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**Healthcare organization management — Pandemic response —
Guidelines for respiratory infection prevention and control in
hospitals**

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Foreword

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

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Introduction

In the wake of the COVID-19 pandemic, guidelines have become necessary to prevent cross-contamination of the respiratory tract that can occur in hospitals in a disaster situation where a respiratory infectious disease has occurred. Therefore, this document was written to prevent cross-contamination in hospitals due to the outbreak of common respiratory infectious diseases.

This document is intended to standardize the guidelines for the separate operation of wards dedicated to respiratory infectious diseases; transportation of confirmed cases; and cleaning, disinfection and waste management, etc. in order to prevent respiratory cross-infections under emergency situations caused by respiratory infectious diseases such as COVID-19.

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Healthcare organization management — Pandemic response — Guidelines for respiratory infection prevention and control in hospitals

1 Scope

This document provides guidelines to prevent cross-infections within a hospital, with a specific focus on the separate operation of wards dedicated to highly contagious respiratory infectious diseases, transportation of confirmed cases of highly contagious respiratory infectious diseases, disinfection, waste management, etc.

This document applies to the following:

- a) separate operation of wards dedicated to highly contagious respiratory infectious diseases;
- b) ~~the~~ transportation of confirmed cases of highly contagious respiratory infectious diseases and roles of the dedicated healthcare team in a ward dedicated to highly contagious respiratory infectious diseases;
- c) cleaning, disinfection, and waste management.

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 ~~terminological~~ **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

coronavirus

virus that is part of a large family of viruses that can cause illness in animals or humans

Note 1 to entry: In humans, several coronaviruses are known to cause respiratory infections ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS). The coronavirus discovered in 2019 causes the coronavirus disease COVID-19.

[SOURCE: ISO 5472:2022, 3.3]

3.2

infectious disease patient

person who has tested positive in a diagnostic test for an infectious disease

3.3

negative pressure ~~isolation patient~~ room

~~patient room such as a room or a support facility that maintains negative~~ in which the air pressure differential between the room and ~~isolation practices~~

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3.4

negative pressure isolation buffer zone

area ~~the~~ adjacent to the negative pressure area, in which a nurse station, etc. is installed to prepare the medical treatment or monitor patients' condition

3.5

negative pressure isolation ~~indoor airspace directs the air flowing into the~~ room (i.e. room that includes an anteroom and a bathroom within the negative pressure isolation area where an infectious disease patient is hospitalized)

3.6

negative pressure isolation anteroom

space reserved to prepare essential activities for infection prevention and control, while preventing airborne infection

Note 1 to entry: The anteroom helps to maintain a stable negative pressure in the negative pressure area, and includes a "patient air is prevented from leaking out of the room anteroom," "and into adjacent areas such as the corridor anteroom," etc.]

3.7

[SOURCE: ISO 5472:2022, 3.8]

3.4

internal corridor

corridor inside the negative pressure isolation area, which connects a patient room anteroom, corridor anteroom, personal protective equipment (PPE) doffing room (3.5), waste disposal room (3.6), equipment storage room (3.7), etc.

3.8.5

essential support facilities

facilities that consist of a PPE doffing room, waste disposal room, equipment storage room, etc.

3.9

PPE doffing room doffing room

space connected to the *internal corridor* (3.4), where healthcare workers who completed medical treatment take off their PPE before entering the general area

3.10.6

waste disposal room

space connected to the *internal corridor* (3.4), where medical waste generated from treatment of inpatients is sterilized or stored before discharge

Note 1 to entry: The waste disposal room is set to maintain a negative pressure lower than the internal corridor and a high temperature autoclave can be installed, if necessary.

3.11.7

equipment storage room

space connected to the *internal corridor* (3.4), where mobile equipment used for the treatment of *infectious disease patients* (3.2), etc. is stored or disinfected after use

3.12.8

HEPA filter

high efficiency particulate air filter, or an equivalent or higher grade filter [4]

~~filter with retentive matrix having a decontamination function equivalent to or higher grade than a HEPA filter, which can remove minimum particle-collection efficiency of 99,97% or more % (that is, a maximum particle penetration of 0,03 % for 0,3 µm particles)~~

Note 1 to entry: See Reference [4].

[SOURCE: ISO 5472:2022, 3.6, "high efficiency particulate air filter" has been changed from a preferred term to an admitted term; note 1 to entry has been added.]

4 Separate operation of a ward dedicated to respiratory infectious diseases

4.1 General

A ward dedicated to respiratory infectious diseases refers to a unit that is established in order to prevent the infection of other patients and healthcare workers in the process of treating respiratory infectious disease patients, etc. and to suppress the transmission of causative pathogens in the local community. In principle, a negative pressure room ~~needs to~~ should be operated as a single-occupancy room to curb the spread of infectious agents within a hospital through droplets or the air. (See [Annex A](#) ~~Annex A~~).

