

Infection Prevention and Control (IPC) for COVID-19 Virus



IPC Technical and Clinical Hub, Integrated Health Services, WHO HQ
WHO Health Emergencies, WHO HQ

Principles of Emergency Management



Evaluate prevention, mitigation preparedness and response efforts; facilities seek to return to “normal” or Build Back Better (BBB)

Prevention and Mitigation

Strategies that can help a facility prevent and reduce the impact of an emergency (e.g., providing the staff vaccination against diseases)

Recovery

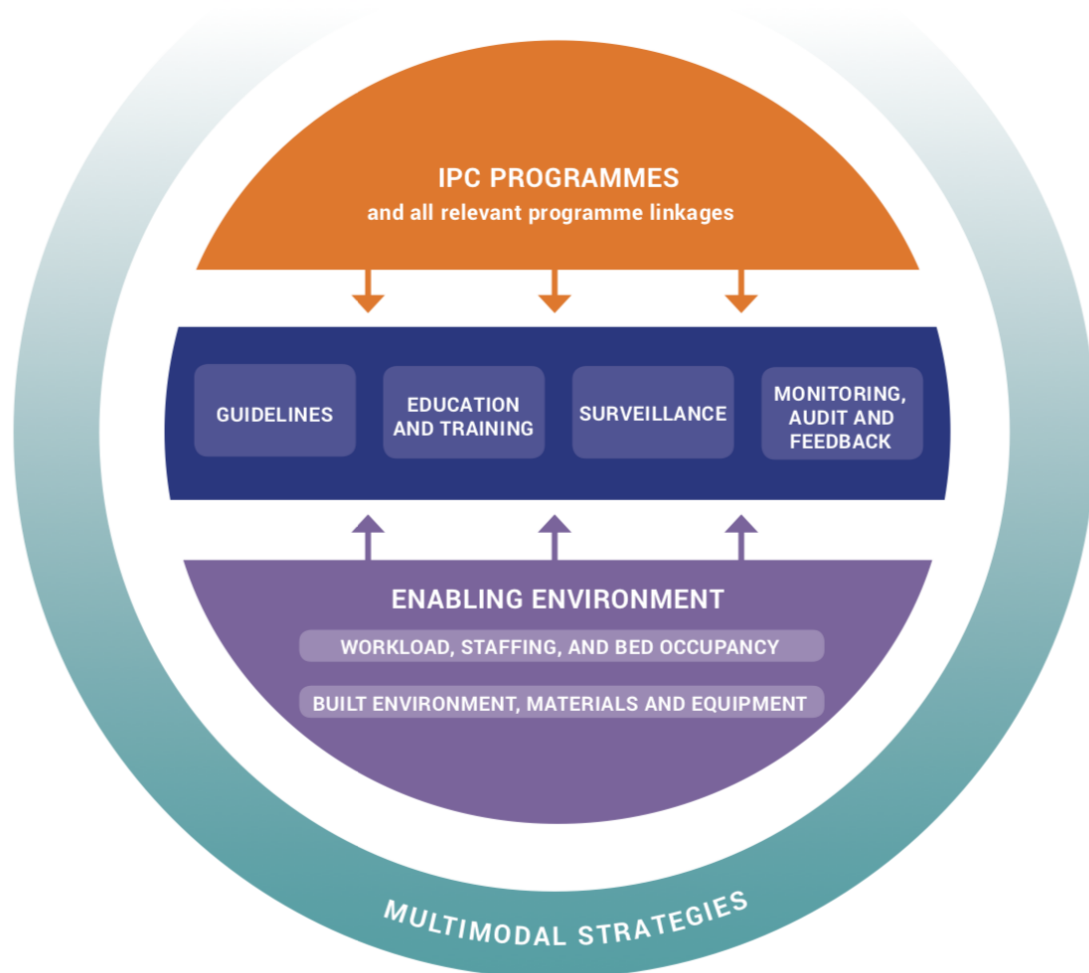
Preparedness and Readiness

Activities in reaction to a known or suspected event

Response

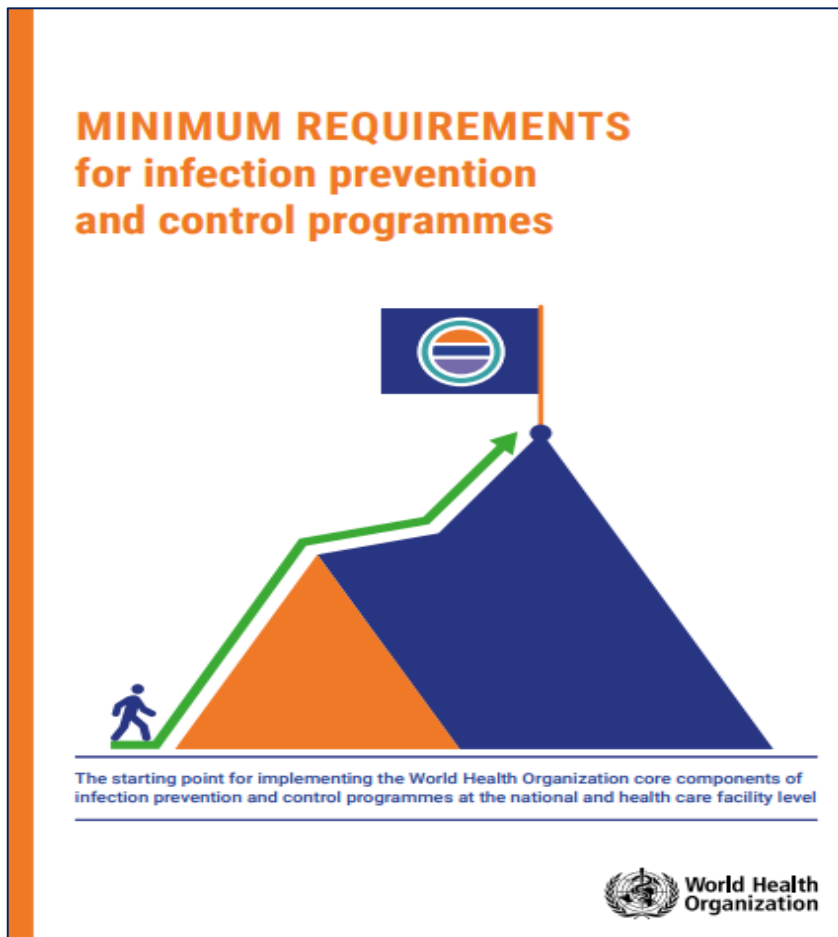
Actions that take place before an emergency

Core components for effective IPC programmes in all contexts



- Effective IPC programmes must be based on the implementation of all Core Components
- They must be implemented using the multimodal strategies
- If IPC systems and resources are not in place, it is not likely that a country or facility would be able to respond effectively to an outbreak

At least the IPC Minimum Requirements must be in place



Thus, the minimum requirements represent the starting point for undertaking the journey to build strong and effective IPC programmes at the national and facility level (Fig. 2) and **SHOULD** be in place for all countries and health care facilities to support further progress towards full implementation of all core components.

