingency planning; and situation analysis.

Other characteristics to consider in software or license acquisition include: optimization for mobile devices; offline mode or a disconnected client for server or cloud-based products; scalability to meet expanding requirements of the PHEOC; modularity; and a multi-language interface.

**6.5.5 Human resources**

A PHEOC requires competent and trained persons to achieve its objectives and functions successfully.

Ideally, PHEOC staff should be familiar with the structure and systems of international components of public health response. Human resource needs for maintaining and operating a PHEOC include both routine and surge staff. For example, ICT and infrastructure staff include a PHEOC facility manager, information management staff, ICT support and a GIS specialist, while the majority of response personnel assigned to a PHEOC are surge staff. A roster of competent and trained human resources must be maintained for each position.

Some positions are hazard specific and/or related to the scale of the event, such as those positions responsible for coordination of partners. Some personnel may not be assigned full-time to the PHEOC, and will be able to adjust their normal work schedule to accommodate part-time engagement. Others may be required full-time, and if the centre is required for long periods each day and over a prolonged period of time (as in a 24 hour continuous operation), it should have sufficient surge staff available to accommodate a standard shift schedule of either 12- or 8-hour shifts. This will commonly require workforce redundancy (two or three backup personnel for each position).

Staff must not be assigned to roles and responsibilities unknown to them. Their roles within the PHEOC should be aligned as closely as possible with their established skill sets, and they should receive thorough orientation in the PHEOC as well as training specific to the functions, roles, and procedures they will undertake.

PHEOC personnel, including those whose purpose is to provide staff support to the emergency response process, are required at varying levels to satisfy the following three criteria.

1. They must have relevant subject matter expertise: they must possess knowledge about the type of emergency event being managed or the management function they are performing
2. They must have the authority and responsibility to commit or access agency resources
3. They must have been trained in the functions and operations of a PHEOC.

It is normal in a PHEOC to use expedited and empowered processes, whereby those executing them have the authority to do what is required of their role. These will need to be supported by established agency structures and procedures, which may need to be suspended, delegated or accelerated for the duration of operation of the PHEOC.

All personnel recruited to the PHEOC must be committed to teamwork and emergency management work, and should be instructed to respect the fact that teamwork, collaboration and cooperation are absolute requirements. There are four ways in which personnel can learn or be assisted to engage effectively in a PHEOC:

1. Where possible and practical, involvement in developing or improving the PHEOC
2. Receiving training to develop required competencies for responsibilities within the PHEOC
3. Being oriented to and practising assigned roles in a variety of ways (exercising)
4. Evaluating the effectiveness of the EOC and plans after exercises and events.

Human resource tracking is an important task.

Depending on the staff functions, generic terms of reference should be maintained for surge staff.

## 7. Training and exercises

As mentioned in the previous section staff should not be assigned to roles and responsibilities unknown to them: PHEOC roles should be aligned as closely as possible with the established skill sets of staff, who should receive thorough orientation in the PHEOC and training specific to the functions, roles, and procedures they will undertake therein.

A PHEOC requires a tiered approach to competency development. A list of required knowledge, skills and abilities for each PHEOC essential function is provided in Annex 6. Public health response requires additional specific competencies, including applied epidemiology; biostatistics; trauma care; mental health; environmental health; communicable disease; risk communications; and bioterrorism.

The knowledge, skills and abilities necessary at a tactical level within a PHEOC require a higher level of hands-on proficiency than those necessary at a strategic level, where a broad awareness of issues may be sufficient. The function and staffing of the PHEOC should be assessed through an ongoing series of training and exercises; this allows for the development and maintenance of critical skill sets, and continuous improvement of PHEOC function based on evaluation through exercises. Exercises should include both internal exercises and external exercises carried out with health response partners, as well as with other sectors involved in emergency management.

### 7.1 Training

A training needs assessment—either at organizational/institutional level or for individuals—proceeds from assessment of the knowledge, skills and abilities (competencies) people require in order to be able to work effectively in a PHEOC, as well as of their training needs and the existing opportunities for collaboration with partners and other sectors. These needs are then compared with known or identified shortfalls to formulate training objectives. A programme of training is then designed, developed, delivered, evaluated and projected forward to the next level of training requirements as successive groups of trainees progress from basic awareness to working-level knowledge, then on to advanced competence.

Participants in a training programme will undertake pre-and-post-training evaluation to confirm that the training objectives have been addressed. For personnel assigned to work in a PHEOC there are three specific types of training requirements:

1. Training in the incident management system used in the PHEOC
2. Training in the specific function the person is expected to fulfil within the PHEOC
3. Training on emergency management aspects of the subject matter expertise that the trainee brings to the operation.

In addition, all personnel should have the ICT skills required to work in the PHEOC. Specialised training for ICT support staff, induction for PHEOC users on facility utilisation, and simulations involving use of facilities and ICT infrastructure should be planned and conducted.

There are many recognized training processes to establish the knowledge, skills and abilities required to function effectively in a PHEOC, including the following:

- Classroom-based courses leading to certification of acquired knowledge
- e-learning courses
- Participation in PHEOC planning and development of operating procedures

- Site and field assignments to provide training through experience
- Participation in exercises, peer-to-peer learning, coaching, mentoring, and team-building.

## 7.2 Exercises

Exercises are a primary training tool. There are two broad categories of exercise, each with different costs and benefits. The two categories are:

1. Discussion-based exercises, which are useful for learning and understanding plans and procedures
2. Operational exercises, which are useful for practising and evaluating response and management procedures.

The types of exercises suitable for testing, validation and training are summarised by degree of complexity in Fig. 7, and described in detail in **Annex 7**. A table showing exercise selection criteria is provided in **Annex 8**.

**Figure 7: Exercises suitable for testing, validation and training**

- Orientation
- Drill
- Tabletop
- Functional
- Games

## 8. Monitoring and evaluation

Within an activated PHEOC there is a variety of tools available to monitor the effectiveness of the operation. The standard operating procedures required within an IMS operation contain specific vertical and horizontal communications processes, the presence or absence of which provides an early indication of organizational effectiveness and efficiency.

Routine planning meetings, which usually involve all supervisors and often many others, entail discussions that lead to continuing evaluation of the effectiveness of plans and interventions.

Routine use of status boards to monitor and track achievement of objectives and status of resources enables near real-time monitoring of effectiveness and efficiency.

All exercises and live activations should be followed by an evaluation (often called an 'after action review') focussing on the effectiveness of the plans and suitability of the PHEOC. All after action reviews are based on the construction of a timeline of what happened, with key events on the timeline changing the operational context of the PHEOC. Typical evaluation questions are shown in Fig. 8.

### Figure 8: Typical evaluation questions

- What aspects of the exercise or operation met expectations or standards, and how might the plans or the facility be improved?
- What partially met expectations or standards, and what adjustments are needed to improve the plans or the facility?
- What did not meet expectations, and what corrections are necessary to the plans or the facility?
- Which capabilities were satisfactorily demonstrated by the exercise and which were not?

Usually there are two separate evaluations or reviews. The first is a 'hot debrief' immediately following termination of the exercise or activation, carried out when impressions are still fresh. A short time later (a few hours or days), there is a 'cold debrief,' which will be more structured and informed by a careful review of the outcomes. Notes taken during these sessions become part of an after-action report (AAR), which documents strengths, weaknesses and lessons identified, resulting in recommendations for specific, actionable improvements.

Large scale or prolonged activations and functional and full-scale exercises usually have a structured evaluation, often performed by an external evaluator or done jointly with partners, which results in a formal evaluation report containing recommendations for a corrective action plan. As part of a comprehensive exercise programme those recommendations should be implemented and then tested with a new exercise within the progressive exercise framework, thereby creating a continuous improvement process.

At national level and immediately subordinate subnational levels it is beneficial to have dedicated training and exercise staff to sustain this continuous improvement process.

## 9. Costing, funding and sustaining a PHEOC

A PHEOC is not a one-time investment. It is part of a programme intended to enhance and sustain institutional readiness. The costs of a PHEOC include all the aforementioned aspects of PHEOC planning and development required to achieve the minimum necessary scope and scale as determined by an assessment of anticipated needs. In addition, further consideration should be given to future enhancements that move the PHEOC towards a more optimal level as requirements change and new technological opportunities mature.

PHEOC development requires an understanding of fixed and recurring cost categories. The fixed cost categories include but are not limited to costs for acquiring and maintaining physical infrastructure and related utilities, ICT investments, and basic PHEOC staffing. Recurring variable cost categories include but are not limited to meetings, consultant fees, training, equipment, materials, travel and transport, and surge staff costs.

## 10. Checklists for planning and implementing a PHEOC

A consolidated checklist for planning and implementing a PHEOC, compiled from various sources, is provided in **Annex 9**. The checklist reflects the contents of this framework document, augmented by requirements stated in some of the published standards. It is not intended to be rigorously followed, but rather used as a guide. The sources for the referenced tools and materials, which form much of the basis for these lists of core components and capabilities, were as follows:

- Other WHO programmes
- UN Office for the Coordination of Humanitarian Affairs (UNOCHA)
- Various national and international partner institutions
- Material prepared for the WHO Consolidated Ebola Virus Disease Preparedness Checklist
- A similar more comprehensive EOC assessment tool developed by the US Centers for Disease Control and Prevention (CDC).
- Systematic reviews of PHEOCs through EOC-NET

## Annexes:

1. **Glossary of terms and definitions**
2. **Sample concept of operations (CONOPS)**
3. **PHEOC systems and infrastructure requirements**
4. **Example of a PHEOC minimum data set**
5. **Representation of minimum dataset for PHEOCs**
6. **Required knowledge, skills and abilities for essential PHEOC functions**
7. **Types of exercise**
8. **Exercise selection criteria**
9. **Checklists for planning and implementing a PHEOC**



