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Healthcare organization management — Pandemic response — Response resource information management

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Foreword

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This document was prepared by Technical Committee ISO/TC 304, *Healthcare organization management*.

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Introduction

During a public health emergency (PHE), resources such as masks and gloves are extremely important for an effective and appropriate response.

The rapid spread of a disease within a municipality or in a country can incur various obstacles in an effective PHE response, especially in terms of PHE response resources. With proper management, resources can be timely produced, used and distributed to the right place at the right time.

To have proper management, the information used by the information and communication technology (ICT) system, which is essential in modern society, should be collected and managed in an appropriate manner. Effective information management enables resource management, including the collection, storage, and distribution of response resources by health facilities, facilitating better resource control and the establishment of appropriate response plans.

Healthcare organization management — Pandemic response — Response resource information management

1 Scope

This document specifies requirements for the management of information related to response resources for a public health emergency (PHE) response, from the perspective of information and communication technology (ICT). This document provides:

— an overview of response resource information management;

— requirements for managing response resource information including:

  — information collection;

  — information storage;

  — information disposal;

  — information distribution.

The requirements in this document can only be effectively applied, if information exchange described in Clause 5 is supported at both municipal and national levels.

2 Normative references

There are no normative references in this document.

3 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
PHE response resource
public health emergency response resource
medical resource essentially used during a public health emergency

3.2
negative pressure isolation room
NPIR
room where the ventilation system is designed in such a way that the pressure in the room is below that of the surrounding areas to isolate patients with airborne diseases

3.3
personal protective equipment
PPE
device or appliance designed to be worn or held by an individual for protection against one or more health and safety hazards

[SOURCE: ISO 15384:2018, 3.12]

3.4
heating, ventilation and air conditioning system
HVAC system
system that provides heating, ventilation or air conditioning for buildings

[SOURCE: ISO 16814:2008, 3.18, modified — the full form "heating, ventilation and air conditioning system" has been added as a preferred term.]

4 Overview

Personal protective equipment (PPE), such as masks and respirators, are used to protect against the inhalation of infectious aerosols. Hospital rooms are used to accommodate patients, and temporary accommodations are needed to accommodate a sharply increasing number of patients. A heating, ventilation, and air conditioning (HVAC) system is also needed to create negative pressure isolation rooms (NPIRs) to prevent cross-contamination between rooms. Ventilators for patients with severe respiratory failure, as well as medicines such as vaccines, drugs, and assessment tools, are also important in responding a PHE. Figure 1 illustrates examples of PHE response resources for protection and treatment.