4.2 Principles of isolation room assignment and operation

4.2.1

In principle, isolation rooms in a ward dedicated to respiratory infectious diseases should be operated as a single-occupancy negative pressure room, with the aim to prevent the circulation of air from isolation rooms occupied by confirmed cases to other areas within a hospital.

- a) ~~when~~ When no negative pressure room is available, it is necessary to prevent the circulation of air from isolation rooms occupied by confirmed cases to other areas within the hospital as best as possible.

The criteria for air handling units (AHU) and heating, ventilation and air-conditioning (HVAC) system ~~are as follows~~ (see [Annex B](#) ~~Annex B~~).

~~);~~ because the default is to circulate a mix of outside air (30 %) and inside air (70 %), the opening rate of AHU is adjusted to prevent air mixing and to switch to a system with 100 % outside air supply and 100 % exhaust. In case of resource-limiting settings, staff open the windows at least three times a day for more than 30 ~~minutes~~. (see [Annex C.1](#)) ~~min~~.

- b) ~~when~~ When no single-occupancy room is available, multi-patient rooms can be used for confirmed cases in a ward that is completely separated from the routes of general patients.
- c) ~~there~~ There are partial guidelines for the prevention and management of infectious diseases, so overall management guidelines are needed. (see [Annex D](#))

4.2.2

Suspected cases are assigned single-occupancy negative pressure rooms in principle until testing results are released. However, when no single-occupancy negative pressure room is available, patients with confirmed cases can be admitted to separate single-occupancy rooms that meet the AHU criteria.

4.2.3

The priority for the assignment of negative pressure rooms is to firstly assign them to high-risk patients in need of medical treatment, etc. The high-risk groups in terms of the priority for room assignment are as follows:

- a) patients with oxygen saturation below 90 % who require initial oxygen therapy;

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- b) patients with underlying diseases (chronic obstructive pulmonary disease, cardiovascular diseases, etc.).

~~Example room~~EXAMPLE Room assignment for confirmed cases in healthcare facilities⁵ [7].

- 1) ~~priority~~Priority is given to positive patients that are persons under investigation (PUI) or undergoing PUI or aerosol generating procedures (AGP).
- 2) ~~assign each~~Each confirmed case should be assigned to a single-occupancy negative pressure room in principle.
- 3) ~~when~~When no single-occupancy negative pressure room is available, ~~assign~~ a confirmed case should be assigned to a multi-patient negative pressure room.
- 4) ~~when~~When no multi-patient negative pressure room is available, ~~assign~~ a confirmed case should be assigned to a regular single-occupancy room.
- 5) ~~when~~When no regular single-occupancy room is available, ~~assign~~ a confirmed case should be assigned to a regular multi-patient room (a minimum distance of 1 ~~meter~~ m is recommended between beds).
- 6) ~~when~~When no regular multi-patient room is available, ~~assign~~ confirmed cases should be assigned to all rooms on a single floor in the facility.

The conditions for ~~clauses~~ 3), 4), and 5) are as follows:

route: ~~In~~ order to ensure completely separate routes between confirmed cases and general patients, a ward (or single floor) is operated independently when confirmed cases are admitted to regular rooms.

5 Transportation of confirmed cases and roles of the dedicated healthcare team in a ward dedicated to respiratory infectious diseases

5.1 Patient transportation

5.1.1 ~~Basic rules of~~ Safe patient transportation

To ensure safe patient transportation, the following ~~basic rules~~ should be considered.

- a) ~~organize a~~ patient transportation team should be organized with a minimum number of personnel when transporting a confirmed case of a respiratory infectious disease.
- b) ~~provide~~An advance notice should be provided to the receiving healthcare facility before the arrival of a confirmed case of a respiratory infectious disease so that proper preparations are taken prior to patient arrival.
- c) ~~during~~During the transportation of a confirmed case, ~~make sure~~ any contact personnel should wear PPE.
- d) ~~use an~~An ambulance should be used that is prepared at the transportation location as a vehicle for transportation.
- e) ~~transport a~~ patient should be transported on a predetermined route of the shortest travel distance and time (using designated elevators and pathways reserved exclusively for infectious disease patients).

- f) ~~when~~When transporting a patient to a ward dedicated to respiratory infectious diseases, ~~block~~ the route should be blocked to prevent contact with other patients or visitors.
- g) ~~leave the~~The wheelchair or transportation cart used for patient transportation should be left in the ward dedicated to respiratory infectious diseases.