## ANNEX 1: Glossary of terms and abbreviations

<b>Action plan</b>	Often called an <b>incident action plan</b> , this is a statement of intent that is specific to an incident or event. It details the response strategies, objectives, resources to be applied and tactical actions to be taken (see <b>plans</b> ).
<b>Activation level</b>	A level of readiness or emergency response describing an EOC's activities in response to predetermined criteria related to the severity of an incident.
<b>Administration</b>	The response management function that attends to accounting, budgeting, time- and record-keeping, payments and disbursements and procurement contracting. Commonly also identified as <b>finance and administration</b> .
<b>After action report or review (AAR)</b>	After an activation, operation or exercise has been completed, a process involving a structured facilitated discussion to review what should have happened, what actually happened, and why.
<b>All-hazards</b>	An approach to the management of the entire spectrum of emergency risks and events based on the recognition that there are common elements in the management of these risks, including in the responses to virtually all emergencies, and that by standardizing a management system to address the common elements, greater capacity is generated along with specific measures to address the unique characteristics of each event.
<b>Assisting agency</b>	An agency or organization providing personnel, services, or other resources to the agency with lead responsibility for incident management.
<b>Business continuity plan</b>	A document that describes how an organization will maintain and restore critical operational functions and services to a predetermined acceptable level in the event of an occurrence that disrupts its operational capabilities. The focus is not on the nature of the occurrence but on recovering from the damage to the organization. Often called a <b>continuity of operations plan</b> , particularly for government agencies.
<b>Capacity</b>	A combination of all the strengths, attributes and resources available within an organization, jurisdiction, society or community that can contribute to managing and reducing the level of risk and strengthening resilience. Capacity can include infrastructure and physical means, institutions, social coping abilities, or economic assets as well as human knowledge, skills and collective attributes such as social relationships, leadership and management capability.
<b>Capability</b>	Possessing the demonstrable ability to perform a particular task.
<b>Chain of command</b>	A series of command, control, executive, or management positions in hierarchical order of authority.
<b>Cold debrief, cold wash</b>	A debriefing session held after a period of time has passed following an exercise or incident, in order to discuss, with the benefit of hindsight, any observations and issues that may have been overlooked during a hot wash. See <b>hot wash</b> .
<b>Command</b>	The act of managing, directing, ordering, or controlling by virtue of explicit statutory, regulatory, or delegated authority. The common short name for 'incident command', involving making decisions, implementing plans to manage an incident, and controlling their effects.
<b>Command post</b>	A form of site-level emergency operations centre, which may be mobile and assembled as needed by the agency or agencies responding to an incident.
<b>Command and control</b>	Aspects of a management system that provide for vertical authority and accountability (a 'chain of command') and control of resources such as staff and assets.
<b>Common operating picture</b>	A single, continuously updated overview of an incident compiled throughout its life cycle from data shared between integrated systems for communication, information management, and intelligence and information sharing. A common operating picture is available to all EOC personnel, creating uniform situational awareness.
<b>Communications, technical/internal</b>	The processes, protocols and content of event management information exchanged vertically and horizontally within an incident or event management organization.

<b>Complex emergency</b>	A disaster complicated by civil violence, government instability, macroeconomic collapse, population migration, elusive political solutions, etc., in which any emergency response has to be conducted in a difficult political and security environment, potentially involving a multi-sectoral, international response that goes beyond the mandate or capacity of any single agency.
<b>Comprehensive emergency (risk) management programme</b>	A corporate or government programme that commits resources to a range of measures to implement prevention and mitigation, preparedness, response and recovery (also <b>disaster (risk) management programme</b> ). Typically, this programme includes the full range of capacities for managing risks associated with emergencies and disasters.
<b>Comprehensive (progressive) exercise programme</b>	A training and exercise programme consisting of a progression of increasingly complex exercises designed to increase understanding of, practice, and evaluate different emergency management capabilities. Five general types of exercises comprise a comprehensive programme: orientations; drills; table-top exercises (TTXs); functional exercises; and full-scale exercises.
<b>Concept of operations (CONOPS)</b>	A section or statement in an agency emergency plan or EOC plan that identifies policies, roles and responsibilities and how the structural or functional elements of the organization will work together to produce a coherent management response.
<b>Consequence management</b>	The coordination and implementation of measures and activities to alleviate the damage, loss, hardship and suffering caused by an emergency. The term intends to be distinct from crisis management—i.e. it distinguishes between dealing with the immediate emergency event (e.g. putting out the fire) and dealing with the consequential effects or aftermath of the event (e.g. treating burn victims). Some examples of consequence management in the health sector include mass casualty management; psychosocial services; communicable disease control; and environmental health measures. Consequence management also includes measures to restore essential government services, protect public health and provide emergency relief to affected governments, businesses and populations.
<b>Context</b>	As applied to emergency (risk) management, context is described by a number of factors related to the setting, circumstances and environment of risks and events. These include the cultural, social, political, legal, regulatory, financial, technological, economic, natural and competitive environment—whether local, national, regional or international—and those factors related to the governance, organizational structure, roles, accountabilities, policies, objectives, and strategies that are in place to achieve those objectives. They also include the capabilities of and relationships between the internal and external actors and stakeholders.
<b>Contingency plan</b>	A plan to deal with particular aspects of a specific threat that is different from other threats. For example: while the general management of emergencies is similar for most, and therefore efficiently addressed by a generic (all hazards) approach, the specific resources and actions that would be required to address a communicable disease outbreak are different from those used to respond to an earthquake. Each would require a different contingency plan (see <b>plans</b> ).
<b>Control</b>	The application of authority, combined with the capability to manage resources, in order to achieve defined objectives. Refers to the overall direction of the activities, agencies or individuals concerned and operates horizontally across all agencies/organisations, functions and individuals.
<b>Cooperating agency</b>	An agency supplying assistance other than direct operational or support functions or resources to the incident management effort.
<b>Coordination</b>	Management processes to ensure integration (unity) of effort. Coordination relates primarily to resources, and operates vertically (within an organisation) as a function of the authority to command, and horizontally (across organisations) as a function of the authority to control.
<b>Credentialing</b>	A process that results in authentication and verification of the certificates, licences, identity and competence of personnel, including designated incident managers, emergency responders, and professional, technical, or managerial personnel.

<b>Debrief/debriefing</b>	A critical examination of a completed operation or exercise in order to evaluate actions.
<b>Disaster</b>	A type of event which causes serious disruption to the functioning of a community or a society due to hazards interacting with conditions of vulnerability, exposure and insufficient capacity to reduce risks or cope with consequences, leading to widespread human, material, economic and environmental losses and impacts. The impact of a disaster is often widespread and can last for a long period of time. The impact may test or exceed the capacity of a community or society to cope using its own resources, and therefore may require assistance from external sources, which could include neighbouring jurisdictions, or national or international sources. Consequences may include injuries, disease and other negative effects on human physical, mental and social wellbeing, together with damage to property, loss of services and environmental degradation.
<b>Discussion-based exercise</b>	An exercise that consists of a facilitated discussion that allows players to familiarize themselves with response plans, policies and procedures, and to explore their application in specific emergency scenarios. Discussion-based exercises include seminars, workshops, table top exercises and games.
<b>Drill</b>	A limited form of operational training exercise, the purpose of which is to establish and maintain specific response behaviours and procedural skills, and evaluate how the EOC facility supports the procedures.
<b>Emergency</b>	A type of event or imminent threat that produces or has the potential to produce a range of consequences, and which requires coordinated action, usually urgent and often non-routine. Emergencies have effects that may be considered on a continuum from local emergencies with limited consequences to wide area disasters with catastrophic consequences. Incidents or events are often referred to as emergencies, with the terms used interchangeably, but not all incidents or events are emergencies.
<b>Emergency coordination centre</b>	A term used to describe a type of EOC that has no direct, tactical or operational function, but which serves as a point of control and coordination for the strategic allocation of resources and management of policy issues.
<b>Emergency (risk) management</b>	Also referred to as <b>disaster (risk) management</b> . Emergency (risk) management is the application of policies, process and actions to prevent new risks, reduce existing risks and manage residual risk. It includes the organized preparedness for and response to risk events and post-event support for recovery, rehabilitation and reconstruction of affected communities and societies.
<b>Emergency (risk) management agency or organization</b>	An organization, often a government agency, specifically mandated to provide a single point of accountability for the coordination of multi-sectoral and interagency emergency activities, including risk assessment, prevention, mitigation, preparedness, response and recovery activities within a particular area. Also called a <b>disaster (risk) management organization</b> .
<b>Emergency response plan (ERP)</b>	A document that describes how an agency or organization will manage its responses to emergencies of various types by providing a description of the objectives, policy and concept of operations for the response to an emergency; and the structure, authorities and responsibilities for a systematic, co-ordinated and effective response. In this context, emergency plans are agency- or jurisdiction-specific, and detail the resources, capacities and capabilities that the agency or organization will employ in its response (see <b>plans</b> ). Also referred to as an <b>emergency</b> or <b>operations plan</b> .
<b>Emergency operations centre (EOC)</b>	A place within which, in the context of an emergency, personnel responsible for planning, coordinating, organizing, acquiring and allocating resources and providing direction and control can focus these activities on responding to the emergency. An EOC is a generic concept, embracing a range of emergency management facilities from an on-scene incident command post at an emergency site to a national emergency coordination centre providing strategic direction and resources to multiple jurisdictions and agencies in a wide-area disaster. An EOC usually sits between these extremes and provides strategic policy, logistical and operational support to site-level responders and response agencies—see also <b>public health emergency operations centre (PHEOC)</b> .

<b>EOC plan</b>	A document that describes the structure, functions and standard operating procedures for operating an EOC. It is the primary resource manual for EOC staff, containing samples of all necessary forms, role descriptions, concepts of operations and standard operating procedures.
<b>Event</b>	An emergency incident or occurrence. 'Event' and 'incident' are often used interchangeably. An event may be insignificant or could be a significant occurrence, planned or unplanned (e.g. extreme weather event or mass gathering), that may impact the safety and security of communities. Under the <i>International Health Regulations (2005)</i> (Article 1) an event is defined as 'a manifestation of disease, or an occurrence that creates a potential for disease' (with particular reference to public health events of international concern, or PHEIC).
<b>Exercise</b>	A form of practice, training, and evaluation of capabilities involving the description or simulation of an emergency, to which a described or simulated response is made based on agency emergency plans or contingency plans, and an EOC plan. Exercises can be used for validating policies, plans, procedures, training, equipment, and inter-organizational agreements; clarifying and training personnel in roles and responsibilities; improving inter-organizational coordination and communications; identifying gaps in resources; improving individual performance and identifying opportunities for improvement; and as a controlled opportunity to practice improvisation.
<b>Full-scale exercise</b>	An operational exercise that focuses on operational capabilities by actually deploying agency resources in real time, in a simulated setting that is as realistic as possible, without putting public and staff safety at risk. Full-scale exercises are the most complex and costly form of training and evaluation.
<b>Function</b>	One of the five major activities in the incident command system (which are, respectively, command, operations, planning, logistics, and finance/administration). The term 'function' is also used when describing the activity involved (e.g. 'the planning function'). Other functions, such as intelligence/investigations, may be established if it is required in order to meet incident management needs.
<b>Functional exercise</b>	A fully simulated complex operational exercise (involving no deployment of resources) for evaluation and training, which focuses on policies, roles, responsibilities and management capabilities within an emergency response management system. A functional exercise will usually involve challenging time constraints and occur within the EOC or coordination centre, so that the available tools and technologies can be used and evaluated.
<b>Geographic Information Systems (GIS)</b>	A computerised database for the capture, storage, analysis and display of geographically defined information. An organized collection of computer hardware, software, geographical data and personnel designed efficiently to capture, store, update, manipulate, analyse and display all forms of geographically referenced information. It is first and foremost an information system with a geographical variable, which enables users easily to process, visualize and analyse data or information spatially. Also <b>geospatial information mapping</b> .
<b>Hazard</b>	A potentially damaging physical event, phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental degradation.
<b>Health communication</b>	Activities for informing, influencing, and motivating individual, institutional, and public audiences about important health issues.
<b>Health emergency</b>	A type of event or imminent threat that produces or has the potential to produce a range of health consequences, and which requires coordinated action, usually urgent and often non-routine. A health emergency may pose a substantial risk of significant morbidity or mortality in a community.
<b>Hot site</b>	An alternate EOC site that can be either fixed or mobile, and which is fully equipped for swift resumption of the delivery of critical services affected by a disruption.
<b>Hot wash/hot debrief</b>	A debriefing session held immediately after an exercise or incident to identify the strengths and weaknesses of plans, policies and procedures. See also <b>cold wash</b> .

