

SYSTEMS REFERENCE DELIVERABLE

**Smart city use case collection and analysis - Managing public health
emergencies in smart cities -
Part 1: High level analysis**



THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2025 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Secretariat
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search -
webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, ...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished
Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc
If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch

Discover our powerful search engine and read freely all the publications previews, graphical symbols and the glossary. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 500 terminological entries in English and French, with equivalent terms in 25 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD	8
INTRODUCTION	10
1 Scope	11
2 Normative references	11
3 Terms, definitions and abbreviated terms	11
3.1 Terms and definitions	11
3.2 Abbreviated terms	12
4 Public health emergency management	13
4.1 General	13
4.2 Scenarios	13
5 Testing and checking	14
5.1 General	14
5.2 Objectives	14
5.3 Widespread testing	14
5.3.1 Current practice	14
5.3.2 Rational for the new practice	15
5.3.3 Example case studies	15
5.3.4 Stakeholder roles and responsibilities	15
5.3.5 Stakeholder relationships	15
5.4 Tracking	16
5.4.1 Current practice	16
5.4.2 Gaps	16
5.4.3 Case studies	16
5.4.4 Stakeholder roles and responsibilities	16
5.4.5 Stakeholder relationships	17
6 Effective treatment	17
6.1 General (need statement)	17
6.2 Objectives	17
6.3 Current practice	17
6.4 Gaps	17
6.5 Case studies	18
6.6 Stakeholder roles and responsibilities	18
6.7 Stakeholder relationship	18
7 Medical supplies and facilities	19
7.1 General	19
7.2 Objectives	19
7.3 Basic workflow	19
7.3.1 Current practice	19
7.3.2 Gaps	20
7.3.3 Case studies	21
7.3.4 Stakeholder roles and responsibilities	21
7.3.5 Stakeholder relationships	22
7.3.6 Implementing during different stages of the emergency and beyond	22
7.4 Temporary medical treatment facilities	23
7.4.1 General	23
7.4.2 Current practice	23

7.4.3	Gaps	23
7.4.4	Example case studies.....	24
7.4.5	Stakeholder roles and responsibilities	24
7.4.6	Stakeholder relationships.....	24
7.4.7	Implementing during different stages of the emergency and beyond	25
8	Supply chains and services.....	27
8.1	General	27
8.2	Objectives.....	27
8.3	Transportation and logistics	27
8.3.1	Current practice	27
8.3.2	Gaps	27
8.3.3	Example case studies.....	27
8.3.4	Stakeholder roles and responsibilities	27
8.3.5	Stakeholder relationships.....	28
8.3.6	Implementing during different stages of the emergency and beyond	29
8.4	Food supplies.....	29
8.4.1	Current practice	29
8.4.2	Gaps	29
8.4.3	Example case studies.....	29
8.4.4	Stakeholder roles and responsibilities	29
8.4.5	Stakeholder relationships.....	30
8.4.6	Implementing during different stages of the emergency and beyond	31
8.5	Energy and water supplies.....	31
8.5.1	Current practice	31
8.5.2	Gaps	31
8.5.3	Example case studies.....	31
8.5.4	Stakeholder roles and responsibilities	31
8.5.5	Stakeholder relationships.....	32
8.5.6	Implementing during different stages of the emergency and beyond	33
8.6	Telecoms (tele-communications)	33
8.6.1	Current practice	33
8.6.2	Gaps	33
8.6.3	Example case studies.....	33
8.6.4	Stakeholder roles and responsibilities	33
8.6.5	Stakeholder relationships.....	34
8.6.6	Implementing during different stages of the emergency and beyond	35
8.7	Volunteering.....	35
8.7.1	General.....	35
8.7.2	Current practice	35
8.7.3	Gaps	35
8.7.4	Example case studies.....	35
8.7.5	Stakeholder roles and responsibilities	35
8.7.6	Stakeholder relationships.....	36
8.7.7	Implementing during different stages of the emergency and beyond	37
8.8	Communications	37
8.8.1	Current practice	37
8.8.2	Rational for the new practice.....	37
8.8.3	Example case studies.....	37
8.8.4	Stakeholder roles and responsibilities	37