~~patient~~Patient transportation equipment, etc. that are left in the ward dedicated to respiratory infectious diseases can be reused after being disinfected ~~in accordance with~~according to the infection control guidelines.
- h) ~~after~~After transportation, ~~remove~~PPE should be removed and ~~dispose PPE and thoroughly perform~~disposed of; hand hygiene should be performed thoroughly ^{[6, [29]]}.

5.1.2 Roles and composition of dedicated patient transportation team

The dedicated patient transportation team for confirmed cases of respiratory infectious diseases performs the roles outlined in Table 1 ~~Table 1~~.

Table 1 — Roles of dedicated patient transportation team for confirmed cases of respiratory infectious diseases

Category	Roles	Department or person in charge
Medical support	— Designation, cancellation, and management of hospital access and restricted areas. Installing signs or signboards for restricted areas	Support department
	— <u>Installing signs or signboards for restricted areas</u>	Support department
	— Disinfection of surrounding environment after patient transportation, such as designated elevators, rooms, transportation route, etc.	Environmental service
<u>Medical support</u>	— Wearing a N95 or its equivalent or higher-grade respirator and PPE (excluding access control personnel who have no direct contact with patients and maintains a 2 m distance).	Administration personnel in charge of access control to patient transportation route
	— Access control of general patients, guardians and hospital staff to the transportation route before transporting confirmed cases.	
	— Access control to reserved designated elevators.	
	— Setting up a restricted area in accordance with <u>according to</u> the hospital policies and attaching and installing signboards if necessary.	Administration personnel in charge of guidance on patient transportation and provision of related support
	— Facility management for cancellation and reoperation of restricted facilities.	
	— Disinfection of surrounding of environment.	
	— Wearing PPE and taking over a patient from emergency medical services (EMS) personnel.	Patient transportation team (two persons per team)
	— In the case of a severe patient, a healthcare worker accompanies the patient during transportation.	
	— Transporting a patient to an assigned room using transportation equipment (negative pressure stretcher, negative pressure wheelchair, etc.) depending on the patient's condition.	

Split Cells

Split Cells

5.1.3 Precautions for patient transportation

Matters related to patient transportation are at the discretion of healthcare workers, and these guidelines outline specific precautions for transportation.

- a) ~~preparations~~Preparations for patient transportation
- 1) ~~use an~~An ambulance should be used for patient transportation ~~use (an isolation stretcher equipped with a HEPA filter~~should be used, if available).
 - 2) ~~organize a~~A patient transportation team should be organized with the minimum number of personnel (driver, health service workers, healthcare worker, etc ~~and verify~~); it should be verified that there is no other person with the patient.
 - 3) ~~provide~~An advance notice should be provided to the receiving healthcare facility so that proper preparations are taken prior to patient arrival.
 - ~~(required)~~the following information ~~to~~should be delivered when requesting patient transfer, including:
 - patient condition (notable information such as severity, age, underlying diseases, dialysis status, cancer patient, mental illness, etc.);
 - patient location (name of the healthcare facility, etc.);
 - contact details of healthcare workers who can explain the patient's health condition.
- b) ~~considerations~~Considerations for infection prevention^{[17] [1][3]}
- 1) ~~make sure that patient~~Patient transportation personnel should wear PPE during patient transportation according to 5.1.1 ~~in accordance with the "basic rules for patient transportation"~~.
 - 2) ~~prohibit aerosol~~Aerosol generating procedures should be prohibited whenever possible and ~~reduce~~ aerosol-generating clinical pattern/procedures should be reduced before arriving at the hospital.
 - 3) ~~avoid any~~Any behaviour that can lead to pathogen transmission through contact during patient transportation should be avoided, such as taking off a mask, eating food, touching the face, etc.
 - 4) ~~after~~After patient transportation, ~~clean and disinfect~~ the vehicle and transportation equipment should be cleaned and disinfected, given the possibility of pathogen transmission from the patient.
- c) ~~make sure that the~~The patient ~~wears~~should wear a mask during transportation, with the aim to minimize exposure through the respiratory system or physical contact ~~and make sure that~~ the patient ~~wears~~should wear a mask whenever possible.
- d) ~~make sure that patient~~Patient transportation personnel should wear a N95 or its equivalent or higher-grade respirator, disposable long-sleeved plastic gown or protective clothing (coverall), disposable gloves, protective goggles or face shields, and surgical hat (optional), with the aim to minimize exposure through the respiratory system or physical contact.