The *minimum requirements* are defined as:

IPC standards that should be in place at the national and facility level to provide minimum protection and safety to patients, HCWs and visitors, based on the WHO core components for IPC programmes.

Mode of transmission – what is known to date



Primary modes of transmission of COVID-19:

- **Droplet:** Respiratory droplets (particles $>5-10\ \mu\text{m}$ in diameter) are generated when an infected person coughs or sneezes. Any person who is in close contact (within 1 m) with someone who has respiratory symptoms (coughing, sneezing) is at risk of having his/her mucosae (mouth and nose) or conjunctiva (eyes) exposed to potentially infective respiratory droplets
- **Contact:** *direct contact* with infected people and *indirect contact* with surfaces in the immediate environment of or with objects used on the infected person (e.g., stethoscope or thermometer) (droplets may land on surfaces where the virus could remain viable).
 - WHO Joint Mission COVID-19 to China, <https://www.who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf>
 - Ran L, et al. CID 2020
 - Moriarty LF, et al. MMWR 2020
 - Jefferson T, et al. Medrx 2020

Airborne transmission – what is known to date



- ❑ Mainly limited to circumstances and settings in which aerosol generating procedures (AGPs): tracheal intubation, non-invasive ventilation, tracheotomy, cardiopulmonary resuscitation, manual ventilation before intubation, bronchoscopy.
- ❑ **Detection of COVID-19 RNA in air samples**
 - Experimental studies not reflecting human cough or clinical settings (e.g. van Doremalen N et al, NEJM 2020)
 - Reports from settings where symptomatic COVID-19 patients have been admitted, in absence of AGPs
 - Negative: Cheng V, et al. *ICHE* 2020; Ong SW, et al. *JAMA* 2020; Faridi S et al. *Science of The Total Environment* 2020
 - Positive air samples with fragments of the virus detected by RT-PCR in microdroplets: Liu Y et al, 2020, bioRxiv preprint; Santarpia JL et al, 2020, medRxiv preprint;
 - RT-PCR positive respiratory droplet and aerosol samples for coronaviruses: Leung et al. *Nature Med* 2020
 - Detection of COVID-19 RNA in extremely low concentrations (well below what could be the infectious inoculum)
 - The detection of RNA in air samples based on PCR-based assays is not indicative of viable virus that could be transmissible (Wölfel R, *Nature* 2020)

Infection prevention and control during health care when novel coronavirus (nCoV) infection is suspected

[https://www.who.int/publications-detail/infection-prevention-and-control-during-health-care-when-novel-coronavirus-\(ncov\)-infection-is-suspected-20200125](https://www.who.int/publications-detail/infection-prevention-and-control-during-health-care-when-novel-coronavirus-(ncov)-infection-is-suspected-20200125)

Rational use of personal protective equipment for coronavirus disease (COVID-19) and considerations during severe shortages

https://apps.who.int/iris/bitstream/handle/10665/331695/WHO-2019-nCov-IPC_PPE_use-2020.3-eng.pdf

Home care for patients with suspected novel coronavirus (nCoV) infection presenting with mild symptoms and management of contacts

[https://www.who.int/publications-detail/home-care-for-patients-with-suspected-novel-coronavirus-\(ncov\)-infection-presenting-with-mild-symptoms-and-management-of-contacts](https://www.who.int/publications-detail/home-care-for-patients-with-suspected-novel-coronavirus-(ncov)-infection-presenting-with-mild-symptoms-and-management-of-contacts)

Advice on the use of masks in the context of COVID-19

[https://www.who.int/publications-detail/advice-on-the-use-of-masks-the-community-during-home-care-and-in-health-care-settings-in-the-context-of-the-novel-coronavirus-\(COVID-19\)-outbreak](https://www.who.int/publications-detail/advice-on-the-use-of-masks-the-community-during-home-care-and-in-health-care-settings-in-the-context-of-the-novel-coronavirus-(COVID-19)-outbreak)



WHO recommended IPC strategies for preventing or limiting the spread of COVID-19



IPC strategies to prevent or limit transmission in health care settings include the following:

1. applying standard precautions for all patients;
2. ensuring triage, early recognition, and source control;
3. implementing empiric additional precautions for suspected cases of COVID-19 infection;
4. implementing administrative controls; and
5. using environmental and engineering controls.

General WHO advice for COVID-19



1. Practice frequent **hand hygiene**, especially after direct contact with ill people or their environment
2. Practice **social distancing**: avoid close contact with people, especially those suffering from acute respiratory infections
3. For those with **symptoms** of acute respiratory infection, they should isolate themselves and practice respiratory etiquette, wear a medical mask and seek medical care if in respiratory distress

Standard precautions



The basic level of IPC precautions, to be used for ALL patients at ALL times:

- the minimum prevention measures that apply at all times to all patient care regardless of suspected or confirmed status of the patient

Risk assessment is critical for all activities, i.e. assess each health care activity and determine the personal protective equipment (PPE) that is needed for adequate protection