<b>Incident</b>	An actual or imminent occurrence of a natural or human-induced event (see <b>event</b> ) that requires a response to prevent or minimize illness, loss of life or damage to property or the environment, and to reduce economic and social losses.
<b>Incident action plan</b>	An oral or written plan outlining objectives related to the strategy for managing an incident. It may include the identification of operational resources, assignments, attachments that provide direction, and important information for management of the incident during one or more operational periods. Also <b>event action plan</b> .
<b>Incident command (function)</b>	The lead managerial position in an EOC with responsibility for setting the incident objectives, strategies, and priorities, and which has overall responsibility for incident management.
<b>Incident management system (IMS)</b>	An emergency management structure and set of protocols that provides an approach to guiding government agencies, the private sector, non-governmental organizations and other actors to work in a coordinated manner primarily to respond to and mitigate the effects of all types of emergencies. The incident management system may also be utilised to support other aspects of emergency management, including preparedness and recovery. Also <b>incident command system</b> .
<b>Information and communications technology (ICT)</b>	A system of hardware, software and networks that move information, and the personnel required to design, implement and support the system.
<b>Information management</b>	A set of processes and procedures to collect, store, analyse and distribute data and information to enable EOC functions.
<b>Information system</b>	An integral set of computational components to ensure availability, accessibility, quality, timeliness and usefulness of data and information for EOC functions. The components include resources (coordination and leadership, policies, financial and human resources, infrastructure); data requirement and information needs; data sources; data management (data storage, data quality, data processing and compilation); information products; and information use.
<b>Interoperability</b>	The ability of two or more systems or components to exchange data using common standards.
<b>Joint management</b>	Commonly referred to as <b>unified management</b> or <b>unified command</b> , this is a form of EOC management where agencies with complementary jurisdictions, or mandates in an emergency, work together to share the control and direction of the EOC, with agreement that one manager will take the lead for the duration of the emergency event or for an agreed operational period.
<b>Jurisdiction</b>	An organization (level of government or designated agency) with the authority and responsibility to provide particular functions and services within a defined area.
<b>Lead agency</b>	Agency or sector responsible for managing specific types of emergencies.
<b>Leadership</b>	The process of engaging others and fostering constructive processes for working together, and sustaining collaborative interaction to guide activities and achieve objectives.
<b>Lessons learned</b>	Identified issues for which remedial actions may be implemented, in order to improve performance.
<b>Liaison</b>	A process of linking and coordinating joint planning and efforts of agencies that are external to the jurisdiction responsible for the emergency response. Such agencies may have either a policy or an operational interest in the response and may participate through a liaison officer either by <b>assisting</b> in the response (assigning tactical resources to the event) or <b>cooperating</b> (providing external support). Liaison officers are considered part of the command/management staff and report to the incident manager/incident commander.
<b>Location</b>	A field or site-level EOC (command post) commonly located near to where tactical operations (direct application of resources) need to occur. The facility will often be the responders' normal office or field workspace, or may be a mobile unit that moves to new sites as needed. For many public health emergencies it is best located near the geographical perimeter of the event, with good transportation access, rather than in the middle.

<b>Logistics</b>	The aspect of emergency (risk) management that deals with the procurement, distribution, maintenance, replacement and repatriation of material and human resources, including the provision of support infrastructure and services to response staff.
<b>Management by objectives</b>	A management approach that entails: establishing overall incident objectives; developing strategies based on the objectives; developing and assigning appropriate resources; establishing specific, measurable results or tasks for various incident response activities; directing efforts to achieve the results; and evaluating results to measure achievement and facilitate corrective action.
<b>Minimum dataset</b>	A set of data elements developed and used for essential EOC functions. The EOC minimum dataset consists of: domains; associated indicators (data and information needs); definitions for each indicator to provide standardization; possible sources of data for each indicator; a rationale for why each indicator is important; and additional supporting information.
<b>Mitigation</b>	Activities designed to reduce or limit risks to persons or property or to lessen the actual or potential effects or consequences of an incident. Mitigation measures may be implemented prior to, during or after an incident. Mitigation involves ongoing actions to reduce hazards and vulnerability and exposure to hazards, and to increase capacities.
<b>Mobile command post</b>	A vehicle, employed by response agencies, designed and equipped to support tactical level coordination and control of personnel and agencies involved in responding to an emergency at field or site level.
<b>Modularity</b>	An organizational characteristic where components are standardized to support flexibility in building or adjusting the organization to address changing requirements.
<b>Objectives</b>	Results or outcomes of specific activities to be achieved over a stated time. Objectives are specific, measurable, and realistic statements of intention.
<b>Off-site EOC</b>	Established to support responses to larger, often multi-site emergencies that entail a more complex set of considerations. Proximity to decision-makers, partners, stakeholders, donors and humanitarian agencies is a significant consideration for establishment of such an EOC. Commonly, it will reside within the normal office infrastructure of a responsible agency. To the greatest extent possible, if the EOC is providing multi-site area coordination, it is best located separately from the incident.
<b>Operational period</b>	The time required to achieve a particular set of objectives.
<b>Operations</b> (EOC function)	The function that establishes tactics and directs operational resources to achieve incident response objectives.
<b>Operations-based exercises</b>	Exercises characterized by fully simulated or actual responses with use of equipment and resources and commitment of personnel. Operations-based exercises are used to validate capabilities, plans, policies, agreements and procedures. They include drills, functional exercises and full-scale exercises.
<b>Orientation</b>	A discussion-based process that is the simplest form of training and evaluation exercise, designed to acquaint users of an emergency plan or emergency management facility with the features of the plan or facility and how they should be used. An orientation uses low levels of simulation to focus on issues of coordination and assignment of responsibilities.
<b>Personal protective equipment (PPE)</b>	Protective clothing (gowns, gloves, boots etc.) and equipment (masks, shields, respirators, earplugs etc.) necessary to shield or isolate a person from biological, chemical, physical, sonic and thermal exposure.
<b>Public health emergency operations centre (EOC) (PHEOC)</b>	An emergency operations centre specializing in the command, control and coordination requirements of responding to emergencies involving health consequences and threats to public health.
<b>Plans</b>	Generic reference to documents designed to identify, at various levels, responsibility for a range of activities and intended objectives, strategies and tactics. The purpose of plans is to maximize effectiveness and minimize response time to events, and to standardize routine activities associated with response and management so that additional capacities can be focused on addressing the unique characteristics of each event. Plans are specific to their intended users. See also <b>contingency plan</b> , <b>EOC plan</b> and <b>support plan</b> .

<b>Planning (EOC function)</b>	In an EOC, the planning function is responsible for collecting, processing, analysing and evaluating information to predict the evolution of the emergency, and identifying strategies and objectives for addressing it. This function is also responsible for the preparation and dissemination of status reports and documentation of the incident response. Generally, planning is comprised of the intellectual and interpersonal processes of designing, developing, testing and evolving activities necessary to achieve objectives. An inclusive, comprehensive planning process usually results in the value of the product (the plan) being less important than the value of the planning process, which builds on the synergy of bringing together people and agencies with common interests to analyse and solve problems cooperatively.
<b>Preparedness</b>	The knowledge and capacities of governments, response and recovery agencies, communities and individuals that allow them effectively to anticipate, respond to, and recover from the impacts of a wide range of likely, imminent or current events. A state of preparedness is the product of a combination of planning, allocation of resources, training, exercising, and organizing to build, sustain, and improve operational capabilities based on risk assessments.
<b>Prevention</b>	Activities and measures taken, based on risk assessments, to avoid existing and new risks. <b>Prevention and mitigation</b> are often used interchangeably, as they aim to reduce the probability or consequences of disasters, and communities' vulnerability thereto. Prevention measures can also be implemented in response and recovery to stop specific consequences from occurring.
<b>Public health emergency</b>	An occurrence, or imminent threat, of an illness or health condition that poses a substantial risk of a significant number of human fatalities, injuries or permanent or long-term disability. Public health emergencies can result from a wide range of hazards and complex emergencies.
<b>Public health emergency of international concern (PHEIC) (IHR definition)</b>	An extraordinary event which is determined, as provided in the [International Health] Regulations: (i) to constitute a public health risk to other States through the international spread of disease and (ii) to potentially require a coordinated international response.
<b>Public communication</b>	The discipline and process of providing public audiences with information that creates awareness and knowledge so that people can adjust their personal understanding of risks, and their reactions, decisions and responses to threats and crisis situations.
<b>Redundancy</b>	Having secondary or backup human and physical resource capacity in case primary resource capacity is impaired or becomes unavailable for any reason.
<b>Risk</b>	The combination of the probability of an event and its consequences, which results from interactions between natural and human-induced hazards, vulnerability, exposure and capacity.
<b>Risk assessment</b>	The process of determining those risks to be prioritised for risk management by the combination of risk identification, risk analysis, and evaluation of the level of risk against predetermined standards, targets, risks or other criteria. Risk assessments include a review of the technical characteristics of hazards, analysis of exposures and vulnerability, and evaluation of the effectiveness of prevailing coping capacities in respect of likely risk scenarios.
<b>Risk communication</b>	Public communication throughout the preparedness, response and recovery phases of a serious public health event to encourage informed decision making, positive behaviour change and the maintenance of trust.
<b>Risk management</b>	Coordinated activities to direct and control an organization or entity with regard to risk. The systematic approach and practice of managing uncertainty to minimize potential harm and loss (of life, assets and resources, injury, illness and other adverse effects). Activities include conducting risk assessments, implementing risk treatment measures, and evaluation, monitoring and review.
<b>Scalability</b>	The capability to expand or reduce in size in order to adjust capacity and capability by adding or deactivating organizational modules to adapt to changes in demand without the need for reconfiguration of a basic structure.
<b>Sector</b>	A division or collective aspect of a geographical area, economy or society.