8.8.5	Stakeholder relationships.....	38
8.8.6	Implementing during different stages of the emergency and beyond	39
9	Digital supplies and technology support	39
9.1	General	39
9.2	Objectives.....	39
9.3	Collecting and analysing data	39
9.3.1	General.....	39
9.3.2	Current practice.....	39
9.3.3	Gaps	40
9.3.4	Example case studies.....	40
9.3.5	Stakeholder roles and responsibilities	40
9.3.6	Stakeholder relationships.....	41
9.3.7	Implementing during different stages of the emergency and beyond	41
9.4	Developing models	41
9.4.1	General.....	41
9.4.2	Current practice.....	41
9.4.3	Gaps	42
9.4.4	Example case studies.....	42
9.4.5	Stakeholder roles and responsibilities	42
9.4.6	Stakeholder relationships.....	43
9.4.7	Implementing during different stages of the emergency and beyond	43
9.5	Acting in response to the data and the models.....	43
9.5.1	General.....	43
9.5.2	Current practice.....	44
9.5.3	Gaps	44
9.5.4	Example case studies.....	44
9.5.5	Stakeholder roles and responsibilities Table 9-2.....	44
9.5.6	Stakeholder relationships.....	45
9.5.7	Implementing during different stages of the emergency and beyond	46
9.6	Continuously optimize the models	46
9.6.1	General.....	46
9.6.2	Current practice.....	46
9.6.3	Gaps	46
9.6.4	Example case studies.....	47
9.6.5	Stakeholder roles and responsibilities	47
9.6.6	Stakeholder relationships.....	47
9.6.7	Implementing during different stages of the emergency and beyond	48
9.7	Data security and privacy protection	48
9.7.1	General.....	48
9.7.2	Current practice.....	48
9.7.3	Gaps	48
9.7.4	Example case studies.....	49
9.7.5	Stakeholder roles and responsibilities	49
9.7.6	Stakeholder relationships.....	50
9.7.7	Implementing during different stages of the emergency and beyond	51
10	Management platform	51
10.1	General	51
10.2	Objectives.....	51
10.3	Digital platform.....	51

10.3.1	General.....	51
10.3.2	Current practice.....	51
10.3.3	Gaps	51
10.3.4	Example case studies.....	52
10.3.5	Stakeholder roles and responsibilities	52
10.3.6	Stakeholder relationships.....	52
10.3.7	Implementing during different stages of the emergency and beyond	52
10.4	Privacy between individual and community.....	53
10.4.1	Current practice.....	53
10.4.2	Gaps	53
10.4.3	Example case studies.....	53
10.4.4	Stakeholder roles and responsibilities	53
10.4.5	Stakeholder relationships.....	54
10.4.6	Implementing during different stages of the emergency and beyond	55
10.5	Cost benefit analysis.....	55
10.5.1	General.....	55
10.5.2	Current practice.....	55
10.5.3	Gaps	55
10.5.4	Example case studies.....	55
10.5.5	Stakeholder roles and responsibilities	56
10.5.6	Stakeholder relationships.....	56
10.5.7	Implementing during different stages of the emergency and beyond	57
10.6	Budgets.....	57
10.6.1	Current practice.....	57
10.6.2	Gaps	57
10.6.3	Example case studies.....	58
10.6.4	Stakeholder roles and responsibilities	58
10.6.5	Stakeholder relationships.....	58
10.6.6	Implementing during different stages of the emergency and beyond	59
11	Finances plans.....	59
11.1	General	59
11.2	Objectives.....	59
11.3	Basic finances for citizens	60
11.3.1	Current practice.....	60
11.3.2	Gaps	60
11.3.3	Example case studies.....	60
11.3.4	Stakeholder roles and responsibilities	60
11.3.5	Stakeholder relationships.....	61
11.3.6	Implementing during different stages of the emergency and beyond	62
11.4	Basic finances for enterprises	62
11.4.1	Current practice.....	62
11.4.2	Gaps	62
11.4.3	Example case studies.....	62
11.4.4	Stakeholder roles and responsibilities	62
11.4.5	Stakeholder relationships.....	63
11.4.6	Implementing during different stages of the emergency and beyond	63
11.5	Banking services	64
11.5.1	Current practice.....	64
11.5.2	Gaps	64

