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**Health informatics — — Interoperability of public health  
emergency preparedness and response information systems**

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**Contents**

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## Contents

Foreword	8
Introduction	9
1	Scope 1
2	Normative references 1
3	Terms, definitions and abbreviated terms 1
<b>3.1.</b>	<b>Terms and definitions.....1</b>
3.2	Abbreviated terms 7
4	Requirements for PH EPR information systems 9
4.1	Defining the PH EPR information system's domain 9
4.2	General principles of management and conformance 10
4.2.1	Conformance with general incident management principles 10
4.3	PH EPR data and information management (DIM) processes 13
4.3.1	Background 13
4.3.2	Establishing strategies and goals for the PH EPR DIM 14
4.3.3	Defining goals for the PH EPR information system 14
4.4	Supporting PH EPR mission areas 16
4.5	Establishing data and information governance 16
4.5.1	Data and information governance: background and principles 16
4.5.2	Ongoing training 22
4.5.3	Defining Essential Elements of Information (EEIs) and Critical Information Requirements (CIRs) 23
4.5.4	Establishing a process for the collection, development, and utilization of standardized case definitions 25
4.6	Reporting 27
4.6.1	Data analytics and visualization. 27
5	Interoperability in PH EPR information systems 28
5.1	Background 28
5.2	Aligning the PH EPR information systems interoperability with the organizational interoperability of the activated IMS and overall emergency response 28
5.3	Facilitating the improvement of organizational interoperability through organizational emergency resilience 29
5.4	Assuring the expandability of PH EPR information systems without compromising interoperability 30
5.5	Usability 32
5.6	Adaptability 33
5.7	Measure-driven capabilities for PH EPR information systems 34
6	Business requirements for collecting, developing and maintaining PH EPR terminology and data vocabulary 35

6.1	Background	35
6.2	Alignment of standardized PH EPR terminology and vocabulary with critical PH EPR functions	36
6.3	Applying standardized terminology and vocabulary to emergency response to standard operations procedures (SOPs) and disaster planning	39
6.3.1	Utilising event grading and classifications of emergencies	40
6.3.2	Using the WHO International Classification of Diseases (ICD)	42
6.4	Assuring relevance and coverage	43
6.5	Role of stakeholders' involvement in collecting, developing, and maintaining a public health preparedness and response data vocabulary	44
6.6	Assuring flexibility and scalability of PH EPR vocabulary	46
6.7	Supporting tasks for PH EPR vocabulary quality and integrity	47
6.8	Ongoing maintenance and updates	48
6.9	Assuring compliance and fulfilment of regulatory requirements	50
6.10	Providing adequate training and support	51
	Annex A (informative) Recommendations on knowledge, skills and abilities for the fulfilment of essential PH EOC functions	53
	Appendix B (informative) Competencies for Public Health Emergency Preparedness and Response Informatics Professionals	63
A.1	Recommended higher order information management knowledge, skills, and aptitudes, KSA's	63
A.1.1	Model leadership	63
A.1.1.1	Solving problems under emergency conditions	63
A.1.1.2	Managing behaviours associated with emotional responses in self and others	63
A.1.1.3	Facilitating collaboration with internal and external emergency response partners	64
A.1.1.4	Maintaining situational awareness	65
A.1.1.5	Demonstrating respect for all persons and cultures	65
A.1.1.6	Acting within the scope of one's legal authority	66
A.1.2	Communicate and Manage Information	66
A.1.2.1	Manage information related to an emergency	66
A.1.2.2	Using principles of crisis and risk communication	66
A.1.2.3	Reporting information potentially relevant to the identification and control of an emergency through the chain of command	67
A.1.2.4	Collecting data according to protocol	67
A.1.2.5	Managing data recording and/or transcription according to protocol	68
A.1.3	Planning for and improve practice	68
A.1.3.1	Contributing expertise to a community hazard vulnerability analysis (HVA)	68
A.1.3.2	Contributing expertise to the development of emergency plans	69
A.1.3.3	Participating in improving the organization's capacities (including, but not limited to programmes, plans, policies, laws, and workforce training)	69