<b>Seminar</b>	A guided informal discussion led by a presenter/seminar leader, without time constraints, in order to orient personnel and partners to plans and procedures and enlist their participation in refining a product.
<b>Site-level</b>	The actual location of the hands-on, tactical-level response to an emergency. When site-level emergency response capacities are overwhelmed, the role of a site-support (operational level) EOC is to provide assistance with logistics (resources) and strategy (direction and coordination).
<b>Situation report (SITREP or SitRep)</b>	A routinely produced report that provides current information about an emergency response and immediate and future response actions, an analysis of the impact of the emergency, and identification of related management issues.
<b>Situational awareness</b>	Being aware of and attentive to what is happening in a given environment at a particular time, with particular emphasis on the effect of changes in the environment; in effect, knowing how an incident or event is evolving.
<b>Standard operating procedure/s (SOP/s)</b>	A set of instructions or directions detailing what actions should be taken by EOC personnel—as well as how, when, by whom and why—for specific events or tasks.
<b>Steering committee</b>	An oversight or user committee responsible for providing sponsorship, leadership, policy and funding support to a working group assigned to develop an emergency operations centre.
<b>Strategic</b>	The defining characteristic of something ‘strategic’ is that it deals with relatively long-term, high-level, big picture concepts in order to integrate an organization’s major goals, policies, and action sequences into a cohesive whole. It may also have a normative or standard-setting component.
<b>Supporting agency</b>	An agency that provides essential services, personnel, or material to support or assist a lead agency (the <b>supported</b> agency). <b>Supporting</b> agencies may support either by <b>assisting</b> (i.e. contributing their own operational resources) or <b>cooperating</b> (providing indirect assistance).
<b>Surge capacity</b>	The ability to draw on additional resources to sustain operations and increase capacity, usually for emergency response, as required.
<b>Table-top (exercise) (TTX)</b>	A discussion-based form of training or evaluation exercise where all the personnel assigned to an EOC gather informally, without the pressure of tight time constraints, to examine hypothetical emergency situations. They discuss intended responses, and identify and solve problems based on the EOC operational plan and the agencies’ emergency plans.
<b>Tactical</b>	Those activities, resources and manoeuvres that are directly applied at a task level in order to achieve goals. Compare with <b>strategic</b> . The tactical level is the level (below strategic level and above operational level) at which the response to an emergency is managed.
<b>Technical communications</b>	Communications related to the protocols, procedures and methods used to pass critical information among key participants during the management of an emergency.
<b>Unified management/command</b>	A team approach to the management of complex, multi-agency or multi-jurisdictional emergencies that allows all agencies with complementary geographical or functional responsibilities in the response to establish a common set of objectives, strategies and operations. A lead agency is established based on agreement on the primary problem being addressed; other agencies share responsibility and participate fully in decision-making. See also <b>joint management</b> .



# ANNEX 2: Sample concept of operations (CONOPS)

Public Health Emergencies can involve multiple agencies, sectors, and jurisdictions. A concept of operations (CONOPS) identifies roles and responsibilities in a coordinated response, outlining how organizations work together.

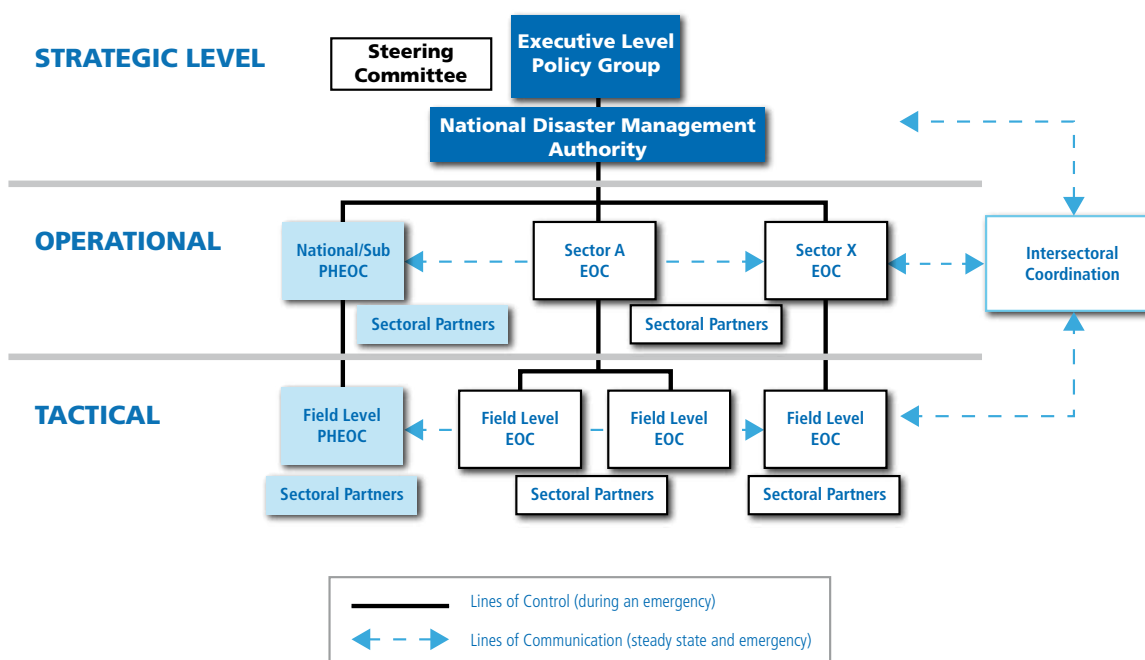
This sample CONOPS uses the incident management system to address the command and control arrangements for effective coordination of responding agencies from different sectors and jurisdictions, and of multiple levels of response (national, subnational and local level). The incident management system outlines responsibilities for management, operations, planning, logistics, finance, administration, policy, and communications. It can be adapted to the context of the incident, to accommodate the interests and mandates of responding agencies with potentially overlapping authorities, responsibilities, and roles.

This CONOPS outlines public health responsibilities and relevant actions at strategic, operational, and tactical levels, and describes how they should relate to wider national disaster management structures.

Modification is likely to be needed at the strategic or operational levels in order to meet specific policy issues or issues associated with coordination of resources. Examples of potential modifications include newly-unified leadership within the management function to ensure unity of effort; establishment of a substantial unit to conduct risk communication; or expanded scientific and technical functions within the operations branch.

The organizational structure for command and response is shown in Figure 9.

**Figure 9: Organizational structure for command and response**



## 1. Strategic and policy level

This is the highest level of the national disaster management structure and is responsible for strategic coordination and policy making. It is usually led by the office of the president/prime minister or a cabinet level delegate, with executive management capacity from participating agencies. It may also include key technical partners and political representatives from the affected districts.

With regard to responsibilities and relevant actions, the strategic level:

- Provides high-level direction for the response
- Determines the need to declare a national-level emergency
- Determines when the state of national-level emergency has ended
- Makes and endorses policy required to enable the response
- Establishes national and multinational objectives
- Develops national-level plans to support these objectives
- Coordinates the response of national-level agencies
- Monitors the operational coordination and implementation of the strategy
- Ensures provision of human resources and other capabilities as needed to support operations and to achieve established objectives
- Prepares and/or approves public communications materials, technical guidance and activities.

In most countries and under a multi-hazard approach, this function is normally assigned to the national disaster management authorities such as the national disaster management office or a similar agency.

A ministry-level EOC should be established to coordinate planning and operations with other responding ministries and partners, and to control and coordinate the activities of operational-level EOCs for a public health response. This may include coordination with international partners to ensure strategic-level unity of effort. At the Member State's discretion, they may coordinate international efforts including international and non-governmental organizations through the UN cluster system.

In the absence of an EOC at this level, there must be adequate representation by the ministry of health, with appropriate authority in the national disaster management structure to ensure coordination with all responders at a strategic level.

When a public health event is of a smaller scale, coordination might be achieved through the EOC alone and a full national disaster management structure is not required. If the scale and scope of an outbreak or other emergency were to escalate, requiring the involvement of a large number of responders from outside the health agency, then broader engagement of the national disaster management authority should be considered. Close coordination and timely information exchange is required between the national disaster management authority and other responding agencies. When an EOC is operating, liaison officers should be maintained at the national disaster management structure to represent health issues.

To ensure clarity of responsibilities and authority, senior leadership within the national government must identify 'supported' and 'supporting' relationships among the response agencies. The supported agency is the agency with the responsibility, authority, and technical expertise to best manage the incident or event. Supporting agencies are those with additional or available resources, including personnel, material, and expertise, that the supported agency requires. When a supporting agency or jurisdiction is contributing

their own resources directly to the response they are an assisting agency. When the contribution is indirect, they are a cooperating agency. Assisting agencies will often participate directly with the lead agency in the command and control structure of response management, to avoid duplication of effort and misuse of scarce resources.

## 2. Operational (coordination) level

The operational level is responsible for effective coordination of all response elements and maintenance of situational awareness for strategic-level authorities.

With regard to responsibilities and relevant actions, the operational level:

- Provides the technical lead for the operational response based on strategic guidance
- Develops operational-level plans to meet strategic objectives
- Coordinates the response of the agency with other responding agencies, including international partners responding at the operational level
- Controls and maintains situational awareness of tactical units and their actions
- Prioritises and provides the resources to support response activities at the tactical level
- Provides the 'common operating picture' against which strategic and operational decisions are made.

In some settings, the operational and strategic-level responsibilities can be combined into a single EOC. In a resource-constrained environment, the operational-level EOC may reside at the national level.

Where there are other agencies maintaining EOCs, it is essential to coordinate operational level planning with these EOCs to ensure efficient use of resources and unity of effort. When possible, responding agencies, including international partners, should place a liaison officer within the operational-level EOC to maintain unity of effort.

## 3. Tactical (implementation) level

The third level of a response is the tactical management of response operations. Unlike the national or subnational levels, this will normally be located as close to the incident as possible, at district or community level. This may take the form of a mobile and temporary command post, an EOC staffed by all agencies responding locally, or a local public health-specific EOC.

This level is responsible for the day-to-day actions that will achieve the established strategic and operational goals and objectives. To accomplish these actions, the tactical EOC will generally develop incident action plans that focus on measurable and achievable actions by tactical resources during a set 'operational period' (typically 24 hours for a public health response). Tactical planning within the incident action plan will describe what mechanisms will be used with the available resources to achieve the desired results.

### **Decisions related to tactical actions should be made at the lowest level possible.**

The tactical level should have the freedom to determine a course of action based on assigned objectives. Higher levels should avoid directing specific actions or tasks except as dictated by policy or resource limitations. The tactical level should be able to reach up to the operational level to request resources as needed to complete assigned objectives.

As with the higher levels, coordination between the EOC and other agencies, including international partners, in the local response is crucial to ensuring the best outcomes.

## 4. Incident/event grading and EOC scaling

Grading refers to an assessment of the level of risk associated with an incident, considering such factors as its geographic extent, complexity, severity and duration, and the extent of existing internal and acquired external resources required to resolve it. The grading process—the risk assessment—starts immediately upon detection/notification or alert, to ensure that a response is appropriately urgent and adequately resourced. Continual reassessment of the incident is required to ensure necessary escalation or de-escalation.