11.5.3	Example case studies.....	64
11.5.4	Stakeholder roles and responsibilities	64
11.5.5	Stakeholder relationships.....	65
11.5.6	Implementing during different stages of the emergency and beyond	65
12	Maintaining normal life	65
12.1	General	65
12.2	Objectives.....	66
12.3	Online life	66
12.3.1	General.....	66
12.3.2	Current practice	66
12.3.3	Rational for the new practice	66
12.3.4	Example case studies.....	66
12.3.5	Stakeholder roles and responsibilities	66
12.3.6	Stakeholder relationships.....	67
12.3.7	Implementing during different stages of the emergency and beyond	68
12.4	Remote and home working	68
12.4.1	General.....	68
12.4.2	Current practice	68
12.4.3	Gaps	68
12.4.4	Example case studies.....	68
12.4.5	Stakeholder roles and responsibilities	68
12.4.6	Stakeholder relationships.....	69
12.4.7	Implementing during different stages of the emergency and beyond	70
12.5	Exercise and entertainment	70
12.5.1	General.....	70
12.5.2	Current practice	70
12.5.3	Gaps	70
12.5.4	Example case studies.....	70
12.5.5	Stakeholder roles and responsibilities	70
12.5.6	Stakeholder relationships.....	71
12.5.7	Implementing during different stages of the emergency and beyond	72
13	City collaboration.....	72
13.1	General	72
13.2	Objectives.....	72
13.3	Learning from what is working elsewhere (see Table 13-1)	72
13.3.1	Current practice	72
13.3.2	Gaps	72
13.3.3	Example case studies.....	73
13.3.4	Stakeholder roles and responsibilities	73
13.3.5	Stakeholder relationships.....	74
13.3.6	Implementing during different stages of the emergency and beyond	74
13.4	Sharing between cities (see Table 13-2)	74
13.4.1	Current practice	74
13.4.2	Gaps	74
13.4.3	Example case studies.....	75
13.4.4	Stakeholder roles and responsibilities	75
13.4.5	Stakeholder relationships.....	75
13.4.6	Implementing during different stages of the emergency and beyond	76
13.5	Working with local companies and organizations (see Table 13-3)	76

13.5.1	Current practice	76
13.5.2	Gaps	76
13.5.3	Example case studies.....	76
13.5.4	Stakeholder roles and responsibilities	76
13.5.5	Stakeholder relationships.....	77
13.5.6	Implementing during different stages of the emergency and beyond	78
Annex A (informative)	Use case database collection and descriptions	79
Bibliography	81
Figure 4-1	– The structure of public health emergency management.....	13
Figure 5-1	– Stakeholder relationship for widespread testing.....	15
Figure 5-2	– Stakeholder relationship for PHE tracking.....	17
Figure 6-1	– stakeholder relationship for effective treatment	18
Figure 7-1	– Information management platform of emergency medical supplies and facilities.....	20
Figure 7-2	– The relationships of all stakeholders of the basic workflow	22
Figure 7-3	– The relationships of all stakeholders of temporary medical facilities	25
Figure 8-1	– Relationship between transportation logistics supply chain and service stakeholders	28
Figure 8-2	– Stakeholder relationships.....	28
Figure 8-3	– Relationship between food supply chain and service stakeholders	30
Figure 8-4	– Stakeholder relationships.....	30
Figure 8-5	– Relationship between energy and water	32
Figure 8-6	– Stakeholder relationships.....	32
Figure 8-7	– Relationship Telecoms	34
Figure 8-8	– Stakeholder relationships.....	34
Figure 8-9	– Relationship Volunteering	36
Figure 8-10	– Stakeholder relationships.....	36
Figure 8-11	– Relationship Communications.....	38
Figure 8-12	– Stakeholder relationships.....	38
Figure 9-1	– Stakeholder relationships for collecting and analysing data	41
Figure 9-2	– Stakeholder relationships for developing models	43
Figure 9-3	– Stakeholder relationships for acting in response to the data and the models	46
Figure 9-4	– Stakeholder relationships for continuously optimize the models	48
Figure 9-5	– Stakeholder relationships for data security and privacy protection.....	50
Figure 10-1	– Relationship Digital public health emergency platform.....	52
Figure 10-2	– Stakeholder relationships.....	55
Figure 10-3	– Relationship between cost benefit analysis and modelling	56
Figure 10-4	– Stakeholder relationships.....	57
Figure 10-5	– Relationship Managing overall budgets.....	58
Figure 10-6	– Stakeholder relationships.....	59
Figure 11-1	– The relationships of all stakeholders of basic financial plan for citizens.....	61
Figure 11-2	– The relationships of all stakeholders of finances for enterprises	63
Figure 11-3	– The relationships of all stakeholders of banking services.....	65