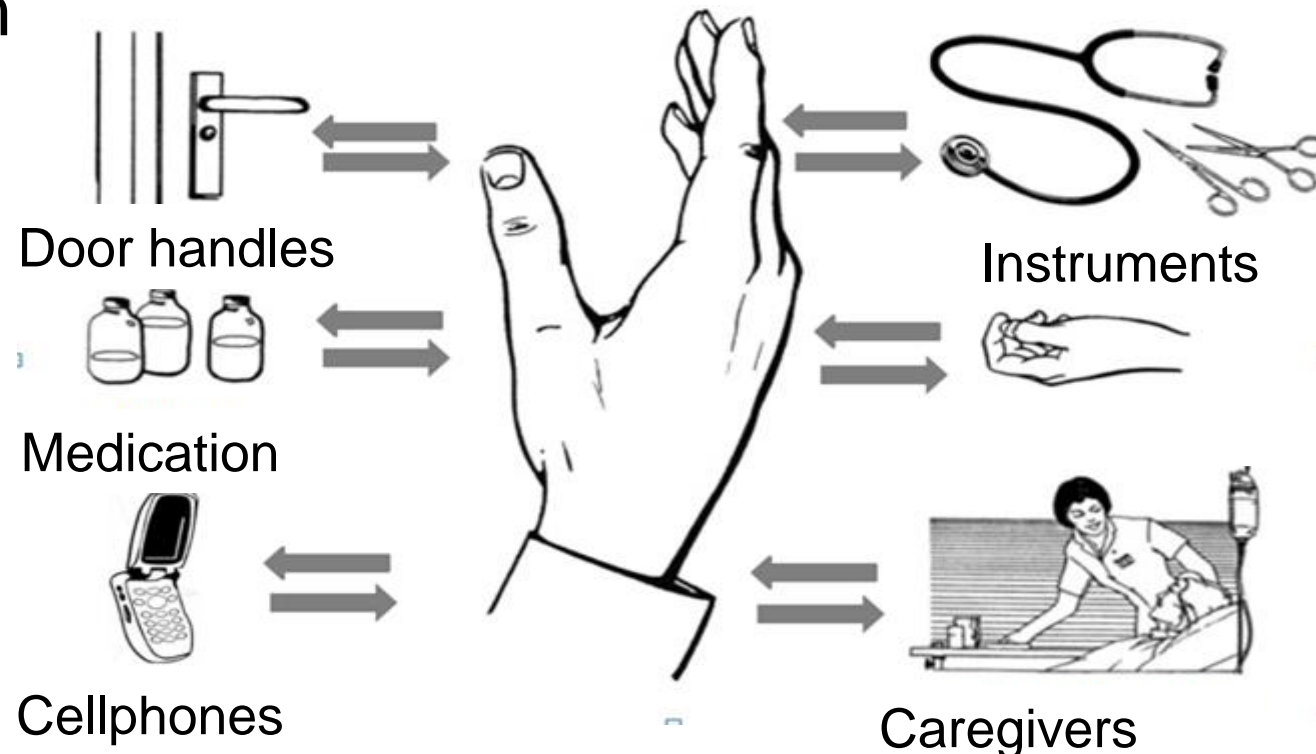
Elements of Standard Precautions



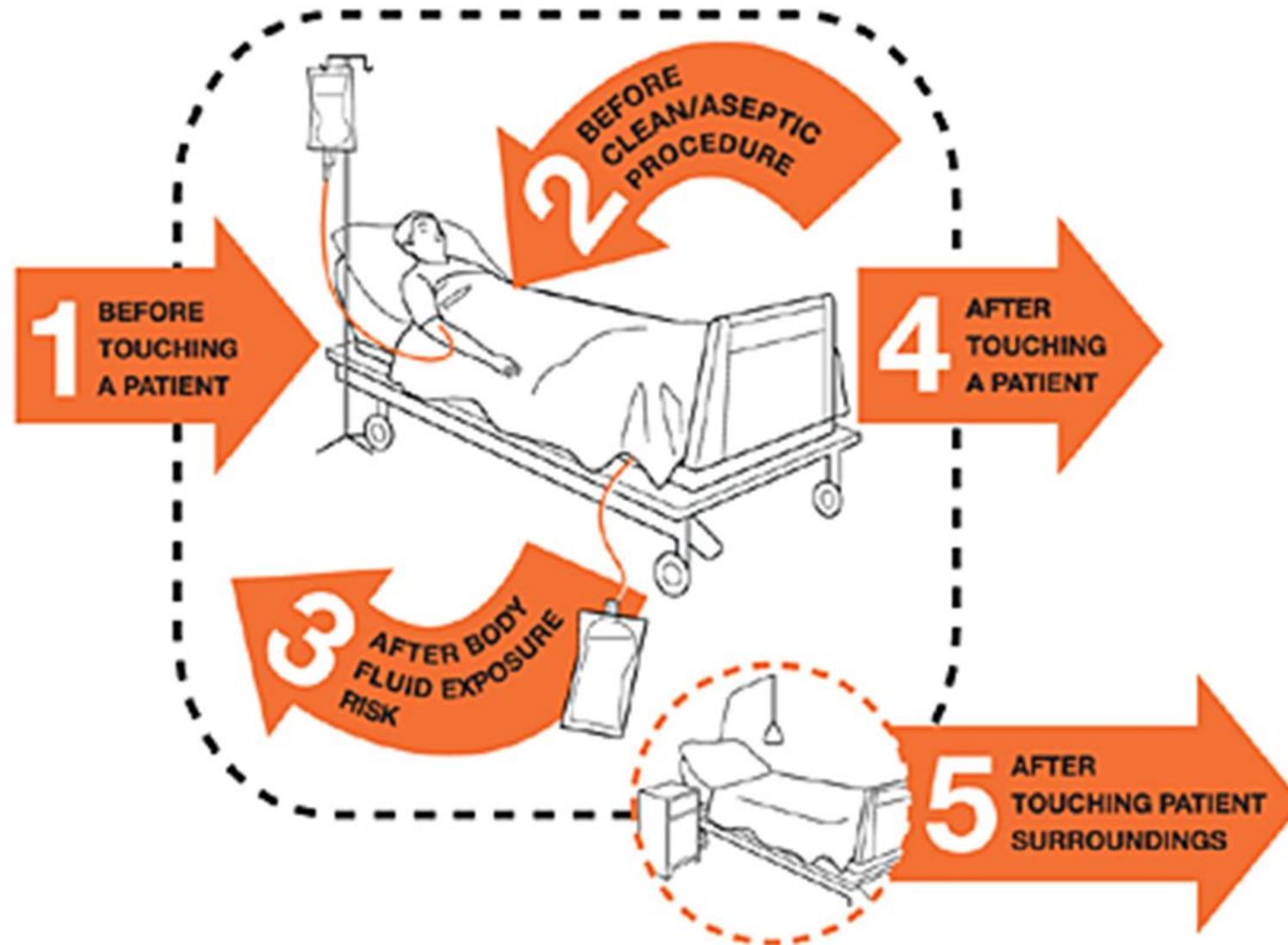
1. Hand hygiene
2. Respiratory hygiene (etiquette)
3. PPE according to the risk
4. Safe injection practices, sharps management and injury prevention
5. Safe handling, cleaning and disinfection of patient care equipment
6. Environmental cleaning
7. Safe handling and cleaning of soiled linen
8. Waste management