The process is often triggered at a tactical level, but becomes operational and strategic as additional resources are required or pre-established thresholds are exceeded. A gradient of levels, often three to five in number, is based on the increasing level of response resources required, and triggers escalating levels or phases of EOC activation. The higher the grade of an incident, the more response and management resources will be required, and the more fully developed the EOC activation will need to be.

Upon alert that an incident with elevated risk has occurred or is imminent, the responsible agency (ministry of health if designated) appoints an incident manager to monitor the event and adjust the grading and the scale of the response as the situation evolves. In a national level EOC the highest grading, regardless of the number of grades, would be characterized by extensive impact on the population and the health system, and would require a coordinated, multi-sectoral, multi-jurisdictional response with international assistance.

## ANNEX 3: PHEOC systems and infrastructure requirements

The table gives examples of items required for EOC systems and infrastructure at basic, general and optimal evolution levels of an EOC and for different emergency management phases.

Requirements classified as “basic” support fundamental EOC operations that can be performed by limited numbers of personnel even in critical situations. Items classified as “general” represent widely adopted practices for EOCs in normal operational conditions. Those classified as “optimal” are expected to provide state-of-the-art features that, though they are not vital, may enhance the capacity and performance of EOC and thus could be adopted if there is a demand for an advanced EOC that is backed by sufficient funding.

Legend: B=basic, G=general, O=optimal, S=specialized, M=mitigation, P=preparedness, R=response, A=throughout all phases

Items		Static/ permanent EOC	Portable / field EOC
<b>1. ICT hardware, services and security</b>			
1.1 Office equipment	Printer	B	B
	Writing board	B	B
	Copier	B	B
	Fax (if applicable)	B	B
	Scanner	B	B
	Multi-functional printer (as alternative to the above)	B	B
	Plotter	O	
	Multi-line fax system (if applicable)	O	
	Supplies for office equipment	B	B
1.2 Telecommunication equipment and services	Radio base station	G	G
	Handheld portable radios	G	G
	Satellite data communication (primary or backup)	O	O
	Satellite telephones	O	G
	Public switched telephone network (PSTN)	B	O
	Basic internet connectivity	B	B
	High speed internet connectivity	G	G
	Audio-visual multi-point conferencing bridge or equivalent services	G	O
	Repeater/tactical communication bridge	S	S
	Permanent network connections between sites and centres located outside EOCs (if applicable)	O	O
	Private automatic branch exchange (PABX)	G	O
	Telephone/video conferencing	B	G
	Web conferencing	G	G
	Messaging system (telephone, instant messaging)	G	G
	E-mail system/services	B	B
Voice/video over internet protocol (VoIP)	G	O	
Integrated communications control system (ICCS) (radio & telephone)	S	S	

1.3 Network infrastructure	Network devices (switch, router)	B	B
	Local area network (LAN)	B	O
	Wireless network	G	G
	Information broadcast and exchange	O	O
	Network redundancy	O	O
	Network virtualisation/software-defined networks (SDN)	S	S
1.4 Technological infrastructure	Computers (desktop/laptop/tablet)	B	B
	Data storage (physical/virtual)	B	B
	Servers (physical/virtual)	G	G
	Cable/satellite/internet television	G	G
	DVD/Blu-Ray player/recorder	B	G
	Large video display/video wall/projector	B	B
	Video & audio matrix switch	G	O
	Central (remote) control system	O	O
	Media streaming	O	O
	Field substance detectors	S	S
	Audio system	B	B
	Wireless sensor networks	S	S
	Radio frequency identification (RFID)	S	S
	GPS devices	S	G
	Remote imaging system	S	S
	Digital recorder	O	O
1.5 IT security	Firewall	B	B
	Encryption	B	B
	Virtual private networks (VPN)	G	G
	Anti-virus/-malware	B	B
	Vulnerability scanning	G	G
	Local data redundancy	B	B
	Network data storage/redundancy	G	O
	“Cold” off-site backup strategy	B	B
	“Warm” off-site backup strategy	G	G
	“Hot” off-site backup strategy	O	O
	Rapid service recovery	O	O
	System administration security	G	G

<b>2. Information management software</b>				
2.1 Functions	Predictive analysis & modelling	GA	GA	
	Surveillance (health/all hazard), mapping, analytics, and statistics	GA	GA	
	Alert/early warning	BP	BP	
	Monitoring core indicators	BA	BA	
	Health resources availability mapping	OA	OA	
	Planning	BP	BP	
	Emergency call-taking & dispatch	GA	GA	
	Emergency evacuation system	SR	SR	
	Risk management	GA	SA	
	Data/situation analytics	GR	GR	
	Tasking & on-scene command	BA	BA	
	Deployment/post-deployment briefing/debriefing	GA	GA	
	Deployment briefing/debriefing	OR	OR	
	Contact management	BA	BA	
	Action summary	BA	BA	
	Activity logging	BA	BA	
	Collaboration platform	GR	GR	
	Data management	BA	BA	
	Document management	BA	BA	
	Training	GA	GA	
	Reporting/visualisation	BA	BA	
	Geographic information system	GA	GA	
	Registering and mapping partners	GPR	GPR	
	Public communication	BA	GA	
	2.2 Characteristics	Server-based	G	G
		Cloud-based	O	O
Standalone		B	B	
Real-time/dynamic		G	O	
Optimised for mobile devices		G	G	
Offline mode		O	G	
Interoperability		G	O	
Scalability		G	O	
Modularity		O	O	
High availability		B	G	
Multi-language interface		O	O	
Open source		O	O	
Proprietary		S	S	
User friendly		B	B	
Specialized (for experts)		O	O	
Virtual EOC	O	O		

<b>3. Infrastructure (facilities, security, furniture)</b>			
3.1 Premises support	Dedicated building in proximity to decision makers	O	O
	Multi-purpose space converted within reasonable time frame (e.g. one hour)	B	B
	Dedicated room/suites	G	G
	Emergency service call room	B	B
	Separate meeting rooms for priority discussion	G	O
	Conference room	G	O
	Surveillance room	G	O
	Operations room	G	G
	Briefing space for visitors and media	G	O
	Public information office/joint information centre (PIO/JIC) and media	G	G
	Room to house external and non-jurisdictional entities	O	O
	Communication equipment room	G	O
	Separate communication centre (emergency call room)	O	O
	Storage room	G	G
	Cloakroom	O	O
	Medical treatment space	O	O
	Break and recreational space	O	O
	Staging area for transport (air or land)	O	O
	Access to personal hygiene facility	B	B
	Personal hygiene (shower and laundry) and related supplies	G	O
	First aid	G	G
	Water & food availability & storage	B	B
	Standalone water supply	S	S
	Lighting	B	B
	Mains electricity power supply	B	B
	Backup diesel generator	B	B
	Uninterruptible power system (potentially with filtering) capability	B	G
	Broadcasting system	G	G
	General environment control (air conditioning, ventilation, lighting, etc.)	G	O
	Stand-alone HVAC (heating, ventilation and air conditioning) system	O	O
	Cabling system infrastructure	B	O
	Acoustic treatment	O	O
	Built-in levelling system	S	G
Light tower/remote area lighting system	S	O	
Emergency alarm system	G	G	
Weather-resistant fold-out shelter system	S	B	
Mobile signal blocker/booster	S	S	
Dedicated space for ICT support	G	O	



3.2 Furniture	Workstation with space for computer, display, keyboards, mouse, telephone, stationery, etc. Retractable arm stand for display may be considered	B	B
	Chairs	B	B
	Console with adjustable viewing angles and sight lines	G	G
	Easy access to personal power outlets	B	B
	360 degree chair rotation	G	G
	Pneumatic seat height	G	G
	Backrest angle/height/depth	G	G
	Ergonomic and modular design of console	O	O
	Dimmable workstation task lighting	O	O
	Seat angle and tension control	O	O
	Seat lumbar pump	O	O
	Seat armrest height/rotation/swivel/width	O	O
	Seat headrest height/depth	O	O
3.3 Premises security	Surveillance/integrated video management system (IVMS)	G	G
	Perimeter protection	G	G
	Dangerous goods scanning	G	G
	Access control	G	G
	Flood prevention	G	G
	Disaster protection (natural or human-incurred)	B	B
	Public address system	G	G
	Fire protection	B	B
<b>4. Training and exercises for ICT and infrastructure</b>			
4.1	Improve relevant ICT skills of the EOC users	B	G
4.2	Specialised training for ICT support staff	G	G
4.3	Induction for EOC users on facility utilisation	B	G
4.4	Simulation involving use of facilities and ICT infrastructure	G	O
4.5	Testing the interoperability of EOC information systems with other sectors	G	O
4.6	Evaluate readiness based on results of simulation(s)	O	O
<b>5. Human resource needs for ICT and infrastructure</b>			
5.1	EOC facility manager	G	O
5.2	Information management	G	G
5.3	ICT support	B	B
5.4	GIS specialist	O	O
<b>6. Support and maintenance</b>			
6.1	Hardware support and maintenance	B	B
6.2	Software support and maintenance	B	B
6.3	Maintenance of premises	B	B

# ANNEX 4: Example of a PHEOC minimum data set

This table provides an example data set corresponding to sample essential activities and information needs that support the five PHEOC functions. For more information on relevant data elements, format and description please visit:

International Statistical Classification of Diseases and Related Health Problems 10th Revision (WHO ICD-10): <http://apps.who.int/classifications/icd10/browse/2015/en>  
 Health Level Seven International (HL7) Standards (Clinical and Administrative Domains): [https://www.hl7.org/implement/standards/product\\_section.cfm?section=3](https://www.hl7.org/implement/standards/product_section.cfm?section=3)  
 Public Health Information Network Vocabulary Access and Distribution System (CDC PHIN VADS): <http://phinvads.cdc.gov>

Management function			Example data elements description*
Example essential activities: decisions and approvals; coordination of partners; external communication; leadership and IMS, etc.			Example data elements
Example of information needs	Example of data elements	Example data elements format	Example data elements description*
Activate/deactivate decision	Event ID	Free text	A unique event identifier
	Decision activate/deactivate	Coded value	This is a flag that shows the purpose of the action (activate or deactivate)
	Event description	Free text	Provides characteristics of the event (i.e., time, location, casualties, etc.)
	Trigger description	Free text	Defines conditions that trigger early response
	Threshold	Free text	Defines conditions that terminate event
...	...	...	...
Partners	Partner name	Free text	The name of partner organization to the EOC
	Partner organization contact information	Free text	Partner organization contact information (address, phone, email)
	Contact person	Free text	Name and contact information of person in a partner organization
	Capabilities	Free text	Description of what the partner could/should do in relation to the response
	Assigned task	Free text	Description of tasks that were assigned to the partner for a specific event
...	...	...	...

