



**International
Standard**

ISO 37113

**Sustainable cities and
communities — Guidance
for managing a public-health
emergency response in smart city
operating models**

*Villes et communautés territoriales durables —
Recommandations pour la gestion d'une réponse d'urgence en
matière de santé publique dans les modèles d'exploitation des
villes intelligentes*

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Foreword

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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).

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This document was prepared by Technical Committee ISO/TC 268, *Sustainable cities and communities*.

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.

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Introduction

Managing public-health emergencies (PHEs) and eliminating their impact on sustainable development has become a common challenge for all countries in the world. In recent years, various types of PHEs [e.g. Ebola virus disease (EVD) in West Africa, the Middle East Respiratory Syndrome (MERS), Zika virus disease, COVID-19 and monkeypox], have caused severe consequences to countries around the world. This has critically challenged the public-health emergency management (PHEM) systems of many countries, especially developing countries. Eliminating the impact of sudden public-health events is an important goal for achieving sustainable development globally.

The rapid development of the internet, Internet of Things (IoT), artificial intelligence (AI), cloud computing and other information and communication technologies are accelerating change across the economy and society at large. In smart cities and communities, new network facilities, new data environments, and new technology applications offer the potential to transform the effectiveness of PHEM. This enables monitoring and analysis, virus tracing, prevention and control treatment, resource allocation and other aspects of PHEs, to be managed more quickly. It also allows more efficient and transparent reporting systems, and more effective medical, social and economic outcomes.

Equally, however, technology can only make a difference when accompanied by innovative ways of working through smart governance processes, supported by interoperable standards that enable organizations to collaborate in new ways to deliver integrated action, efficiently, effectively and at scale. This is done through partnership across the public sector and private sector, and across local, regional, national and international levels of government.

This document brings together practical recommendations to community authorities on how to plan and deliver this type of smart response to PHEs, combining innovation in technology with innovation in governance processes. These recommendations are designed to be flexible, enabling tailored implementation by the local governments of cities and communities in ways that recognize their unique situation and policy context.

This document helps leaders of cities and communities to:

- use smart technologies, following the principles of ISO 37106, to manage relevant facilities and resources for PHEs, enabling dynamic real-time monitoring and management of relevant data;
- support a more effective response to PHEs and promote more effective cooperation among all interested parties, based on each stage of the command-and-control process for emergency management and incident response set out in ISO 22320;
- help cities to assess the current level of maturity of a PHE response in smart city operating models;
- improve urban resilience so that the cities or communities can adapt to all risks in PHEs and lead towards sustainability with the help of smart city operating models.

NOTE This document was informed by research from cities around the world on how smart operating models supported effective responses to the COVID-19 pandemic, as described in ISO/TR 37112.

The document is structured as follows:

- [Clause 1](#) describes the scope;
- [Clause 2](#) lists normative references;
- [Clause 3](#) sets out the terms and definitions used in the document;
- [Clause 4](#) illustrates the framework for smart city operating models in response to PHEs;
- [Clause 5](#) describes how to implement smart city operating models in response to PHEs;
- [Clause 6](#) describes the way to improve the maturity of smart city operating models in response to PHEs within a community;

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- [Annex A](#) describes the maturity model for smart city operating models in response to PHEs.

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Sustainable cities and communities — Guidance for managing a public-health emergency response in smart city operating models

1 Scope

This document provides guidance to community authorities on how to use smart technologies and smart ways of working to improve their ability to anticipate, manage and mitigate public-health emergencies (PHEs), including through transparent, interactive and citizen-centric communications with citizens. It does this by demonstrating how the principles and good practices for smart city operating models recommended in ISO 37106 can deliver improved outcomes in public-health emergency management (PHEM), at every stage of the command-and-control process for emergency management and incident response set out in ISO 22320.

This document sets out recommendations for community authorities and provides tools that can be used to assess the maturity of community systems for smart PHEM.

This document applies to all types of cities and communities that are willing to apply smart city operating models to respond to PHEs.

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.