Figure 12-1 – Relationship Online life	67
Figure 12-2 – Stakeholder relationships	67
Figure 12-3 – Relationship between remote and home working	69
Figure 12-4 – Stakeholder relationships	69
Figure 12-5 – Relationship between exercise and entertainment	71
Figure 12-6 – Stakeholder relationships	71
Figure 13-1 – The relationships of stakeholders in the scenario of learning from what is working elsewhere	74
Figure 13-2 – The relationships of stakeholders in the scenario of city-to-city sharing	76
Figure 13-3 – The relationships of stakeholders in the scenario of working with local companies and organizations	77
 Table 7-1 – Requirements and needs about the workflow for the demand of medical supplies and facilities in different stages	 23
Table 7-2 – Requirements and needs of temporary medical facilities in different stages	25
Table 9-1 – Stakeholder roles and responsibilities for developing roles	43
Table 9-2 – Stakeholder roles and responsibilities in acting in response to data and models	45
Table 9-3 – Stakeholder roles and responsibilities in continuously optimizing models	47
Table 9-4 – Stakeholder roles and responsibilities in Data security and privacy protection	50
Table 10-1 – Stakeholder roles and responsibilities in Privacy between individual and community	54
Table 11-1 – Stakeholder roles and responsibilities of basic financial plan for citizens	61
Table 11-2 – Stakeholder roles and responsibilities of basic finances for enterprises	63
Table 11-3 – Stakeholder roles and responsibilities of working with banks	65
Table 13-1 – Stakeholder roles and responsibilities in 13.3 Learning from what is working elsewhere	73
Table 13-2 – Stakeholder roles and responsibilities in 13.4 Sharing between cities	75
Table 13-3 – Stakeholder roles and responsibilities in 13.5 Working with local companies and organizations	77

INTERNATIONAL ELECTROTECHNICAL COMMISSION

Smart city use case collection and analysis – Managing public health emergencies in smart cities - Part 1: High level analysis

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at <https://patents.iec.ch>. IEC shall not be held responsible for identifying any or all such patent rights.

IEC SRD 63347-1 has been prepared by IEC systems committee Smart Cities: Electrotechnical aspects of smart cities. It is a Systems Reference Deliverable.

The text of this Systems Reference Deliverable is based on the following documents:

Draft	Report on voting
SyCSmartCities/378/DTS	SyCSmartCities/389/RVDTS

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this Systems Reference Deliverable is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts in the IEC 63347 series, published under the general title *Smart city use case collection and analysis – Managing public health emergencies in smart cities*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

INTRODUCTION

Smart cities are a key trend of urban development in the new information age, and an effective way to ensure that cities are built and managed in a way that best supports the needs of their residents. The major international standardization organizations are vigorously promoting the research and development of standards. However, the Covid 19 pandemic has demonstrated that there are few relevant international standards that provide guidance for the smart city to respond to public health emergencies, as well as a lack of unified understanding and systematic review, and clear direction for the development of such standards, which affects the development and application of international standards for smart city public health emergency (PHE).

In response to the above issues, this document: "Use case collection and analysis – Management of public health emergencies in smart cities" has been developed to collect relevant use cases in important scenarios of smart city management under public health emergencies in order to enable national and international standards development organizations develop a comprehensive portfolio of standards to help cities be well prepared for any future public health emergency.

1 Scope

This part of IEC 63347 describes and analyses a comprehensive set of high-level scenarios of how smart cities can best respond to public health emergencies, and strengthen their "urban immune system", using evidence from as many countries as possible. It covers use cases related to the prevention, the control and the successful ending of public health emergencies, and to dealing with the longer-term harm that these can cause. It considers a wide range of different scenarios and reviews both the management challenges and the range of technology solutions, including the use of IoT, telecommunications, AI, big data, and cloud computing, available in each of them, in order to provide a comprehensive outline of the standardization requirements to develop an effective urban immune system.

The public health emergencies envisaged are those relating to pandemics resulting from novel forms of disease, for which there is no natural immunity within the population and no tried and tested treatment. However, some of its provisions will be helpful to dealing with pandemics of existing diseases such as typhoid and cholera brought on through natural disasters or war.

This document will provide useful information to international and national standards development organizations and thus facilitate and promote the development of the smart city standards required. Annex A gives a use case database collection and descriptions.

2 Normative references

There are no normative references in this document.