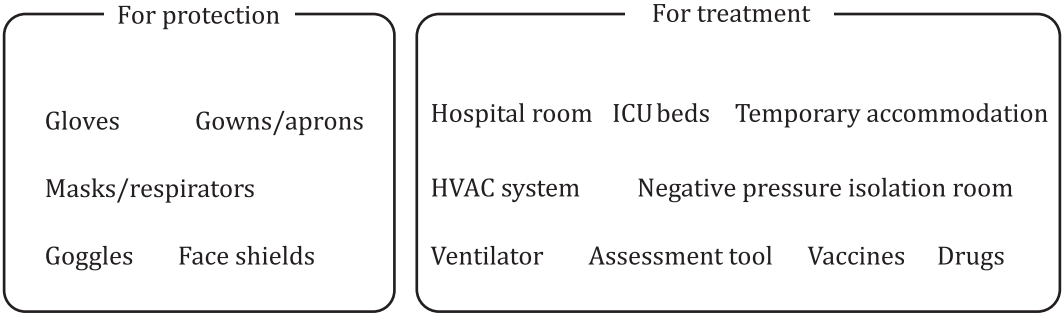


Figure 1 — Examples of resources for responding public health emergency

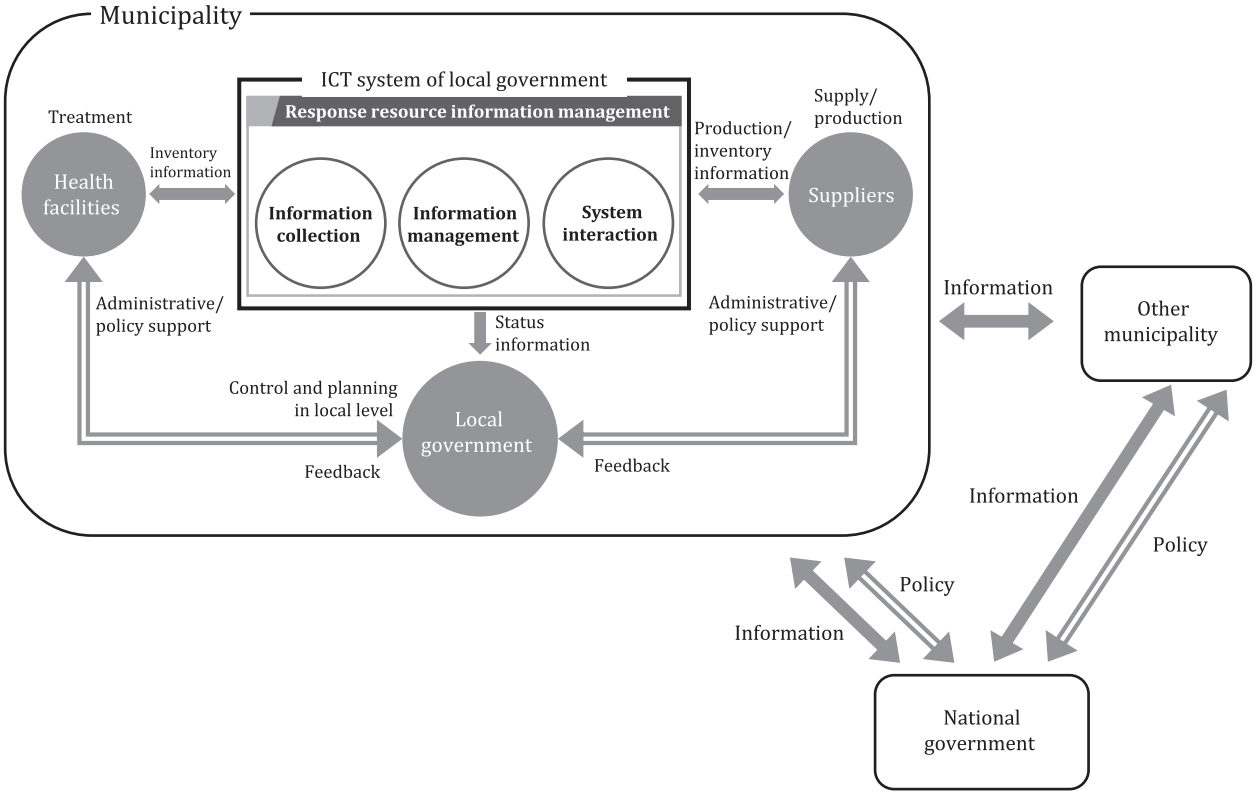
The rapid spread of disease within a municipality or a country can create various obstacles in PHE response. For example, there can be a shortage of PPE, which can accelerate the spread of disease. A health facility in one municipality can lack a sufficient number of rooms, assessment tools, or drugs, while another municipality can have an abundant number of resources. Local or national governments can address such obstacles by issuing Emergency Use Authorizations (EUAs), transferring patients to another health facility, or establishing emergency temporary accommodations. Therefore, effective management of response resource requires ensuring timely production of these resources in sufficient quantities and their timely distribution to the right locations for appropriate use.

5 Information management of response resource

5.1 Concept of response resource information management

In a municipality equipped with a well-planed ICT infrastructure, health facilities, suppliers, and the local government can interact with each other to manage response resources. Figure 2 illustrate the concept of response resource information management and the role of ICT system within the local government. Health facilities, such as local clinics or hospitals, provide information about their inventory to the ICT system of local government. Suppliers provide the information about their production capabilities and inventory. Based

on the information, the local government can manage resources or establish a response plan. Municipalities can exchange their information with each other to facilitate a collaborated response. In addition, the local government can interact with the national government for national-level of management.



Key

information flow

administrative flow

Figure 2 — Concept of response resource information management

5.2 Components

5.2.1 Health facilities

Health facilities provide data on their inventory of resources, including PPE, patient room, HVAC systems, ventilators, medicine, and assessment tools. Data from health facilities can be transmitted either through real-time data transfers or batch transfers. Depending on the type of data transfer, transmission can occur via autonomous synchronization among ICT systems, short message service (SMS), instant message, handwritten messages, phone conversations, or other suitable means.

To obtain the information on resources, health facilities employ diverse approaches such as scanning NFC tags, QR codes, or manual counting. Health facilities are responsible for reporting the collected information about response resources. Reports include details on medical supplies, equipment, and medication, the number of patients, available beds, and staffs. Additionally, reports can include testing results and vaccination status. Accurate recording and management of the collected information in databases are crucial, along with tracking the latest status of the resources usage over time.