5.1.4 Patient transportation^{[8] [4]}

The following guidelines should be considered for the safe and efficient transportation of patients with respiratory infectious diseases:

- a) ~~a~~ patient ~~uses~~should use a separate route to minimize exposure through droplets from respiratory secretions and physical contact.
- b) ~~a~~ patient ~~wears~~should wear a surgical mask during inter-hospital transportation.
- c) ~~a~~ healthcare worker ~~accompanies~~should accompany a patient during transportation, and ~~wears~~wear a N95 or its equivalent or higher-grade respirator or surgical mask, disposable long-sleeved plastic gown or protective clothing (coverall), disposable gloves, protective goggles or face shields, and surgical hat (optional) to avoid direct contact with the patient as best as possible.
- d) ~~in~~ case of patient transportation to other healthcare facilities, an ambulance ~~is~~should be used in consultation with a local public health center.
- e) ~~patient~~ Patient information ~~is~~should be provided to the receiving healthcare facility in advance and a departure time ~~is~~should be prearranged so that proper preparations are taken prior to the patient arrival.

5.1.5 Detailed handling procedures⁹ [5]

The detailed handling procedure for patients to be hospitalized and outpatients or emergency room patients is as follows:

- a) ~~transportation~~ Transportation of patients to be hospitalized
 - 1) ~~security~~ Security guards control the access of general patients, guardians and hospital staff to the transportation route designated for confirmed cases.
 - 2) ~~after~~ After an ambulance arrives at the predetermined location within the hospital for confirmed cases of respiratory infectious diseases, the patient transportation team (two persons per team) takes over the patient.
 - 3) ~~after~~ After taking over the patient, the patient transportation team (two persons per team) who wears a N95 or its equivalent or higher-grade respirator or surgical mask, long-sleeved surgical gown, disposable gloves, protective goggles or face shields, disposal long-sleeved plastic gown, and surgical hat (optional) transports the patient via the route designated for confirmed cases of respiratory infectious diseases.
 - 4) ~~the~~ The patient is transported to the assigned room using designated elevators exclusive of designated for confirmed cases of respiratory infectious diseases.
- b) ~~transportation~~ Transportation of outpatients or emergency room patients
 - ~~a~~ A patient is transported to the assigned room via a shortest route using designated elevators, along with hospital staff wearing PPE.
- c) ~~the~~ The purpose of access control to a ward dedicated to respiratory infectious disease and transportation routes for confirmed cases is to prevent contamination and the spread of infections during patient transportation. The following methods apply to access control:
 - 1) when starting to operate a ward dedicated to respiratory infectious disease, all confirmed cases who have visited the hospital's main building are transferred to the ward and then the access control line is installed during isolation treatment;
 - 2) a notice of restricted areas is attached to the access control line;

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- 3) when transporting confirmed cases, access to the patient transportation route is controlled for any person other than personnel from the response headquarters.

5.2 Roles of the dedicated healthcare team in a ward dedicated to respiratory infectious diseases and management of visitors (or guests)

5.2.1 Roles and composition of the dedicated healthcare team in a ward dedicated to respiratory infectious diseases

The dedicated healthcare team performs the roles outlined in [Table 2](#), when confirmed cases are admitted to a ward dedicated to respiratory infectious diseases.

Table 2 — Roles of the dedicated healthcare team in the case of hospitalization of confirmed cases in a ward dedicated to respiratory infections

Category	Roles	Department or person in charge
General management of the dedicated healthcare team	<ul style="list-style-type: none"> — Selecting and deploying personnel for the healthcare team dedicated to respiratory infectious diseases. — Deliberating on isolation hospitalization of respiratory infectious diseases and general management of infection control. 	Emergency response headquarters
Patient care	<ul style="list-style-type: none"> — Providing infection prevention education for patients' guardians and visitors. — Various tests for diagnosis. 	<ul style="list-style-type: none"> Doctors Nurses Laboratory personnel
Patient care	<ul style="list-style-type: none"> • Patient care: — Providing infection prevention education for patients' guardians and visitors. Various tests for diagnosis. Specimen tests for respiratory infectious disease patients — Imaging tests for respiratory infectious disease patients 	<ul style="list-style-type: none"> Doctors Nurses Laboratory personnel Radiology personnel
Infection control	<ul style="list-style-type: none"> — Monitoring system operation in hospital. — Providing infection prevention education for hospital staff. — Developing education materials on hospital-acquired infections. — Reporting new cases. 	Doctors and nurses and other healthcare workers (e.g., microbiologists, epidemiologists, etc.) specialized in infection control or infectious diseases.
Administrative support	<ul style="list-style-type: none"> — Purchasing and supplying PPE. — Room ventilation and sewage treatment. — Cleaning and laundry. — Meal supply. 	Support and facilities departments

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