ISO 37100, *Sustainable cities and communities — Vocabulary*

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3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 37100 and the following 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

public-health emergency

PHE

sudden occurrence of major infectious diseases, diseases of unknown causes, major food and water and occupational poisoning and other events that seriously affect and cause, or can cause, damage to public-health

3.2

public-health risk

likelihood of an event that can adversely affect the health of the human population, with an emphasis on one which can spread internationally or can present a serious and direct danger

4 Framework for smart city operating models in response to PHEs

This document supports the United Nations Sustainable Development Goals (UN SDGs) of making cities and human settlements inclusive, safe, resilient and sustainable, and is an enabler for all six strategic purposes of a sustainable community described in ISO 37101. It does so by providing an overall framework for smart city operating models in response to PHEs, as summarized in [Figure 1](#).

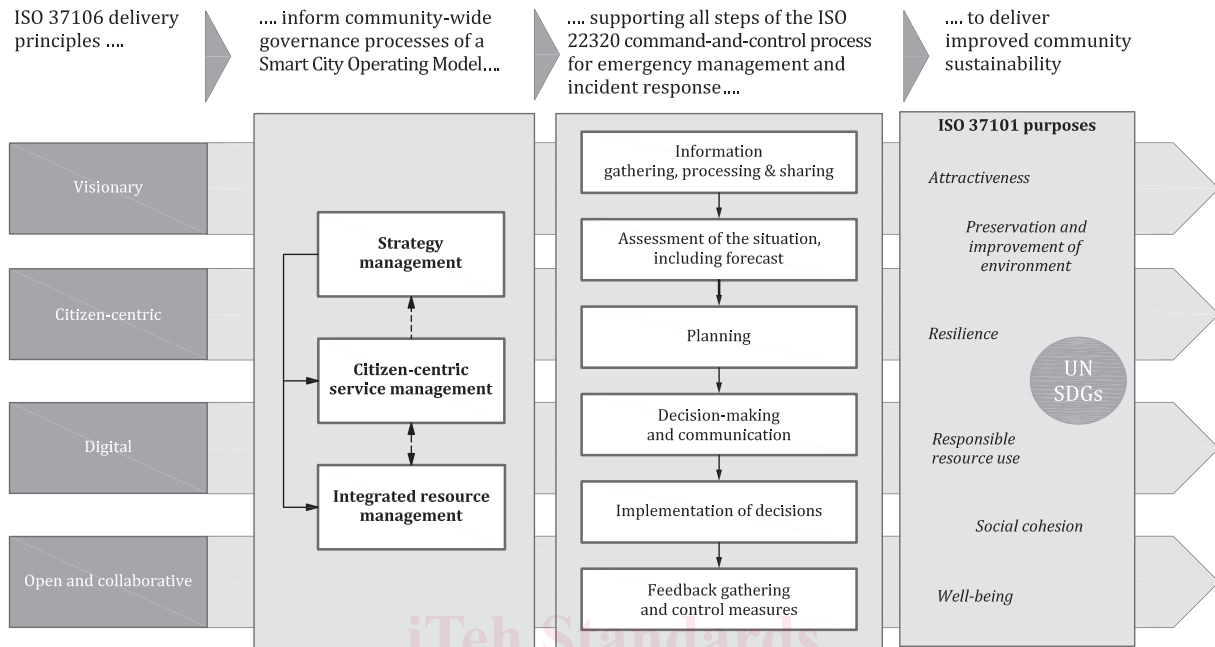


Figure 1 — Framework for smart city operating models in response to PHEs

In particular, this document:

- a) is informed by the four delivery principles for a 'smart city operating model' described in ISO 37106:
 - 1) establishing a clear, compelling and inclusive vision for the sustainable future of the community;
 - 2) taking a citizen-centric approach to all aspects of service design and delivery;
 - 3) enabling a ubiquitous, integrated and inclusive digitization of community spaces and systems;
 - 4) embedding openness and collaboration in the way the community works;
- b) provides recommendations for community authorities on how each of the three community-wide governance processes for a smart city operating model established by ISO 37106 (e.g. strategy management, citizen-centric service delivery, and digital and physical asset management) can support more effective PHEM at each stage of the command-and-control process for emergency management and incident response set out in ISO 22320:
 - information gathering, processing and sharing;
 - assessment of the situation, including forecasting;
 - planning;
 - decision-making and communication;
 - implementation of decisions;
 - feedback and control measures (which also covers monitoring and evaluation).