Upon request from the government, health facilities share the information with the local government or national government as part of their report, which can be sent periodically. Reports serve essential tools for effective resource allocation and management, enabling local or national governments to identify areas of need and allocate resources accordingly. Reports can be also used as an indicator of trends in an emergency situation.

5.2.2 Suppliers

Suppliers provide information on their supply capability for response resources. If suppliers operate their own factories producing response resources, they can provide valuable insights into their production capability, inventory status, lead times, and potential supply chain disruptions. This information is vital for local government agencies (or departments) to assess resource availability and establish appropriate acquisition, production, or distribution plans.

The information can be used by health facilities or local governments to evaluate overall resource availability and make informed decisions on allocation and distribution. For example, if a supplier informs the local government about limited availability of face masks due to increased demand, the local government can utilize this information to develop strategies to procure additional masks from alternative sources or to prioritize mask distribution to high-risk areas.

5.2.3 ICT system of local government

The ICT system of local government can support collecting, managing and analysing data related to response resources, such as inventory levels, production capability, and other critical details.

Secure management of sensitive data, including capacities, beds, staff, ventilators, and PPE, can be supported by ICT systems in accordance with applicable policies and regulations. This includes ensuring that sensitive information is securely stored and accessed only by authorized entities.

Another possible responsibility of the ICT system is to support local governments and health facilities in analysing the collected data enabling them to identify areas of need and effective allocate resources. Based on this analysis, the ICT system can support local governments and health facilities to make informed decisions regarding resource distribution, ensuring that response resources are allocated effectively during a public health emergency. The analysis results provided by the system can also support coordination efforts, such as facilitating patient transfers between health facilities to prevent them from becoming overwhelmed, and enabling sharing of staff and resources among facilities experiencing shortages.

Moreover, the ICT system can facilitate communication and collaboration between municipalities and even between local and national governments. This promotes a coordinated response to the public health emergency, allowing for the sharing of staff, resources, and expertise to address shortages and efficiently manage response efforts.

The actual extent of data sharing, cooperation, and coordination remains dependent upon existing governance structures, local policies, and regulations.

5.2.4 Local government

Local government can be responsible for coordinating and distributing response resources during a public health emergency. Local government ensures that health facilities receive necessary resources based on their specific needs. In situations where a health facility's capacity becomes overwhelmed, local government takes proactive such as establishing temporary facilities or repurposing existing buildings to accommodate the influx of severe patients. Local government can also authorize the use of temporary accommodates, such as hotels or dormitories, for patients recovering from less severe illnesses or awaiting transfer to a health facility. To achieve such purpose, local government works closely with health facilities and local suppliers through its ICT system to collect data and identify areas of need, which helps in allocating resources effectively.

In addition, local government can coordinate the distribution of critical supplies to the local population during a public health emergency. This includes the distribution of essential items such as food, water, PPE, medicine, and other vital resources. Furthermore, the local government can provide support services such as transportation to assist individuals facing challenges in accessing the resources needed. By ensuring availability of critical supplies and services, local government can help to mitigate the impacts of a public health emergency and facilitate an effective response.

Establishing testing sites and providing guidance on response efforts can be important roles of local government. Through the testing sites, local government can enable widespread testing to identify infected

individuals and implement appropriate containment strategies. Local government can also provide guidance on response efforts, disseminating information to the public about preventive measures, treatment options, and available resources. Local government can manage the testing results in its ICT system and interact with national government to report the results for further analysis.

Furthermore, local government can collaborate with other municipalities to ensure a coordinated response across a broader geographic area. The local government can serve as a bridge between the local and the national actions, providing vital information to help the national government make informed decisions about the allocation of resources at the national level.

The actual role remains dependent upon existing governance structures, local policies, and regulations.

NOTE The term "local government" can refer to a municipal, regional, or state governments (in federal systems), as well as other subnational administrative units.

5.2.5 National government

The national government coordinates the response to a public health emergency at a countrywide level. It is responsible for ensuring the efficient and effective distribution of resources throughout the entire nation. In addition, the national government can issue nationwide guidelines or policies aimed at preventing, containing, and treating the disease. Examples of such measures include issuing emergency use authorizations (EUAs) to rapidly respond to public health emergencies, as well as enforcing measures such as quarantine, lockdowns, capacity limits, and mask mandates.