Hand Hygiene

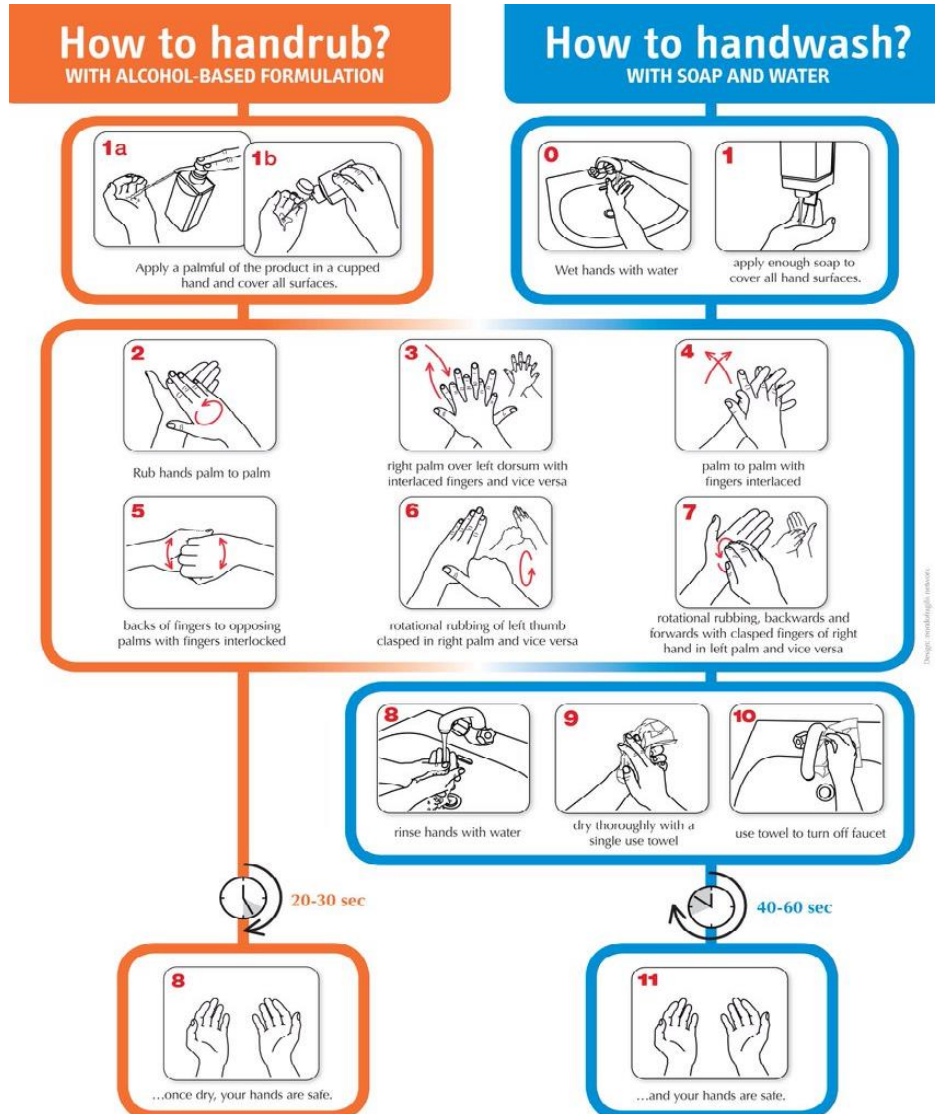
- Best way to prevent the spread of germs in the health care setting and community
- Our hands are our main tool for work as health care workers- and they are the key link in the chain of transmission



Hand Hygiene: WHO 5 moments



Hand hygiene: HOW



Use appropriate product and technique
An alcohol-based hand rub product is preferable, if hands are not visibly soiled

- Rub hands for 20–30 seconds!

Soap, running water and single use towel, when visibly dirty or contaminated with proteinaceous material

- Wash hands for 40–60 seconds!

How to handrub?

RUB HANDS FOR HAND HYGIENE! WASH HANDS WHEN VISIBLY SOILED

⌚ Duration of the entire procedure: 20-30 seconds



How to handwash?

WASH HANDS WHEN VISIBLY SOILED! OTHERWISE, USE HANDRUB

⌚ Duration of the entire procedure: 40-60 seconds



Why is respiratory hygiene important?

Good respiratory hygiene/cough etiquette can reduce the spread of microorganisms (germs) that cause respiratory infections (colds, flu).



Respiratory hygiene/etiquette procedures

- Turn head away from others when coughing/sneezing
- Cover the nose and mouth with a tissue.
- If tissues are used, discard immediately into the trash
- Cough/sneeze into your sleeve if no tissue is available
- Clean your hands with soap and water or alcohol-based products



Promoting respiratory hygiene

- Encourage handwashing for patients with respiratory symptoms
- Provide masks for patients with respiratory symptoms
- Patients with fever + cough or sneezing should be kept at least 1m away from other patients
- Post visual aids reminding patients and visitors with respiratory symptoms to cover their cough
- Consider having masks and tissues available for patients in all areas



Examples of PPE for use in health care settings for COVID-19

Gown



Body

Gloves



Hands

Face Mask



**Nose +
mouth**

N95 Mask



Nose + mouth

Face shield



Eyes + nose + mouth

Goggle



Eyes

Risk Assessment and Standard Precautions



Risk assessment: risk of exposure and extent of contact anticipated with blood, body fluids, respiratory droplets, and/or open skin

- Select which PPE items to wear based on this assessment
- Perform hand hygiene according to the WHO “5 Moments”
- Should be done for each patient, each time

Make this routine!

Minimize direct unprotected exposure to blood and body fluids



EYE-WEAR	MEDICAL MASK	GOWN	GLOVES	HAND HYGIENE	SCENARIO
				x	Always before and after patient contact, and after contaminated environment
			x	x	If direct contact with blood and body fluids, secretions, excretions, mucous membranes, non-intact skin
		x	x	x	If there is risk of splashes onto the health care worker's body
x	x	x	x	x	If there is a risk of splashes onto the body and face

Principles for using PPE (1)

Always clean your hands before and after wearing PPE

PPE should be available where and when it is indicated

- in the correct size
- select according to risk or per transmission-based precautions

Always put on before contact with the patient

Always remove immediately after completing the task and/or leaving the patient care area

NEVER reuse disposable PPE

Clean and disinfect reusable PPE between each use

Principles for using PPE (2)