## Operations function

Example essential activities: task tracing; event investigation; technical guidance and coordination of site-level operations such as vaccination, contact tracing, triage, treating and transporting sick/injured/deceased people, and decontaminating people/premises; conducting disease surveillance and collecting epidemiological data; monitoring food and water supplies; disposal of solid, liquid and hazardous waste; establishing emergency clinics.

Example of information needs	Example of data elements	Example data elements format	Example data elements description*
Task information	Task ID	Free text	A unique task ID
	Task description	Free text	Details of the task
	Assigned to	Free text	Title, name, position of person to whom a task was assigned
	Assignment date	Date, month and year format	Date of a task assignment
	...		
Laboratory operations report	Report date/time	Date, month, year and time format	Date and time for submission of laboratory operations report
	Total number of tested people	Numeric value	Total number of tested people
	Total number of people with final confirmed positive laboratory diagnosis	Numeric value	Total number of people with the final confirmed positive laboratory diagnosis
	Total number of people with preliminary positive laboratory diagnosis	Numeric value	Total number of people with the preliminary positive laboratory diagnosis
	...		
Functionality of health services	Health facility ID	Free text or coded value	Unique health facility identifier
	Health service type	Free text or coded value	Type or classification of health facility
	Capabilities	Free text or coded value	Classification of services and capacity
	.....		

**Planning function**

Example essential activities: situation analysis, plan development, information management, after action review, etc.

Example of information needs	Example of data elements	Example data elements format	Example data elements description*
Infectious diseases reporting and surveillance	Patient ID	Free text	Unique patient identifier
	Name	Free text	Patient name
	Sex	Free text or coded value	Current sex of the subject of the report (i.e., female, male, undifferentiated)
	Age	Numeric value	Age of the subject of the report
	Detailed address	Free text	Home address
	Disease/injury name/code	Free text	Disease or injury name and code
	Illness onset date	Date, month and year format	The first appearance of the signs or symptoms of an illness
...			
Situation report	Date/time	Date, month, year and time format	Date/time when a situation report was developed
	Incident name	Free text	
	Situation description	Free text	Description of a situation
	...		

<b>Logistic function</b>				
Example essential activities: resources management, ICT support				
Example of information needs	Example of data elements	Example data elements format	Example data elements description*	
Health agencies	Agency type	Free text or coded value	Identification of public health vs medical agency	
	Staffing quantity	Numeric value	Quantity of staffing in a medical agency (e.g. 200)	
	Staffing speciality	Free text	An area of study or business in which a staff member specializes or of which they have special knowledge	
	Equipment	Free text	Name, type and quantity of equipment	
	Hospital beds quantity (general/special)	Numeric value	Availability of hospital beds (number)	
	Expansile beds	Numeric value	Availability of expansile hospital beds (number)	
	Laboratory test items	Free text or coded value	Description of what kind of lab test the agency could do	
	Contact information	Free text or coded value	Telephone, e-mail	
	...			
	Reserves of emergency supplies	Items	Free text and coded value	Nature of the reserved supply
Reserves of emergency supplies	Category	Free text and coded value	Examples of coded values: medical materials, equipment	
	Organization	Free text	Name of organization	
	Location	Free text and coded value	Storage location	
	Stockpile	Number	The amount of supplies kept ready for future use	
	Expired date	Date	Expiry date of the	
	Suppliers	Free text	Name of the organization	
	...			

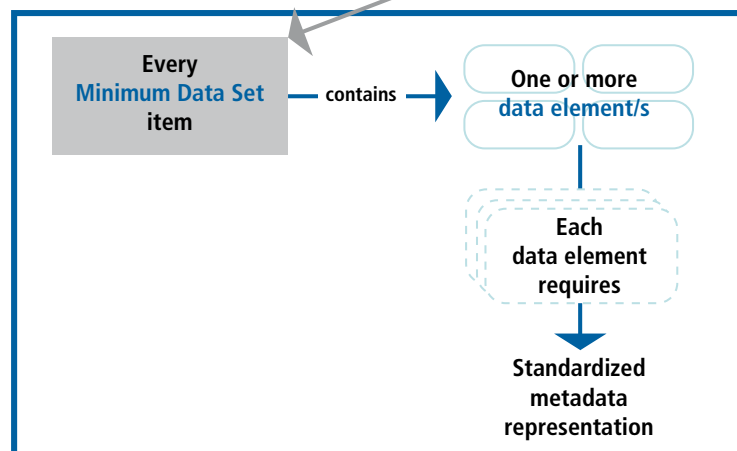
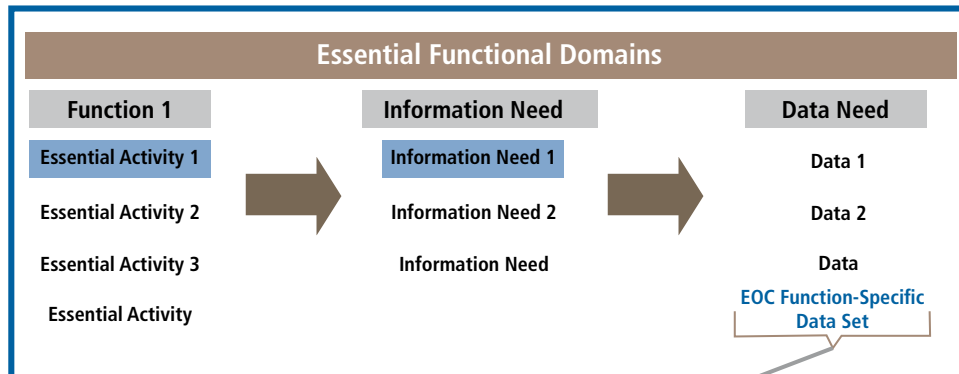
**Finance and administration function**

Example essential activities: cash flow management; tracking of material and human resource costs; budget preparation and monitoring; production and maintenance of administrative records; processing of compensation claims; preparation of procurement contracts; incentive and insurance payments.

Budget	Amount	Numeric value	Budget amount
	Source	Free text	Where the budget comes from; example of the values: government; NGO
	Activity	Free text	Budget breakdown and justification
	Implementing unit	Free text	Who enforces the budget
	...		
Purchase	Amount	Numeric value	Amount of money
	Activity	Free text	Appropriation expenditure
	Implementing unit	Free text	Who enforces the budget
	...		

# ANNEX 5: Representation of minimum dataset for PHEOCs

A standardized minimum dataset improves interoperability and real-time data exchange, and can help avoid repeated collection of the same data. As a principle, a dataset is generally composed of one or more data elements. In order to make the data element interoperable between information systems, these elements need to be represented in a standardized form (Fig. 10).



Minimum Data set	Data elements
Identification Number	<i>Unique Identification Number, Date of Issue, Date of Expiration, Place of Issue</i>
Full Name Birth History	First name, last name, middle name, maiden name, other names <i>Date of Birth, Sex, Place of Birth, Etc.</i>
Address	Physical address
Contact Information	<i>Telephone number, email address, emergency contact name</i>
Employment Status	<i>Employment Status, employment title and occupational category</i>
Data Submission Institution	Name of the institution submitting data; date and time of submission
EOC Function-Specific Data Set	Data Elements that correspond to Data Set

## ANNEX 6: Required knowledge, skills and abilities for essential PHEOC functions

### Policy

- Identify current health trends and gather information that can inform options for policies, programmes and services
- Recognize the value in having an incident command structure during an emergency situation
- Identify limits to legal knowledge, skill, and authority and identify key system resources, including legal advisors, for referring matters that exceed those limits
- Describe the legal authorities related to the distribution and dispensation of medical supplies and the effect of a state and/or federal emergency or public health declaration on those authorities

### Planning

- Contribute to the development and implementation of the organizational strategic plan and emergency plans
- Gather appropriate information for evaluating policies, programmes and services
- Apply strategies for continuous quality improvement
- Verify the credibility of information sources
- Use analytical tools to analyse information and recommend specific actions

### Command

- Demonstrate an ability to set and follow priorities, and to maximize outcomes based on available resources
- Demonstrate an ability to fulfil functional roles in response to a public health emergency
- Develop staff by providing opportunities for professional development for individuals and teams (e.g. training, mentoring, peer advising, coaching) and encouraging use of professional development opportunities by individuals and teams
- Manage organizational change to modify practices in consideration of changes (e.g. social, political, economic, scientific)
- Facilitate collaboration with internal and external emergency response partners
- Demonstrate advanced problem solving skills under emergency conditions
- Utilise staff and technology to maintain situational awareness
- Distinguish the roles of staff involved in collecting and disseminating information for audiences (e.g. coordinator, public information officer, technology/IT departments, etc.)
- Distinguish routine from urgent management information



- Classify information for internal and external audiences
- Clarify the roles of team members in an incident management system
- Summarize the roles and responsibilities of public health personnel in a variety of public health emergencies and in the incident management system
- Demonstrate commitment to safety of personnel by employing protective behaviours according to changing conditions, personal limitations and threats
- Categorize and evaluate potential threats and emergencies
- Describe the relationship between protective measures and behaviours and reduction of worker risk of injury or illness
- Employ practices to minimize exposure to agents and hazards during an emergency
- Know and act within the scope of federal, state, tribal, and local statutory and regulatory authority during public health emergencies and through state and/or federal declarations of emergency

## Communications

- Differentiate between risk communication and emergency crisis communication
- Prepare and deliver messages using the principles and guidelines for crisis and risk communication
- Demonstrate cultural sensitivity as essential to communicating with diverse populations
- Convey information to professionals, personnel and the public using a variety of approaches (e.g., reports, presentations, press releases, emails, social media, etc.)
- Communicate effectively in writing and orally, in person and through electronic means, with linguistic and cultural proficiency
- Maintain relationships with diverse community partners to assist with communicating preparedness planning and population-specific messages
- Verify the credibility of information and sources

## Operations

- Interpret and communicate procedures in emergency operations plans related to information management
- Recognize and report information potentially relevant to the identification and control of an emergency through the chain of command
- Know and manage or apply decontamination or disinfection procedures as necessary
- Use information technology in accessing, collecting, analysing, using, maintaining, and disseminating data and information
- Use informatics standards
- Apply ethical principles in accessing, collecting, analysing, using, maintaining, and disseminating data and information
- Determine quantitative and qualitative data and information

- Collect, analyse and interpret data to determine validity and reliability
- Practice process improvement

## Logistics

- Support information systems development
- Administer procurement procedures and protocols, particularly those most relevant to public health
- Perform IT systems operations and maintenance
- Use inventory management systems
- Plan and implement distribution systems
- Know hazardous materials regulations
- Practice supply chain management
- Know human resource policy, procedures, recruitment and rostering practices
- Provide or administer facilities maintenance services
- Develop and maintain database of contact persons, experts, facilities, logistics, etc.
- Utilize records management systems for important documents and financial records that satisfy agency standards
- Distinguish between different types of electronic information and sources
- Describe and utilize the financial planning, budgetary and cashflow processes of the agency
- Design and implement financial plans for assigned operational projects
- Prepare proposals for funding (e.g. to foundations, government agencies, corporations, etc.)
- Negotiate contracts and other agreements for programmes and services
- Process compensation claims (incentives, insurance, expenses).

