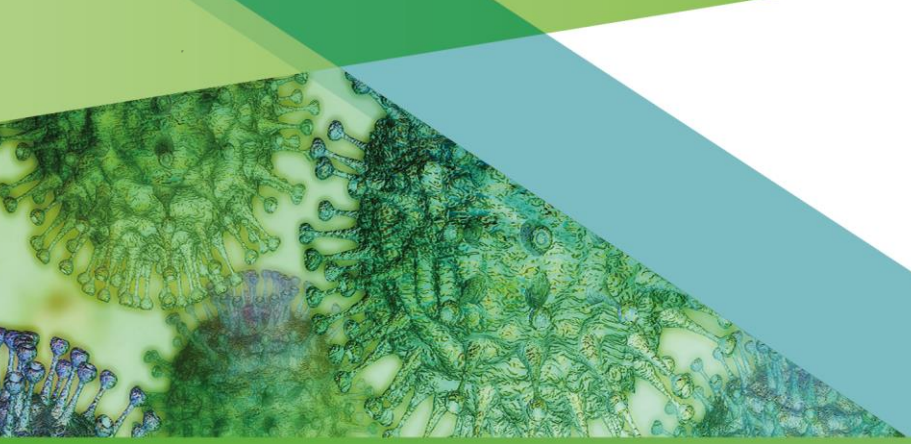

TECHNICAL REPORT

Infection prevention and control and preparedness for COVID-19 in healthcare settings

Fourth update – 3 July 2020

Scope of this document

This document aims to provide guidance to EU/EEA healthcare facilities and healthcare providers on infection prevention and control (IPC) measures for the management of possible and confirmed cases of COVID-19 infection in healthcare settings, including long-term care facilities (LTCF). It also offers guidance on the management of specimens at laboratories in the EU/EEA.

This is the fourth update of the ECDC guidance dated 13 May 2020 'Infection prevention and control and preparedness for COVID-19 in healthcare settings' [1].

The second update included measures to be applied in settings in areas with community transmission and addressed a growing demand for care of COVID-19 patients and ensuing staff issues in the event of shortages of personal protective equipment (PPE) for healthcare facilities in EU/EEA countries and the United Kingdom.

The third update included updated recommendations for healthcare staff, including long-term care facilities staff, regarding medical masks and FFP2 respirators, and actions for staff with mild symptoms of COVID-19. It also contained additional references to current ECDC surveillance guidance for long-term care facilities recommending laboratory testing as soon as possible after the detection of a case, to guide infection prevention and control measures.

Changes to the current update

This fourth update contains the following additions:

- Addition of the section 'Definitions', defining mask types.
- Alignment with information on occupational health and safety from European Agency for Safety and Health at Work (EU-OSHA), in accordance with Occupational Safety and Health (OSH) regulations and codes of practice.
- Update of the background including evidence on transmission and the effectiveness of preventive measures.
- Revision of the physical distancing recommendation for healthcare workers performing the first assessment without direct contact. They should maintain of at least 1.5 metres rather than 1 metre whenever possible, in addition to wearing a medical mask.
- Addressing the uncertainty of the potential for generation of infectious aerosols through administration of nebulised treatment
- Review the evidence and revision of clinical and microbiological criteria for discharge from isolation
- Revision of microbiological testing criteria for new and returning residents of long-term care facilities, in the section 'Long-term care facilities, Administrative measures'.

Suggested citation: European Centre for Disease Prevention and Control. Infection prevention and control for COVID-19 in healthcare settings – Fourth update. 3 July 2020. ECDC: Stockholm; 2020.

Target audience

Hospital administrators, long-term care facility administrators and healthcare practitioners in EU/EEA countries and the United Kingdom.

Definitions

- **A respirator** or filtering face piece (FFP) mask or filtering half mask, is designed to protect the wearer from exposure to airborne contaminants (e.g. from inhaling infectious agents associated with inhaling small and large particle droplets) and is classified as personal protective equipment (PPE) [2]. Respirators are mainly used by healthcare workers to protect themselves, especially during aerosol-generating procedures, and require a fit-test to ensure proper protection. Valved respirators are not appropriate for use as a means of source control since they do not prevent the release of exhaled respiratory particles from the wearer into the environment [3]. Requirements for respirators are specified in EN 149:2001+A1:2009.
- **A medical face mask (also known as surgical or procedure masks)** is a medical device covering the mouth, nose and chin ensuring a barrier that limits the transition of an infective agent between hospital staff and the patient. They are used by healthcare workers to prevent large respiratory droplets and splashes reaching the mouth and nose of the wearer, and as a means of source control to stop the spread of large respiratory droplets by the person wearing them [2]. Requirements for medical masks are defined in EN 14683:2014. Medical masks are not defined as personal protective equipment in Regulation (EU) 2016/425 of 9 March 2016 and Directive 89/656/EEC on personal protective equipment. However, for the purpose of this document and in accordance with guidance on infection prevention and control in the context of COVID-19 by WHO [4] and on transmission-based precautions [5], medical masks are considered to provide protection against infections transmitted by droplets.
- **Non-medical face masks (or 'community' masks)** include various forms of self-made or commercial masks or face covers made of cloth and other textiles or other materials such as paper. They are not standardised and are not intended for use in healthcare settings or by healthcare professionals.