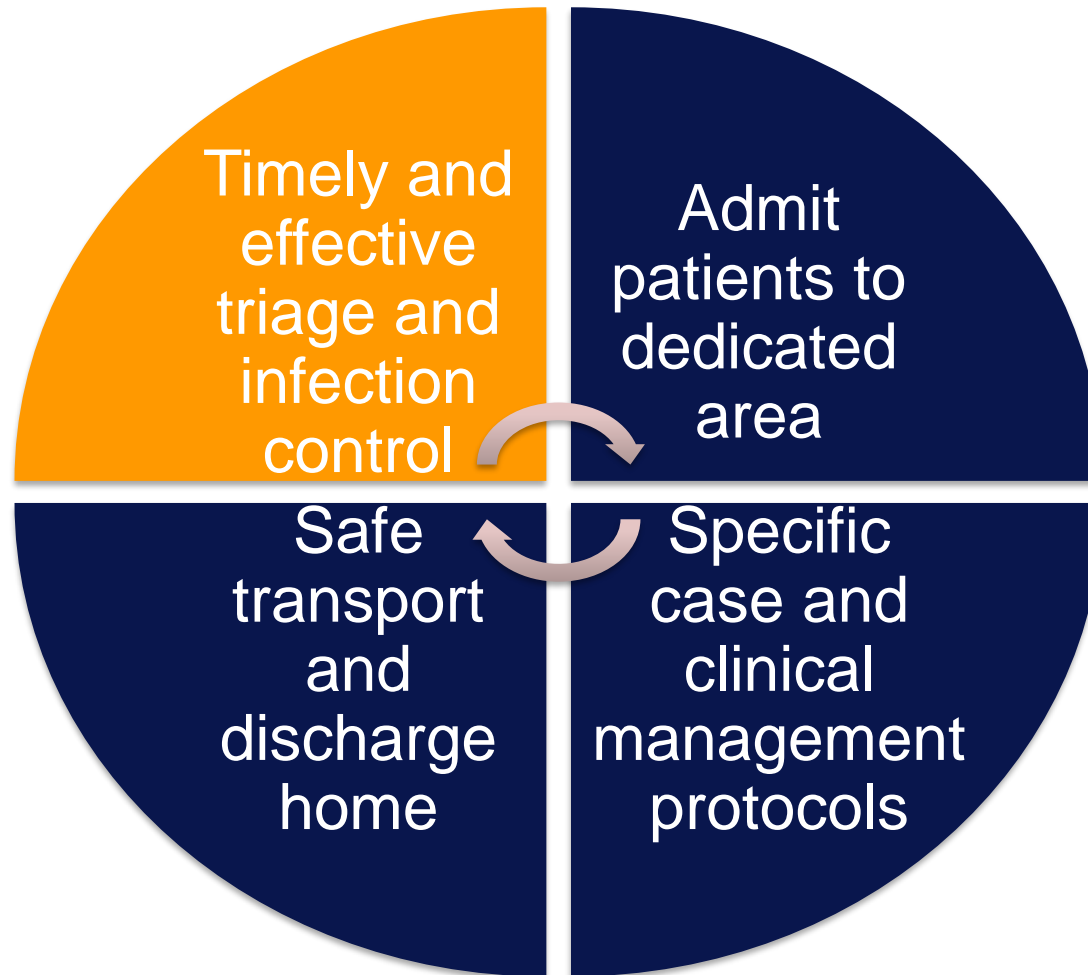
Change PPE immediately if it becomes contaminated or damaged

PPE should not be adjusted or touched during patient care; specifically

- never touch your face while wearing PPE
- if there is concern and/or breach of these practices, leave the patient care area when safe to do so and properly remove and change the PPE
- Always remove carefully to avoid self-contamination (from dirtiest to cleanest areas)

Recommendation 2. Ensuring triage, early recognition, and source control

Manage ill patients seeking care



Clinical triage is to be used in health care facilities for the early identification of patients with acute respiratory infection (ARI) to prevent the transmission of pathogens to health care workers and other patients.

Triage (2)

The triage or screening area requires the following equipment:

- Screening questionnaire
- Algorithm for triage
- Documentation papers
- PPE
- Hand hygiene equipment and posters
- Infrared thermometer
- Waste bins and access to cleaning/disinfection
- Post signage in public areas with syndromic screening questions to instruct patients to alert HCWs.

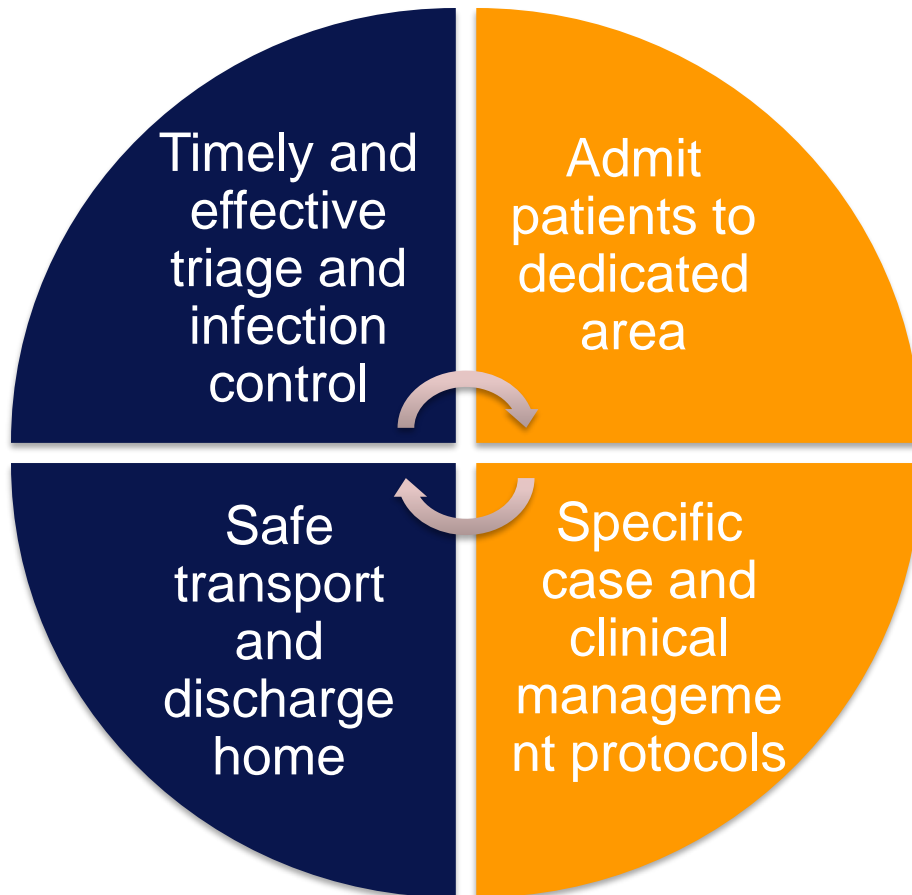
Triage (3)