## ANNEX 7: Types of exercise

### Orientation exercise

This type of exercise involves structured but informal discussions designed to solicit feedback and familiarize EOC participants with plans, roles and procedures. It focuses on questions of coordination and assignment of responsibilities. Orientation exercises are simple and low cost, and should be considered the absolute minimum requirement for validating an EOC plan (or parts thereof) and/or an EOC facility under development.

There are two common variations of an orientation: seminars and workshops. Both are based on relatively informal guided discussions.

Seminars are intended to orient participants to authority structures; strategies and plans; policies; protocols; resources; legislation; and concepts and ideas. They are also used to impart understanding of inter-agency or inter-jurisdictional capacities and capabilities.

The workshop has some of the characteristics of a seminar, with more defined focus that usually includes the preparation of a product (a procedure, plan or component of a plan).

### Drill

When the EOC is established, it is important to practise aspects of activating it with a very limited type of operational exercise called a drill. A drill is used to develop, evaluate and maintain skills in specific procedures. These might include: alerting and notification; passage of critical information; activation of emergency resources, including the EOC itself; and practice of any other specialized skills that constitute one or more components of the EOC operational plan. Part of every drill is a critique of the procedure being practiced, its efficiency, and whether it is properly supported by the facility.

### Table-top exercise (TTX)

A table-top exercise is a process in which all the personnel assigned to the EOC, which may include members of the policy group, gather together informally, without tight time constraints, to examine and evaluate EOC plans, procedures and event-specific responses to hypothetical emergency situations. A table-top exercise is a guided discussion stimulated by scenario-driven, low-level simulation through paper, verbal or electronic messages.

### Functional exercise

A functional exercise is designed to practice and evaluate plans, procedures and policies. Advancing from a table-top to a functional exercise challenges participants in three particular ways:

1. It is fully simulated (though without actual deployment of resources) and interactive, requiring participants to respond to each other in the roles designated for them in the EOC and event-specific plans
2. It is conducted under time constraints that would be similar to, or often more challenging than, a real event
3. It is usually conducted in the EOC facility, so the available tools and technologies can be used and evaluated.

A functional exercise should not be the first exercise for an EOC.

### **Full-scale exercise:**

Where a functional exercise provides a focus on the policy and interactive elements of the management of an emergency, a full-scale exercise focuses on the operational capability of emergency response and management systems. In the training of staff and evaluation of an EOC this would include actual deployment of some resources required to practice coordination and response capabilities in as realistic a setting as possible without putting public and staff safety at risk. For an established EOC, ongoing, cyclical evaluation of its functionality and training of users requires exercises of increasing complexity. This is known as a progressive exercise programme, and is part of a programme of long-term continuous improvement.

### **Games**

Games involve a higher level of simulation, utilizing actual or hypothetical scenarios. Two or more teams may be involved, with exercise controllers providing exercise data and enforcing the rules of the game. They are useful as training tools due to the high level of engagement that is engendered by a gaming environment, and are used to develop higher levels of understanding and capability in implementing plans and procedures.

## ANNEX 8: Exercise selection criteria

Type of exercises	Areas to be practised, tested, evaluated, improved	Factors to be considered
Orientation seminar	Familiarise staff with roles, plans, procedures and standard operating procedures (SOPs) of the organisation. Can also be used to resolve questions of coordination and assignment of responsibilities.	A guided informal discussion, taking place in a meeting or conference room, with no time constraints, using different instructional techniques.
Table-top exercise (TTX)	Validate plans and procedures with a trigger scenario/narrative; provide an opportunity for key agencies and stakeholders to become acquainted with one another, their interrelated roles, and their respective responsibilities.	Designed to achieve a specific objective, and to be as realistic as possible while remaining logistically feasible. Designed around issue areas, rather than scenarios. While many TTXs require relatively little planning and coordination, a large-scale and rigorous TTX requires dedicated planning resources, skilled facilitation and trained evaluators to be effective.
Drill	Normally used to test a single specific operation or function. May test notification and communication systems, command post evacuation, response time, equipment capabilities, EOC call down procedures or staff call back and telephone trees.	A drill can be led by a manager, supervisor, department head, or exercise designer and can be conducted within a facility, in the field, or at the EOC or other operating centre.
Functional exercises	Validate policies, roles and responsibilities, capabilities and procedures of single or multiple emergency management (EM) functions or agencies. Main focus on the coordination, integration, and interaction of an organization's policies, procedures, roles and responsibilities before, during, or after the simulated event. May include such activities as activating command centres, documenting actions and decisions, completing real forms, issuing real communications and responding to simulated media or other questions.	Involves creating a situation and facilitating a 'real' response and is fully simulated to a significant level of detail, usually covering multiple functions. Requires extensive planning and preparation. Staff members need considerable experience with the functions being tested. A functional exercise is always a prerequisite to a full-scale exercise.
Full scale exercises	Test and evaluate a major part of emergency operations in an interactive manner over an extended period. Areas to be tested include information analysis, inter-agency cooperation, negotiation procedures, resource and personnel allocation, equipment locations and capabilities.	Costly and time consuming. All levels of personnel should take part. The EOC or other operating centre is activated, and field command posts may be established. Simulation information is conveyed on paper, by phone, through pseudo media and victims etc. simulated by role-players. Requires extensive planning and preparation.

## ANNEX 9: Checklist for Implementing a PHEOC

In this checklist, ‘capabilities’ means that all the material and human resources with the required knowledge, skills and abilities are available with the necessary policy authority and procedural instructions.

PHEOC PLANNING GUIDANCE		
	Legal authority	Comments
1	<input type="checkbox"/> Legal authority for PHEOC established <input type="checkbox"/> Government commitment has been secured <input type="checkbox"/> Public health emergencies are recognised as potential national disasters	
2	<input type="checkbox"/> The collaboration mechanism between the Ministry of Health and the National Disaster Management Organization, other Ministries, agencies and sectors during public health emergencies has been defined and agreed	
3	<input type="checkbox"/> Mandate and scope of PHEOC decisions and operations approved by government, partners and stakeholders	
<b>Policy group</b>		
4	<input type="checkbox"/> A policy group to provide policy guidance to PHEOC has been established	
<b>Steering committee</b>		
5	<input type="checkbox"/> A steering committee of PHEOC stakeholders has been established for the planning and development of PHEOC	
6	<input type="checkbox"/> Hazards, vulnerabilities and resulting risks have been identified and prioritized	
7	<input type="checkbox"/> PHEOC objectives have been developed	
<b>Planning</b>		
8	<input type="checkbox"/> An all-hazards national public health emergency management plan, addressing priority risks, has been developed and approved	
9	<input type="checkbox"/> Emergency Response Plan for the health sector is in place.	
10	<input type="checkbox"/> Response plans detail roles and responsibilities for MoH and other response agencies, sectors and jurisdiction at various levels in the response organization, including private sector and NGO organizations.	
11	<input type="checkbox"/> Response plans describe scaled levels of response with resource requirements for each level and procedures for acquiring additional resources	
12	<input type="checkbox"/> Response plans detail the notification, reporting, engagement and coordination requirements	
13	Response plans contain information about laboratories including: <ul style="list-style-type: none"> <li><input type="checkbox"/> Contact information</li> <li><input type="checkbox"/> Types, e.g. biosecurity level, locations, business hours, contact information and links to MoH surveillance systems</li> <li><input type="checkbox"/> Types of specimens or samples tested</li> <li><input type="checkbox"/> Types of testing provided</li> <li><input type="checkbox"/> Standard Operating Procedures for collection, packaging, shipping and maintaining chain of custody of specimens and samples.</li> </ul>	

14	<p>Response Plans contain verified location, contact and emergency response information for:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Hospitals, clinics and treatment centres</li> <li><input type="checkbox"/> Points of entry</li> <li><input type="checkbox"/> Pharmacies</li> <li><input type="checkbox"/> NGO's in-country</li> <li><input type="checkbox"/> Public health units</li> <li><input type="checkbox"/> Social services offices</li> <li><input type="checkbox"/> Shelters</li> <li><input type="checkbox"/> Partner Government agencies</li> <li><input type="checkbox"/> IHR Focal Point and WHO IHR contact point</li> <li><input type="checkbox"/> Other subnational PHEOCs or National coordination centre</li> </ul>	
15	<input type="checkbox"/> Response plans provide SOPs for coordinating with law enforcement and national security agencies.	
<b>IMPLEMENTING A PHEOC</b>		
16	<ul style="list-style-type: none"> <li><input type="checkbox"/> A clear operational structure based on the IMS and comprising (i) Management, (ii) Operations, (iii) Planning, (iv) Logistics and (v) Finance and Administration functions is in place</li> <li><input type="checkbox"/> Staff, trained in emergency response management and mission-critical public health activities and objectives, are available to fill key PHEOC roles at all times</li> <li><input type="checkbox"/> A roster of incident managers is maintained</li> <li><input type="checkbox"/> The PHEOC facility manager has been appointed</li> <li><input type="checkbox"/> The information manager has been appointed</li> </ul>	
17	<p>The PHEOC has the capability to:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> prepare public health alerts</li> <li><input type="checkbox"/> conduct web surveillance to detect and correct of rumours, public and interest group concerns and media misinformation</li> </ul>	
18	<ul style="list-style-type: none"> <li><input type="checkbox"/> Infrastructure, personnel and procedures are in place sufficient to support IHR (2005) notification requirements (surveillance, detection, reporting, IHR focal point)</li> <li><input type="checkbox"/> The PHEOC has the capability to produce and share a common operational picture</li> </ul>	
19	<input type="checkbox"/> The PHEOC has the capability to direct and support logistical operations for the acquisition, storage, transportation and delivery of PPE, medical equipment, pharmaceuticals, laboratory supplies and medical countermeasure supplies for public health emergency responses in country	
20	<input type="checkbox"/> The PHEOC has the capability to provide logistical and operational support for team(s) and protect the health and safety of deployed teams	
21	<input type="checkbox"/> Administrative policy has been formulated to support emergency contracting, hiring, procurement and management of donor funds.	