Although Figure 2 illustrates the ISO 22320 command-and-control process as a simplified, linear one, in practice it is a non-linear process with multiple feedback loops across multiple stakeholders, as illustrated in Figure 3.

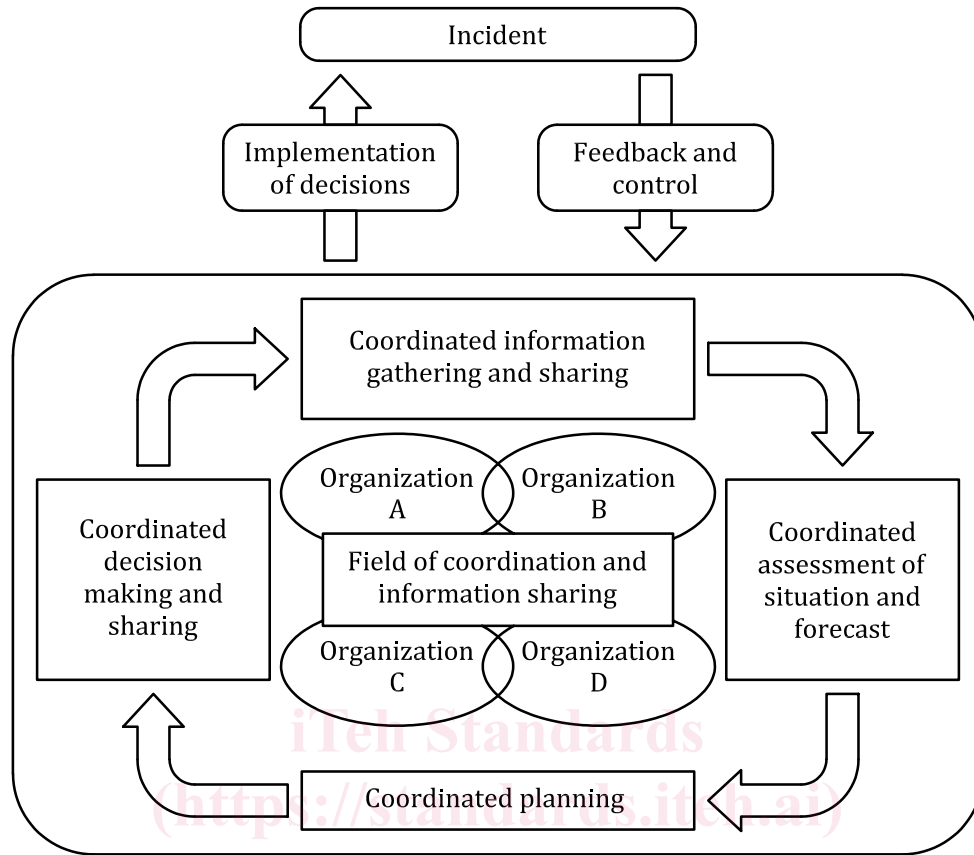


Figure 2 — Multiple stakeholder coordinated command-and-control process for emergency management and incident response

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Smart PHEM uses new technologies and new ways of working to help improve each step of this process, and to facilitate speedier and more effective collaboration across the wide range of stakeholders that need to be involved at each step. [Clause 5](#) describes these new technologies and new ways of working, and [Clause 6](#) provides a tool to assess the maturity of a community’s smart PHEM processes at each stage of the ISO 22320 command-and-control process.

5 Implementing smart city operating models in response to PHEs

5.1 Overview

ISO 37106 sets out recommendations for a smart city operating model that is focused on addressing city-wide challenges of joining up across city silos, in three areas:

- Strategy management: the key aspects of governance, planning and decision-making that need to be managed on a city-wide level in order to provide effective responses to community-wide challenges.
- Citizen-centric service management: the provision of public services for citizens and businesses that are built around user needs, accessibility, inclusivity and co-created with users.
- Integrated digital and physical resource management: ensuring that data on the performance and use of the community’s physical, spatial and digital assets is available in real-time and on an interoperable basis, in order to enable real-time integration and optimization of city resources; and opening up community

data (securely and protecting privacy) in order to enable innovation by citizens, businesses and civil society.