Set up of the area during triage:

1. Ensure adequate space for triage (maintain at least 1 m distance between staff screening and patient/staff entering)
2. Have hand hygiene alcohol rub and masks available (also medical gloves, eye protection and gowns to be used according to risk assessment)
3. Waiting room chairs for patients should be 1m apart
4. Maintain a one-way flow for patients and for staff
5. Clear signage for symptoms and directions
6. Family members should wait outside the triage area-prevent triage area from overcrowding

Hospital admission



- Avoid admitting low-risk patients with uncomplicated respiratory signs and symptoms of infection and no underlying diseases.
- Cohort patients with the same diagnosis in one area.
- Do not place suspect patients in same area as those who are confirmed.
- Place patients with ARI of potential concern in single, well ventilated room, when possible.
- Assign health care worker with experience with IPC and outbreaks.

What do additional precautions include?



Standard Precautions
+
Special accommodations/isolation (i.e. single room, space between beds,
separate toilet etc.)
+
Signage
+
PPE
+
Dedicated equipment and additional cleaning
+
Limit transport
+
Communication

Patients suspected or confirmed COVID-19 (1) World Health Organization

- **Contact and droplet precautions** for all patients with suspected or confirmed COVID-19.
- **Airborne precautions** are recommended **only** in circumstances and settings in which AGPs and support treatment are performed (i.e. open suctioning of respiratory tract, intubation, bronchoscopy, cardiopulmonary resuscitation).
- All **patients** with respiratory illness should be in a single room, or **minimum 1m away from other patients** when waiting for a room
- A team of HCW should be dedicated to care exclusively for suspected patients
- **HCW to wear PPE:** a medical mask, goggles or face shield, gown, and gloves
- **Hand hygiene** should be done **any time the WHO “5 Moments” apply**, and **before PPE and after** removing PPE

Patients suspected or confirmed COVID-19 (2)



- **Equipment** should be **single use** when possible, dedicated to the patient and disinfected between uses
- **Avoid transporting** suspected or confirmed cases – if necessary, have patients wear masks. HCW should wear appropriate PPE.
- Frequent **cleaning and disinfection** of the environment is crucial
- **Limit** the number of HCW, visitors, and family members who are in contact with the patient. If necessary, everyone must wear PPE.
- All persons entering the patient's room (including visitors) should be recorded (for contact tracing purposes).
- Precautions should continue until the patient is asymptomatic.

CONTACT/DROPLET PRECAUTIONS - COVID-19

PERSONAL PROTECTIVE EQUIPMENT (PPE)



COVID-19 Precautions

Contact/Droplet

with option for Airborne (N95) for AGP

1 Perform hand hygiene Alcohol based handrub Rub hands for 20-30 seconds. or Water and soap Wash hands for 40-60 seconds.	
2 Put on the gown	
3 Eye protection Put on goggles or face shield.	
4 Put on the mask Medical mask — or — Respirator mask (N95, FFP2, FFP3, or equivalent). Only use if performing aerosol generating procedures.	
5 Put on gloves Ensure gloves are placed over the cuff of the gown.	
Full PPE Gloves, gown, mask (medical or N95), goggles.	

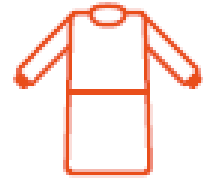
Contact precautions

- **Single room**
- **Hand hygiene**
 - according to the “5 Moments”, in particular before and after contact with the patient and after removing PPE
 - Avoiding touching eyes, nose or mouth with contaminated gloved or ungloved hands.
- **PPE: gown + gloves**
- **Equipment;** cleaning, disinfection, and sterilization
- **Environmental cleaning**
 - Avoiding contaminating surfaces not involved with direct patient care (e.g., doorknobs, light switches, mobile phones)



Droplet precautions

- **Single room**
 - if single rooms are not available, separating patients from others by at least 1m
- **PPE:** Health care workers must wear appropriate PPE
 - Medical mask
 - Eye protection (goggles or face shield)
 - Gown
- **Limit movement:** Patient to stay in the room
 - If transport/movement is required, require the patient using a medical mask and use predetermined transport routes to minimize exposure for staff, other patients and visitors.



Airborne precautions (in the context of COVID-19)



Recommended **ONLY** for circumstances and settings in which AGPs and support treatment are performed, according to risk assessment:

- bronchoscopy,
- tracheal intubation,
- pressure on the chest during cardiopulmonary resuscitation may induce production of aerosol
- and others that are aerosol producing.



The following is required:

- **Single room**
- **Adequate ventilation:** natural ventilation (air flow of at least 160 L/s per patient) or in negative pressure rooms (at least 12 air changes per hour) and controlled direction of air flow.
- **PPE:** gown, gloves, N-95, or FFP2 or equivalent masks, eye protection (goggles or face shield)

Airborne precautions (in the context of COVID-19)

AIRBORNE PRECAUTIONS PERSONAL PROTECTIVE EQUIPMENT (PPE)

- 1 Perform hand hygiene**
- | | | |
|--|----|--|
| Alcohol based handrub
Rub hands for 20–30 seconds. | or | Water and soap
Wash hands for 40–60 seconds. |
|--|----|--|



- 2 Put on the respirator mask**
(N95, FFP2, FFP3, or equivalent)



Recommended **ONLY** for aerosol generating procedures:

- bronchoscopy,
- tracheal intubation,
- pressure on the chest during cardiopulmonary resuscitation may induce production of aerosol
- and others that are aerosol producing.

The following is required:

- Single room
- Adequate ventilation
- PPE: gown, gloves, N-95, or FFP2 or equivalent masks, eye protection (goggles or face shield)

Airborne: N95 Mask Fitting

Do a seal check before you enter the room!



N95 Mask Fitting

Do a seal check before you enter the room!



5A Positive seal check

- Exhale sharply. A positive pressure inside the respirator = no leakage. If leakage, adjust position and/or tension straps. Retest the seal.
- Repeat the steps until respirator is sealed properly.

5B Negative seal check

- Inhale deeply. If no leakage, negative pressure will make respirator cling to your face.
- Leakage will result in loss of negative pressure in the respirator due to air entering through gaps in the seal.