CORE COMPONENTS OF A PHEOC	
Plans and procedures	
22	<input type="checkbox"/> PHEOC plans (EOC plan and CONOPS) have been approved
23	The PHEOC plan/handbook for staff includes: <ul style="list-style-type: none"> <li><input type="checkbox"/> A concept of operations</li> <li><input type="checkbox"/> Map of the PHEOC workstations, rooms and inventories of equipment</li> <li><input type="checkbox"/> Routine staffing requirements</li> <li><input type="checkbox"/> Standard operating procedures</li> <li><input type="checkbox"/> Forms and templates for data collection, reporting, briefing etc</li> <li><input type="checkbox"/> Documentation and records management processes</li> <li><input type="checkbox"/> Role descriptions and job aids for PHEOC functional positions</li> <li><input type="checkbox"/> Response levels and thresholds</li> <li><input type="checkbox"/> Activation, scaling, deactivation thresholds and procedures</li> <li><input type="checkbox"/> Contact information for key officials and PHEOC personnel</li> <li><input type="checkbox"/> Notification and communication protocols with host agency, response organizations and partner agencies.</li> </ul>
24	<input type="checkbox"/> Procedures and equipment are in place to establish and maintain communications between the IHR Focal Point and WHO Regional and Headquarters offices
25	<input type="checkbox"/> Where relevant, hazard-specific response annexes have been developed to address chemical, infectious disease, radiological or food and water safety threats.
26	<input type="checkbox"/> Procedures in place for credentialing and permitting access for health professionals from other jurisdictions to operate in-country
27	The PHEOC has a Business Continuity Plan (Continuity of Operations Plan) which includes: <ul style="list-style-type: none"> <li><input type="checkbox"/> Priority functions that need to be maintained</li> <li><input type="checkbox"/> Key personnel that are needed to implement the plan</li> <li><input type="checkbox"/> Alternative/backup PHEOC site(s) and relocation plans</li> <li><input type="checkbox"/> Records and data management procedures</li> <li><input type="checkbox"/> Processes for maintaining critical external communications</li> <li><input type="checkbox"/> Activation, notification and deactivation procedures</li> </ul>
28	The PHEOC has a communications plan for emergency public information and warning that outlines: <ul style="list-style-type: none"> <li><input type="checkbox"/> Triggers for issuing information to general public or specific audiences</li> <li><input type="checkbox"/> Message templates for priority threats</li> <li><input type="checkbox"/> Roles and responsibilities for communications staff</li> <li><input type="checkbox"/> Procedures for developing and approving new messages</li> <li><input type="checkbox"/> Procedures for issuing risk communications using traditional media, official social media accounts and agency website posting.</li> <li><input type="checkbox"/> Process for developing linguistically and culturally appropriate messages.</li> <li><input type="checkbox"/> Approval authorities for external messages.</li> </ul>



29	<input type="checkbox"/> Deactivation and demobilization plans describe procedures for notification, closing procedures, debriefings, records management, restoring and repatriating staff and supplies to pre-incident levels or to regular roles.	
<b>Physical infrastructure</b>		
30	<input type="checkbox"/> A PHEOC suitable facility is available <input type="checkbox"/> A multi-use facility can be converted in one hour to an adequate operational PHEOC <input type="checkbox"/> A suitable facility has been acquired but not yet developed as an operational PHEOC	
31	<input type="checkbox"/> The PHEOC meets requirements for accessibility, security, structural integrity and resistance to natural and human generated hazards. <input type="checkbox"/> The PHEOC has adequate space for the all expected PHEOC functions, private meetings, surge staff, secure communications, IT equipment and support personnel <input type="checkbox"/> The PHEOC has audiovisual functionality to project operational, contextual and event status information, tested and maintained	
32	<p>The PHEOC has:</p> <input type="checkbox"/> sufficient potable water supply and adequate water to address sanitary requirements <input type="checkbox"/> structural maintenance, janitorial and waste removal services <input type="checkbox"/> toilet and sanitary facilities scaled for the expected occupancy <input type="checkbox"/> approved quantity of first aid supplies <input type="checkbox"/> an approved fire suppression system and/or equipment <input type="checkbox"/> a staff evacuation plan <input type="checkbox"/> security measures to control access <input type="checkbox"/> a backup site that can be activated if the primary site becomes untenable	
<b>Information and communications technology (ICT) infrastructure</b>		
33	<input type="checkbox"/> The PHEOC has sufficient computer workstations with necessary application software loaded and tested.	
34	<input type="checkbox"/> PHEOC servers and backups, with needed applications are maintained and routinely tested	
35	<input type="checkbox"/> The PHEOC has sufficient tested telephonic and/ or interoperable radio communications for every workstation and meeting space, with spares.	
36	<input type="checkbox"/> There is tested web or video conferencing equipment in a private meeting space.	
37	<input type="checkbox"/> There are sufficient printers, copiers, fax machines and scanners are maintained and functional.	
38	<input type="checkbox"/> There is sufficient quantity of electricity including backup capacity (generator and fuel, UPS for critical data storage and processing)	
39	<input type="checkbox"/> The facility has an HVAC system sufficient to maintain comfort for occupants and keep IT equipment cool.	

Information systems and data standards	
40	<p>The PHEOC has the capability to receive, analyse, display, report and share reports of reportable and unusual diseases and health conditions from:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> public and private sector healthcare providers and facilities</li> <li><input type="checkbox"/> sub-national offices and units</li> <li><input type="checkbox"/> veterinary and animal health sources</li> <li><input type="checkbox"/> points of entry</li> <li><input type="checkbox"/> NGOs</li> <li><input type="checkbox"/> Other national governments and international agencies</li> <li><input type="checkbox"/> Other arms and branches of government and Community based sources</li> </ul>
41	<ul style="list-style-type: none"> <li><input type="checkbox"/> The PHEOC has the capability to collect, process and share field epidemiological and other investigational data (including (i) receiving, aggregating and analyzing field data, and (ii) visualization of epidemiological information and timely preparation of reports in standardized format for decision making and sharing with partners)</li> </ul>
42	<ul style="list-style-type: none"> <li><input type="checkbox"/> The PHEOC is linked to a national surveillance information structure for monitoring and responding to priority risks.</li> </ul>
43	<p>The PHEOC has the capability to:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> receive and share public health laboratory data related to outbreaks and events</li> <li><input type="checkbox"/> receive, produce and share integrated surveillance information containing epidemiological findings and laboratory results at individual and aggregated levels</li> <li><input type="checkbox"/> provide data analytic support for other events of public health interest (eg: mass gatherings)</li> <li><input type="checkbox"/> produce geospatial information such as maps and other visualizations from common operational datasets</li> <li><input type="checkbox"/> ascertain the status and report key external partner/resource information such as hospital bed availability, treatment centres, laboratories etc.</li> <li><input type="checkbox"/> monitor the status and needs of deployed field teams and other responder personnel including assisting international support and NGOs</li> <li><input type="checkbox"/> display contextual operational information such as population distribution, administrative and political boundaries, transportation infrastructure, hydrology and elevations</li> </ul>
44	<ul style="list-style-type: none"> <li><input type="checkbox"/> The PHEOC datasets include identification of information necessary to develop a common operational picture for priority risks</li> </ul>
45	<ul style="list-style-type: none"> <li><input type="checkbox"/> The PHEOC can access, display and track status information regarding affected persons and vulnerable populations</li> </ul>
46	<ul style="list-style-type: none"> <li><input type="checkbox"/> The PHEOC has the capability to monitor and account for all resources utilized in a response</li> </ul>
47	<ul style="list-style-type: none"> <li><input type="checkbox"/> The PHEOC has the capability to track and display the status of tasks and objectives</li> </ul>
48	<ul style="list-style-type: none"> <li><input type="checkbox"/> Staff filling IMS functional roles are trained to use relevant software</li> </ul>

<b>Human Resources</b>		
49	<input type="checkbox"/>	The PHEOC has designated non-emergency staffing to manage the facility
50	<input type="checkbox"/>	Technical personnel are available for the operation, maintenance and repair of audio-visual, telecommunications and computer equipment.
51	<input type="checkbox"/>	There are personnel trained in emergency management and PHEOC standard operating procedures
52	<input type="checkbox"/>	There is sufficient trained staff to activate the PHEOC on short notice
53	<input type="checkbox"/>	The PHEOC has the capability to identify and contact a roster of trained personnel, equipment and supplies for deployment to field sites responders (e.g. rapid response teams)
<b>TRAINING AND EXERCISES</b>		
54	<input type="checkbox"/>	The PHEOC has a dedicated training program based on a training needs assessment for incident management personnel that addresses staff roles during response operations; utilization of communications and data processing equipment and software; and hazard-specific response knowledge.
55	<input type="checkbox"/>	The PHEOC has a comprehensive, progressive exercise program for all staff and partners, national and NGO agencies and produces evaluation reports that identify corrective actions required.
<b>MONITORING AND EVALUATION</b>		
56	<input type="checkbox"/>	The PHEOC training and exercise programs are primary components of a performance monitoring and evaluation system focused on continuous improvement of public health emergency management capability and effectiveness.
<b>COSTING, FUNDING AND SUSTAINING A PHEOC</b>		
57	<input type="checkbox"/>	The PHEOC plan includes an itemised schedule of costs
58	<input type="checkbox"/>	There is funding plan and funding mechanism to support the PHEOC
59	<input type="checkbox"/>	Funds are available to develop and sustain the PHEOC

## References

1. International Health Regulations (2005), Second edition. <http://www.who.int/ihr/publications/9789241596664/en/>
2. A systematic review of public health emergency operations centres (EOCs). December 2013. [http://www.who.int/ihr/publications/WHO\\_HSE\\_GCR\\_2014.1/en/](http://www.who.int/ihr/publications/WHO_HSE_GCR_2014.1/en/)
3. Summary report of systematic reviews of: plans and procedures; communication technology and infrastructure; minimum datasets and standards; training and exercises for public health emergency operations centres. [http://www.who.int/ihr/eoc\\_net/en/](http://www.who.int/ihr/eoc_net/en/)
4. Consultation meeting, Public Health Emergency Operations Centre Network, November 2012. [http://www.who.int/ihr/publications/WHO\\_HSE\\_GCR\\_2013.4/en/](http://www.who.int/ihr/publications/WHO_HSE_GCR_2013.4/en/)
5. First consultation meeting on a framework for public health emergency operations centres, April 2015. [http://www.who.int/ihr/publications/9789241509398\\_eng/en/](http://www.who.int/ihr/publications/9789241509398_eng/en/)
6. Framework and standards for country health information systems/Health Metrics Network, World Health Organization. 2008. [http://www.who.int/healthmetrics/documents/hmn\\_framework200803.pdf](http://www.who.int/healthmetrics/documents/hmn_framework200803.pdf)
7. Minimum Data Set for Health Workforce Registry Human Resources for Health Information System. [http://www.who.int/hrh/statistics/minimun\\_data\\_set/en/](http://www.who.int/hrh/statistics/minimun_data_set/en/)
8. Emergency Response Framework (ERF). 2013. <http://www.who.int/hac/about/erf/en/>

## Collaborators

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***A systematic review of public health emergency operations centres (EOC)***, December 2013 [2]

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<sup>1</sup> [http://www.who.int/ihr/eoc\\_net/en/index7.html](http://www.who.int/ihr/eoc_net/en/index7.html)

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<sup>2</sup> [http://www.who.int/ihr/eoc\\_net/en/index7.html](http://www.who.int/ihr/eoc_net/en/index7.html)

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