Figure 3 below uses the "benefit mapping" methodology recommended in ISO 37106 to summarize how development of such a smart city operating model can support more effective PHEM. Subclauses 5.2 to 5.4 then look at each of the three components in turn, setting out practical recommendations for community authorities on how investments and governance changes in these areas can lead to improved PHEM outcomes. This smart city operating model ultimately supports each stage of the command-and-control process for the emergency management and incident response process to public-health emergencies.

NOTE The sixth step in the ISO 22320 command-and-control process in Figure 3 includes monitoring and evaluation.

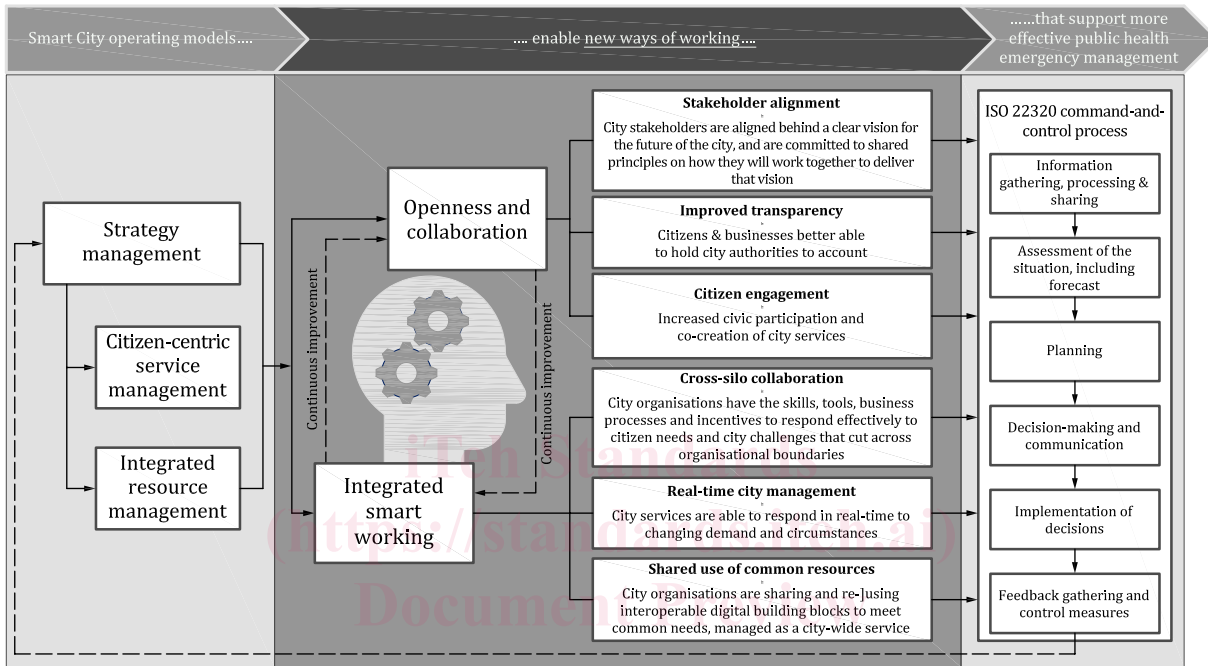


Figure 3 — How a smart city operating model supports more effective PHEM

5.2 Strategy management

5.2.1 General

ISO 37106 sets out recommendations to city leaders on strategy management for smart cities that (as summarized in ISO 37106:2021, 6.2) focus on taking a city-wide approach to:

- establish an integrated vision, strategy and benefit realization plan;
- underpin this with an operating model which provides strong leadership and collaborative engagement with all interested parties, balancing the need for city-wide management on the one hand and local innovation on the other;
- take an organic approach to implementation: establishing the business processes, capacity and structures that can drive transformation and create and grow sustained improvements over time, even if all the steps of that transformational journey cannot be planned in detail at the outset.

The case study evidence from cities around the world presented in ISO/TR 37112 confirms the importance of this approach in the context of PHEM. Key cross-cutting themes across all the case studies featured in ISO/TR 37112 include:

- The importance of taking an integrated, digitally-enabled approach on a whole-chain basis: not simply implementing each individual step of the ISO 22320 command-and-control process but seeking to manage