HOW TO GUIDE - PUTTING ON PPE FOR CONTACT/DROPLET PRECAUTIONS

1 Perform hand hygiene

Alcohol based handrub
Rub hands for 20–30 seconds.
or
Water and soap
Wash hands for 40–60 seconds.



2 Put on the gown



3 Put on the mask

Medical mask.



4 Put on eye protection

Put on goggles or face shield.



5 Put on gloves

Ensure glove is placed over the cuff of the gown.



Full PPE



HOW TO GUIDE - TAKING OFF PPE FOR CONTACT/DROPLET PRECAUTIONS

Order is important

1 Remove gloves



2 Remove the gown

Ensure gown is taken off in a manner in which it does not spread anything off of the gown



3 Perform hand hygiene

Alcohol based handrub
Rub hands for 20–30 seconds.
or
Water and soap
Wash hands for 40–60 seconds.



4 Remove eye protection

Remove goggles or face shield.



5 Remove the mask



6 Perform hand hygiene

Alcohol based handrub
Rub hands for 20–30 seconds.
or
Water and soap
Wash hands for 40–60 seconds.



Additional considerations

- It is important to ensure that environmental cleaning and disinfection procedures are followed consistently and correctly.
- Thorough cleaning environmental surfaces with water and detergent and applying commonly used hospital level disinfectants (such as sodium hypochlorite, 0.5%, or ethanol, 70%) are effective and sufficient procedures.
- Medical devices and equipment, laundry, food service utensils and medical waste should be managed in accordance with safe routine procedures.

Outpatient Care



The basic principles of IPC and standard precautions should be applied in all health care facilities, including outpatient care and primary care.



For COVID-19 infection, the following measures should be adopted:

- Triage and early recognition;
- syndromic screening to be done in clinics;
- emphasis on hand hygiene, respiratory hygiene and medical masks to be used by patients with respiratory symptoms (consider having signage);



Outpatient Care

For COVID-19 infection, the following measures should be adopted (continued):



- if possible – place patients in separate rooms or away from other patients in the waiting rooms, and wear mask, gloves and gown if possible when seeing them in the clinic (as much of contact and droplet precautions as possible);
- when symptomatic patients are required to wait, ensure they have a separate waiting area (1m separation);
- prioritization of care of symptomatic patients;
- educate patients and families about the early recognition of symptoms, basic precautions to be used and which health care facility they should refer to.

Home care for patients with suspected novel coronavirus (2019-nCoV) infection presenting with mild symptoms and management of contacts

Interim guidance
04 February 2020



[https://www.who.int/publications-detail/home-care-for-patients-with-suspected-novel-coronavirus-\(ncov\)-infection-presenting-with-mild-symptoms-and-management-of-contacts](https://www.who.int/publications-detail/home-care-for-patients-with-suspected-novel-coronavirus-(ncov)-infection-presenting-with-mild-symptoms-and-management-of-contacts)

Updated Guidance on use of masks for COVID-19



Advice on the use of masks in the context of COVID-19

Interim guidance
6 April 2020



- This document provides advice on the use of masks in communities, during home care, and in health care settings in areas that have reported cases of COVID-19.
- It is intended for individuals in the community, public health and infection prevention and control (IPC) professionals, health care managers, health care workers (HCWs), and community health workers.
- Updates: Provides *Advice to decision makers on the use of masks for healthy people in community settings*
 - Communication strategy to accompany mask recommendations
 - Types of masks
 - Mask management

Use of masks by healthy people in the community setting – available evidence



Advice on the use of masks in the context of COVID-19

Interim guidance
6 April 2020



- Studies of influenza, influenza-like illness, and human coronaviruses provide evidence that the use of a **medical mask can prevent the spread of infectious droplets from an infected person** to someone else and potential contamination of the environment by these droplets.
- Limited evidence that wearing a medical mask by healthy individuals in the **households or among contacts of a sick patient, or among attendees of mass gatherings** may be beneficial as a preventive measure
- Currently **no evidence** that wearing a mask by healthy persons in the wider community setting can prevent them from infection with respiratory viruses.
- ***Masks should be worn by symptomatic individuals*** when around others, in addition to self-isolating, practicing hand hygiene and social distancing

Use of masks by healthy people in the community setting in the context of COVID-19



Community masking: the wide use of masks by healthy people in the community setting is not supported by current evidence and carries uncertainties and critical risks.

WHO provides advice to decision makers to apply a **risk-based approach** and define:

1. **purpose of mask use:** the rationale and reason for mask use should be clear– whether it is to be used for source control (used by infected persons) or prevention of COVID-19 (used by healthy persons)
2. **risk of exposure** to the COVID-19 virus in the local context
3. **vulnerability** of the person/population to develop severe disease or be at higher risk of death (e.g., people with comorbidities and older people)
4. **setting** in which the population lives in terms of population density (e.g. camps, closed settings) or ability to carry out physical distancing (e.g. on a crowded bus)
5. **feasibility:** availability and costs of the mask, and tolerability by individuals
6. **type of mask:** medical mask versus nonmedical mask

Use of masks by healthy people in the community setting in the context of COVID-19



Advantages

- Population protection according to precautionary principle
- Reducing potential exposure risk from infected person during the “pre-symptomatic” period
- Reducing stigmatization of individuals wearing mask for source control

Risks

- self-contamination that can occur by touching and reusing contaminated mask
- depending on type of mask used, potential breathing difficulties
- false sense of security, leading to potentially less adherence to other preventive measures such as physical distancing and hand hygiene
- diversion of mask supplies and consequent shortage of mask for health care workers
- diversion of resources from effective public health measures, such as hand hygiene

Updated guidance on rational use of PPE

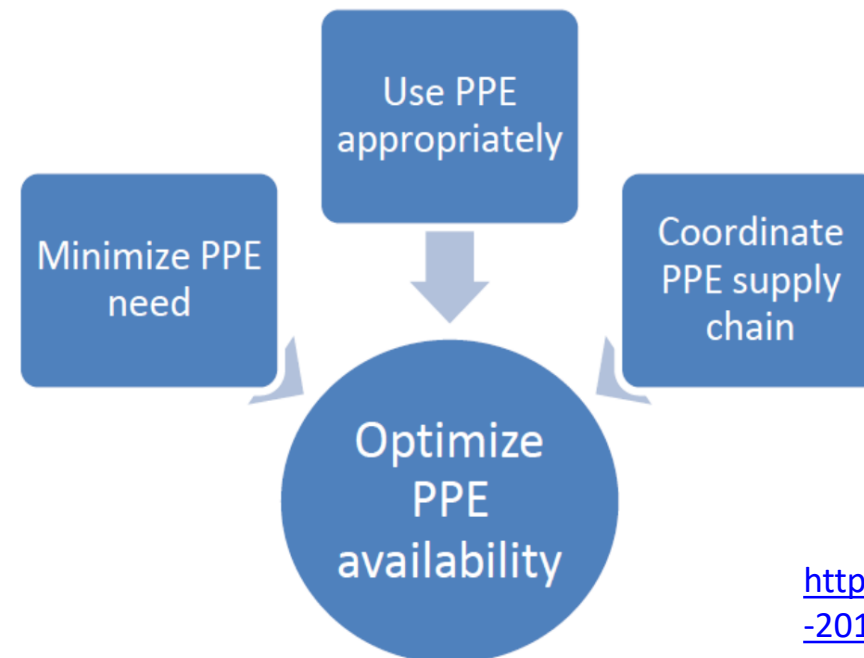


Rational use of personal protective equipment for coronavirus disease (COVID-19) and considerations during severe shortages