~~A.1.4—Protecting Worker Health and Safety—70~~

~~A.1.4.1 Maintaining personal/family emergency preparedness plans—70~~

~~A.1.4.2 Employing protective behaviours according to changing conditions, personal limitations, and threats—70~~

~~A.1.4.3 Reporting unresolved threats to physical and mental health through the chain of command—71~~

~~A.2—Critical Information Management Competencies—71~~

<b>Foreword</b> .....	<b>8</b>
<b>Introduction</b> .....	<b>9</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms, definitions and abbreviated terms</b> .....	<b>1</b>
<b>3.1 Terms and definitions</b> .....	<b>1</b>
<b>3.2 Abbreviated terms</b> .....	<b>7</b>
<b>4 Requirements for PH EPR information systems</b> .....	<b>9</b>
<b>4.1 Defining the PH EPR information system’s domain</b> .....	<b>9</b>
<b>4.2 General principles of management and conformance</b> .....	<b>10</b>
<b>4.2.1 Conformance with general incident management principles</b> .....	<b>10</b>
<b>4.3 PH EPR data and information management (DIM) processes</b> .....	<b>13</b>
<b>4.3.1 Background</b> .....	<b>13</b>
<b>4.3.2 Establishing strategies and goals for the PH EPR DIM</b> .....	<b>14</b>
<b>4.3.3 Defining goals for the PH EPR information system</b> .....	<b>14</b>
<b>4.4 Supporting PH EPR mission areas</b> .....	<b>16</b>
<b>4.5 Establishing data and information governance</b> .....	<b>16</b>
<b>4.5.1 Data and information governance: Background and principles</b> .....	<b>16</b>
<b>4.5.2 Ongoing training</b> .....	<b>22</b>
<b>4.5.3 Defining Essential Elements of Information (EIs) and Critical Information Requirements (CIRs)</b> .....	<b>23</b>
<b>4.5.4 Establishing a process for the collection, development, and utilization of standardized case definitions</b> .....	<b>25</b>
<b>4.6 Reporting — Data analytics and visualization</b> .....	<b>27</b>
<b>5 Interoperability in PH EPR information systems</b> .....	<b>28</b>
<b>5.1 Background</b> .....	<b>28</b>
<b>5.2 Aligning the PH EPR information systems interoperability with the organizational interoperability of the activated IMS and overall emergency response</b> .....	<b>28</b>
<b>5.3 Facilitating the improvement of organizational interoperability through organizational emergency resilience</b> .....	<b>29</b>
<b>5.4 Assuring the expandability of PH EPR information systems without compromising interoperability</b> .....	<b>30</b>
<b>5.5 Usability</b> .....	<b>32</b>

<b>5.6</b>	<b><u>Adaptability</u></b>	<b>33</b>
<b>5.7</b>	<b><u>Measure-driven capabilities for PH EPR information systems</u></b>	<b>34</b>
<b>6</b>	<b><u>Business requirements for collecting, developing and maintaining PH EPR terminology and data vocabulary</u></b>	<b>35</b>
<b>6.1</b>	<b><u>Background</u></b>	<b>35</b>
<b>6.2</b>	<b><u>Alignment of standardized PH EPR terminology and vocabulary with critical PH EPR functions</u></b>	<b>36</b>
<b>6.3</b>	<b><u>Applying standardized terminology and vocabulary to emergency response to standard operations procedures (SOPs) and disaster planning</u></b>	<b>39</b>
<b>6.3.1</b>	<b><u>General</u></b>	<b>39</b>
<b>6.3.2</b>	<b><u>Utilising event grading and classifications of emergencies</u></b>	<b>40</b>
<b>6.3.3</b>	<b><u>Using the WHO International Classification of Diseases (ICD)</u></b>	<b>42</b>
<b>6.4</b>	<b><u>Assuring relevance and coverage</u></b>	<b>43</b>
<b>6.5</b>	<b><u>Role of stakeholders' involvement in collecting, developing, and maintaining a public health preparedness and response data vocabulary</u></b>	<b>44</b>
<b>6.6</b>	<b><u>Assuring flexibility and scalability of PH EPR vocabulary</u></b>	<b>46</b>
<b>6.7</b>	<b><u>Supporting tasks for PH EPR vocabulary quality and integrity</u></b>	<b>47</b>
<b>6.8</b>	<b><u>Ongoing maintenance and updates</u></b>	<b>48</b>
<b>6.9</b>	<b><u>Assuring compliance and fulfilment of regulatory requirements</u></b>	<b>50</b>
<b>6.10</b>	<b><u>Providing adequate training and support</u></b>	<b>51</b>
	<b><u>Annex A (informative) Criteria to take into account on knowledge, skills and abilities for the fulfilment of essential PH EOC functions</u></b>	<b>53</b>
	<b><u>Annex B (informative) Competencies for Public Health Emergency Preparedness and Response Informatics Professionals</u></b>	<b>63</b>
	<b><u>Bibliography</u></b>	<b>72</b>