One of the possible key responsibilities of the national government is to identify and isolate infected individuals. To support this effort, the national government can provide free diagnostic testing or offer financial assistance to affected individuals or businesses. Furthermore, the national government can allocate funds to support medical research and the development of vaccines or treatment options.

NOTE Regardless of their importance, identification and isolation are applicable only at the national level in some countries, as the structure of the health system differs across countries.

To fulfil its role, the national government can interact with local governments. This partnership allows for identification of areas of need and the allocation of resources accordingly. Additionally, the national government can work with suppliers or manufacturers to ramp up production in response to increased demand. For instance, the national government can implement policies to requisition domestically produced response resources to ensure an adequate supply for healthcare workers and the general public. Moreover, the national government can collaborate with local suppliers by offering financial incentives and assistance with securing raw materials, to boost their supply or production capacity.

NOTE The term "national government" can refer to a central government in unitary states or a federal government in federal states.

6 ICT perspective requirements of response resource information management

6.1 Information collection

To manage response resource information, it is important to collect information on response resources. Each health facility and supplier collects and maintains information regarding response resources for further use. For information collection, the following requirements and recommendations apply:

— A health facility shall collect the comprehensive information on its inventory, including details on medical supplies, equipment, and medication, and capability details such as the number of patients, available beds, and staffs.

— A health facility shall collect the information on testing results conducted at the facility.

— A health facility should collect the information on vaccination status conducted at the facility.

— A supplier shall collect the information on its production capability, inventory status (including available material and response resources in stock), lead times, potential supply chain disruptions.

— A health facility and supplier should utilize data collection methods including scanning NFC tags, QR codes, and manual input.

— A health facility and supplier should adopt standardized data format to ensure consistency and interoperability.

6.2 Information storage

To manage response resource information, it is important to manage the stored information after collection. For information storage, the following requirements apply:

— A health facility shall store the collected information securely and manage it properly to maintain the stored information appropriately.

— A health facility should consider utilizing external service providers, such as cloud-based storage suppliers, to securely store and manage collected information, if it does not have sufficient internal capabilities.

— A supplier shall store the collected information securely and manage it properly to maintain the stored information appropriately.

— A supplier should consider utilizing external service providers, such as cloud-based storage suppliers, to securely store and manage collected information, if it does not have sufficient internal capabilities.

— A local government shall store the collected information securely and manage it properly to maintain the stored information appropriately.

— A local government should consider utilizing external service providers, such as cloud-based storage suppliers, to securely store and manage collected information, if it does not have sufficient internal capabilities.

— A national government shall store the collected information securely and manage it properly to maintain the stored information appropriately.

— A national government should consider utilizing external service providers, such as cloud-based storage suppliers, to securely store and manage collected information, if it does not have sufficient internal capabilities.

6.3 Information disposal

To manage response resource information, it is important to dispose of personally identifiable information (PII) and other privacy—sensitive data. For information disposal, the following requirements apply:

— A health facility shall dispose of any privacy-related information collected, in accordance with the applicable policies.

— An ICT system of local governments shall dispose of any privacy-related information collected, in accordance with the applicable policies.

— Agencies or departments of local government shall dispose of any privacy-related information collected, in accordance with the applicable policies.

— Agencies or departments of national government shall disposal of any privacy-related information, in accordance with the applicable policies.

6.4 Information distribution

To manage response resource information, it is important to distribute or share the stored information properly. For information distribution, the following recommendations apply:

— A health facility should share the stored information with ICT system of local government as a periodic or non-periodic report.

— A supplier should share the stored information with ICT system of local government as a periodic or non-periodic report.

— A local government should share the stored information with national government as a periodic or non-periodic report.

— A local government should share the stored information with other local government based on the request or appropriate policy.

6.5 System interaction

To manage response resource information, interaction among components is inevitable. For system interaction, the following recommendations apply:

— A health facility should be capable of communicating with ICT system of local government, and local government including relevant agencies or departments.

NOTE 1 Health facility can communicate with ICT system of national government, if local government does not have ICT system.

— A supplier should be capable of communicating with ICT system of local government, and local government including relevant agencies or departments.

NOTE 2 Supplier can communicate with ICT system of national government, if local government does not have ICT system.

— A local government should be capable of communicating with health facilities and suppliers in the ICT system of local government, and local government including relevant agencies or departments.

— A local government should be capable of communicating with other local governments in the same nation.

— A national government should be capable of communicating with its local governments.

— Communication among the components should adopt standardized protocol to ensure interoperability and extensibility.

— Communication among the components should be secure to protect data in transit.

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