Interim guidance
6 April 2020



Strategies to optimize the availability of PPE



https://apps.who.int/iris/bitstream/handle/10665/331695/WHO-2019-nCov-IPC_PPE_use-2020.3-eng.pdf

Considerations during severe shortages



Key points:

- WHO is not recommending extended use or re-use of PPE but are providing guidance on how to do this appropriately if health care facilities take this decision due to short supply
 - PPE extended use (using for longer periods of time than normal according to standards);
 - Reprocessing followed by reuse (after cleaning or decontamination/sterilization) of either reusable or disposable PPE;
 - Considering alternative items compared with the standards recommended by WHO
- Each of these measures carries significant risks and limitations - considered only as a last resort when all other strategies for rational and appropriate use and procurement of PPE have been exhausted

➤ **Extended use of masks or respirators:**

- ✓ The use without removing for up to 6h, when caring for a cohort of COVID-19 patients

➤ **Reprocessing:**

- ❖ not advised for surgical masks
- ✓ Possible for respirators using vapor of hydrogen peroxide, ethylene oxide, UV radiation lamp

Minimizing the need for PPE



- Consider **telemedicine** to evaluate suspect cases, minimizing the need for them to visit health care facilities for evaluation
- Implement **physical barriers** (glass/plastic windows) where patients first present: triage areas, ED registration desk, pharmacy window
- **Limit** number of healthcare **workers/others entering** COVID-19 patients' **rooms**.
- **Plan ahead** what activities will be performed at bedside to avoid multiple entries and exits. Consider **bundle** activities (e.g. check vital signs when administering medication; have health workers deliver food when performing other care).
- Do not allow **visitors** where COVID-19 patients are isolated, or restrict their number and time allowed

Real-time training for COVID-19

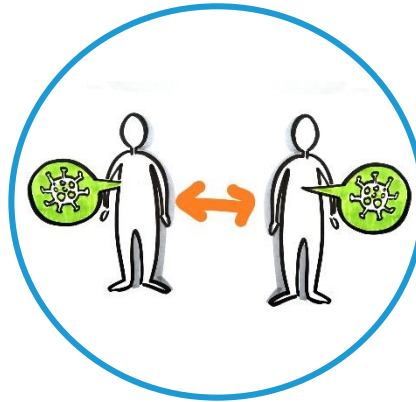
Free online courses from WHO experts



Intro to
COVID-19



Health and
safety



Infection
Prevention
and Control



Clinical care



Country
capacitation

OpenWHO.org 

Access free online courses on COVID-19 in your national language!

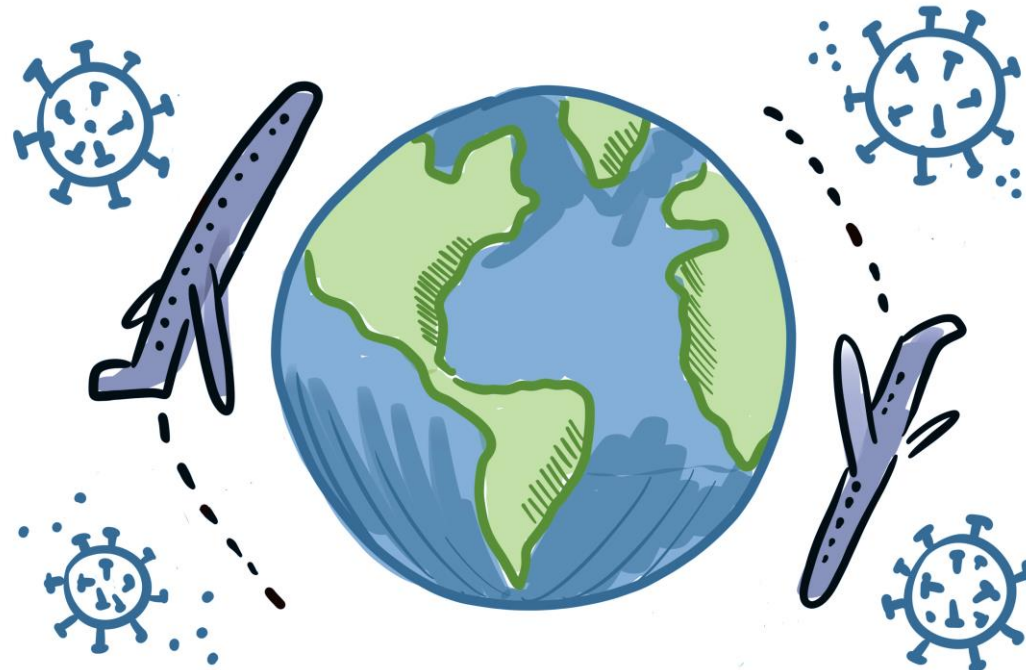
Italiano

日本語

Türk

српски језик

Tiếng Việt



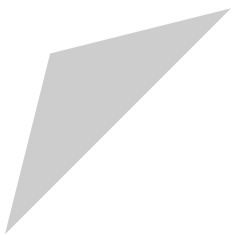
فارسی

Português

Bahasa Indonesia

हिन्दी, हिंदी

OpenWHO.org 



Resources for COVID-19



WHO Coronavirus Homepage

<https://www.who.int/emergencies/diseases/novel-coronavirus-2019>

All coronavirus (COVID-19) technical guidance documents

<https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance>

IPC documents

<https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/infection-prevention-and-control>

<https://www.who.int/infection-prevention/publications/en/>

Questions and Answers

<https://www.who.int/news-room/q-a-detail/q-a-coronaviruses>

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**THANK
YOU!**