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

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This document was prepared by Technical Committee ISO/TC 215, *Health informatics*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).



## Introduction

The public health emergency preparedness and response operations are the critical component of the Global Health Security as well as the national multi-jurisdictional and multi-sectoral emergency response. All these operations rely on a unity of command approach, which FEMA defines as principles clarifying the reporting relationships and eliminating the confusion caused by multiple, conflicting directives. Another critical component of emergency response operations is implementing disaster management interoperability that supports the unity of command through equipping all responders with a clear understanding of their own responsibilities and functional interdependencies with other responders. From an information management perspective, it is important to note that the disaster management interoperability processes include development of communication channels that allow to share information via voice, data signals and electronic data developed on standardized terminology and vocabulary.

This document has been developed in response to the worldwide demand for strengthening PH EPR information systems, ensuring better preparedness at national and international levels, emerging pathogens, including COVID-19, chemical and nuclear accidents, environmental disasters and introduction of the threat of criminal acts and bioterrorism.

The document has been developed based on concepts and methodology described in:

- ~~— 2015 WHO Framework for a Public Health Emergency Operations Centre and supporting WHO Handbooks A and C that were published in 2018,<sup>[33]</sup>~~
- ~~— ISO/IEC 25012:2008 Software engineering — Software product Quality Requirements and Evaluation (SQuaRE) — Data quality model~~
- ~~— ISO/IEC 25012<sup>[34]</sup>~~
- ~~— ISO 30401:2018 Knowledge Management Systems Requirements,<sup>[35]</sup>~~
- ~~— ISO 13054:2012 Knowledge Management of Health Information Management Standards,~~
- ~~— ISO 13054<sup>[36]</sup>~~
- ~~— ISO 22300:2018 Security and resilience — Vocabulary,<sup>[37]</sup>~~
- ~~— ISO 22320:2018 Security and resilience — Emergency management — Guidelines for incident management~~
- ~~— ISO 1087:2019 Terminology work and terminology science — Vocabulary~~

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— ISO 22320<sup>[19]</sup>;

— ISO 1087<sup>[38]</sup>.

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# Health informatics — Interoperability of public health emergency preparedness and response information systems

## 1 Scope

This document provides business rules for PH EPR information systems. It includes a description of the EPR information systems domain. It also includes an informative framework for mapping existing semantic interoperability standards for emergency preparedness and response to PH EPR information systems.

The primary target audience for this document is policy makers (governmental or organizational), regulators, project planners and management of PH EPR information systems, PH EPR data analysts and informaticians. The contents ~~will~~is also ~~be~~ of interest to other stakeholders such as incident managers, PH educators, standards developers and academia.

## 2 Normative references

~~The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.~~

There are no normative references in this document.

## 3 Terms, definitions and abbreviated terms

### 3.1 3.1. Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ~~ISO~~ Online browsing platform: available at <https://www.iso.org/obp>
- ~~IEC~~ Electropedia: available at <https://www.electropedia.org/>

#### 3.1.1

##### all-hazards approach

integrated approach to emergency preparedness planning that focuses on capacities and capabilities that are critical to preparedness for a full spectrum of emergencies or disasters, including internal emergencies and a man-made emergency (or both) or natural disaster

~~Note 1 to entry:~~ The all-hazard approach acknowledges that, while hazards vary in source (natural, technological, societal), they often challenge health systems in similar ways. Risk reduction, emergency preparedness, response actions and community recovery activities are usually implemented along the same model, regardless of the cause.

### 3.1.2

#### case definition

<public health preparedness and surveillance> set of standard criteria for classifying whether a person has a particular disease, syndrome, or other health condition

Note\_1\_to\_entry:- Use of an agreed-upon standard case definition ensures that every case is equivalent, regardless of when or where it occurred, or who identified it. Furthermore, the number of cases or rate of disease identified in one time or place can be compared with the number or rate from another time or place.

### 3.1.3

#### code set

<data> collections of codes or identifiers that are used to represent specific values within a value set

Note\_1\_to\_entry:- These codes are often standardized and internationally recognized, such as ICD-10 codes for diseases or SNOMED CT codes for clinical terms.

### 3.1.4

#### common operating picture

##### COP

unified and shared understanding of a situation or scenario, that involves gathering and integrating data, information, and intelligence from various sources and presenting it in a comprehensive and accessible manner.

Note\_1\_to\_entry:- The COP aims to provide all stakeholders with a real-time, accurate, and synchronized view of the operational environment, enabling effective decision-making, coordination, and communication among the involved parties.

### 3.1.5

#### concept

<public health emergency preparedness and response data vocabulary > set of terms or concepts that have been agreed upon and adopted by a broader community or standard-setting organization in the context of public health emergency preparedness and response

Note\_1\_to\_entry:- Public health emergency preparedness and response concepts are codified within the public health emergency preparedness and response data *vocabulary* (3.1.24)-(3.1.26). They designed in a way to ensure that data is collected and reported in a standardized and consistent manner, enabling effective communication and decision-making during emergency response.

### 3.1.6

#### critical information requirement

##### CIR

high-priority subset of *EEIs* (3.1.11)(3.1.11) that triggers immediate or mandatory action

Note\_1\_to\_entry:- These are elements of information specifically requested by incident leaders. These items are of such importance that leaders are notified immediately when the Planning Section receives updates on a CIR item.

### 3.1.7

#### data governance

process of overall management of the availability, usability, integrity, and security of the data employed in an enterprise assuring that the decision-making process prioritizes investments, allocates resources, and measures results

Note\_1\_to\_entry:- Data governance is a component of the *information governance* (3.1.13)-(3.1.13).

**3.1.8****disaster management interoperability**

ability of systems, personnel, and equipment to provide and receive functionality, data, information and/or services to and from other systems, personnel, and equipment, between both public and private agencies, departments, and other organizations, in a manner enabling them to operate effectively together

~~Note 1 to entry:~~ It allows emergency management/response personnel and their affiliated organizations to communicate within and across agencies and jurisdictions via voice, data, or video-on-demand, in real time, when needed, and when authorized.

**3.1.9****domain**

<information system> ~~a~~ logical grouping of data pertaining to a common purpose, object, or concept.

~~Note 1~~ Note 1 to entry: The domain defines the context, requirements, and objectives that shape the design, functionality, and capabilities of the information system.

**3.1.10****emergency operations centre****EOC**

physical location at which the coordination of information and resources to support incident management (on-scene operations) activities normally takes place

~~Note 1 to entry:~~ An EOC can be a temporary facility or located in a more central or permanently established facility, perhaps at a higher level of organization within a jurisdiction.

~~Note 2 to entry:~~ EOCs can be organized by major functional disciplines (e.g., fire, law enforcement, medical services), by jurisdiction (e.g., Federal, State, regional, tribal, city, county), or by some combination thereof.

**3.1.11****essential elements of information****EElS**

<emergency preparedness> crucial pieces of information necessary for effective planning, response, and coordination in the field of public health emergency preparedness and response.

~~Note 1 to entry:~~ EElS encompass key data, indicators, and intelligence that are essential for public health agencies and organizations to assess, monitor, and respond to public health emergencies and disasters.

~~Note 2 to entry:~~ EElS are specifically tailored to the unique needs and requirements of public health preparedness, including vital information related to disease surveillance, epidemiological data, healthcare system capacity, medical resources availability, population demographics, risk assessments, and other factors influencing public health response efforts.

**3.1.12****incident management system****IMS**

comprehensive, interoperable organizational model for government, nongovernmental organizations, and the private sector to prevent, protect against, mitigate, respond to, and recover from incidents.

~~Note 1 to entry:~~ It provides stakeholders with a platform for sharing resources, coordinating and managing incidents, and communicating information through shared vocabulary, systems, and processes to successfully deliver the capabilities.

### **3.1.13 information governance**

overall strategy that outlines the responsibility for ensuring appropriate behaviour when valuing, creating, storing, using, archiving, and deleting information for an enterprise.

~~Note 1 to entry:~~ It is a fundamental component of enterprise governance that includes processes, roles, policies, standards and metrics that help an organization achieve its goals.

### **3.1.14 information system**

one or more computer systems and communication systems together with associated organizational resources such as human, technical, and financial resources that provide and distribute information.

[SOURCE: ISO/IEC 25012:2008, 4.11]

### **3.1.15 interoperability**

<IT> ability of different information systems, devices and applications (systems) to access, exchange, integrate and cooperatively use data in a coordinated manner, within and across organizational, regional and national boundaries, to provide timely and seamless portability of information.

~~Note 1 to entry:~~ IT interoperability is a component of disaster management interoperability.

~~Note 2 to entry:~~ IT interoperability ensures that diverse technologies can understand, interpret, and utilize information exchanged between them without loss or distortion, allowing the smooth transfer of data, commands, and functionalities between different systems, enabling them to work together in a cohesive manner.

### **3.1.16 preparedness**

<public health> ability to effectively anticipate, respond to, and recover from the impacts of likely, imminent, or current hazard events or conditions.

~~Note 1~~ **Note 1** to entry: Public health preparedness encompasses the planning, organization, and coordination of resources and actions that is carried out within the context of disaster risk management and aims to build the capacities needed to efficiently manage all types of emergencies and achieve orderly transitions from response through to sustained recovery.

~~Note 2 to entry:~~ Public health preparedness is based on a sound analysis of disaster risks and good linkages with early warning systems, and includes such activities as contingency planning, stockpiling of equipment and supplies, the development of arrangements for coordination, evacuation and public information, and associated training and field exercises. These must be supported by formal institutional, legal and budgetary capacities.

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**3.1.17****population health**

science of protecting and improving the health of people and their communities through promoting healthy lifestyles, researching disease and injury prevention, and detecting, preventing and responding to infectious diseases and other health threats

Note-1-to entry:-The field of population health includes health outcomes, patterns of health determinants, and policies and interventions that link these two.

Note-2-to entry:-Population health is a multidisciplinary approach that is based on a variety of disciplines, including epidemiology, biostatistics, social and ~~behavioral~~behavioural sciences, emergency preparedness and response, health policy and management. It is focused on understanding and addressing the health needs of populations, with the goal of improving health outcomes and reducing health disparities.

**3.1.18****public health**

science and practice of protecting and improving the health of individuals, communities, and populations through the prevention of disease, injury, and other health-related issues.

Note-1-to entry:-Public health works to promote healthy behaviours and environments, identify and respond to health threats, and address health inequalities and disparities.

Note-2-to entry:-Public health is a multidisciplinary field that draws on a variety of scientific and social science disciplines, including epidemiology, biostatistics, environmental health, social and behavioural sciences, and health policy and management. Public health professionals work in a range of settings, including public health departments, healthcare organizations, community-based organizations, academia, and government agencies.

**3.1.19****public health and medical situational awareness**

knowledge state that results from the process of active information gathering with appropriate analysis, integration, interpretation, validation and sharing of information related to health threats and the health of the human population, as well as health system and human services resources, health-related response assets, and other information that ~~could~~can impact the public's health to inform decision making and resource allocation.

Note-1-to entry:-Public health medical and situational awareness is critical in emergency response because it enables healthcare professionals to make informed decisions and take appropriate actions to mitigate the impact of the crisis. It allows them to identify potential risks and challenges, assess the capacity of the healthcare system, and develop effective strategies to manage the crisis.

Note-2-to entry:-The public health medical and situational awareness plays a significant role in preventing public health emergencies and medical crises by enabling proactive risk assessment and mitigation. It involves identifying potential threats, developing early warning systems, and implementing appropriate preventive measures to prevent or mitigate a crisis.