Background

While the COVID-19 pandemic has not reached a peak in America, Asia and Africa, the European continent and Oceania have seen decreasing incidence rates since early April. The majority (90%) of EU/EEA countries and the UK are currently (week 23/2020) observing much lower 14-day incidence rates compared to the peak which occurred from 2 to 23 April 2020, depending on the country. All countries are in the process of adjusting their containment measures and travel restrictions, which is expected to contribute to new cases, depending on continued compliance with physical distancing, respiratory and hand hygiene as well as the intensity of testing and contact tracing [6,7].

More up-to-date disease background information is available online from ECDC [8], WHO [9] and in ECDC's Rapid Risk Assessment [10].

Healthcare workers (HCW) are at high risk of COVID-19 infection because of more frequent exposure to COVID-19 cases and may contribute to the spread of COVID-19 in healthcare institutions. A recent study in the United Kingdom and the US estimated that frontline healthcare workers had a 3.4 fold higher risk than people living in the general community for reporting a positive test, adjusting for the likelihood of receiving a test [11]. Up to 10% of the reported cases in China [12] and up to 9% of all cases in Italy have been among healthcare workers [13]. It is well acknowledged that nosocomial outbreaks are important amplifiers of the local outbreaks which disproportionately affect the elderly and vulnerable populations. IPC practices are of critical importance in protecting the functioning of healthcare services and mitigating the impact on vulnerable populations.

Measures to prevent transmission in healthcare facilities are an immediate priority in order to 1) protect patients and healthcare workers; 2) safeguard risk groups; 3) slow the demand for specialised healthcare, such as intensive care unit (ICU) beds and 4) minimise the export of cases to other healthcare facilities and the wider community.

In most instances, coronaviruses are believed to be transmitted from person-to-person via large respiratory droplets, either being inhaled or deposited on mucosal surfaces. Other routes implicated in transmission of coronaviruses include inhalation of aerosols produced during aerosol-generating procedures (AGPs), and possibly the contact with contaminated fomites, although the latter has not been documented yet for SARS-CoV-2. SARS-CoV-2 virus has been detected in respiratory and faecal specimens. Viral RNA has also been detected on rare occasions in blood specimens but there is no evidence of transmission through contact with blood [12]. The relative role of droplet, fomite and aerosol transmission for SARS-CoV-2, the protection provided by the different components of personal protective equipment (PPE) and the transmissibility of the virus at different stages of the disease remain unclear. Caution should therefore be exercised when considering these elements [14,15]. A recent systematic review and meta-analysis estimated that respirators may provide a stronger protective effect compared to medical masks [16].

However, this conclusion was based on a limited number of observational studies and the authors assigned low certainty to it. Therefore, with the exception of AGPs, it is unclear whether respirators provide better protection than medical masks against other coronaviruses and respiratory viruses such as influenza [17,18]. Consequently, in the event of widespread community transmission leading to shortages of PPE, a rational approach would necessitate prioritising use of respirators for care activities involving a higher perceived risk of transmission, such as during AGPs or in intensive care.

There is evidence that persons with mild or no symptoms contribute to the spread of COVID-19 [14,19-22]. Although uncertainties remain about the relative role of transmission by symptomatic versus asymptomatic or pauci-symptomatic persons, the implications of this observation for the prevention of COVID-19 among healthcare workers and vulnerable patient populations in healthcare are significant [23].

Healthcare settings

The following sections provide an outline of technical measures and resources that can be used to reduce the risk of COVID-19 transmission in healthcare settings (including long-term care facilities) and laboratories in the EU/EEA. It draws on interim advice produced by WHO and national agencies, and expert opinion [10,12-14]

Occupational health and safety

The health and safety of healthcare workers and other staff working at healthcare premises is paramount. Not only for their own protection but also to help prevent the spread of the virus and to improve overall care. There is a comprehensive body of EU legislation to protect workers' health and safety at the workplace. Additional measures that need to be taken when COVID-19 cases are registered at healthcare premises may pose additional risks to staff in terms of higher physical and mental workload, longer working hours and increased administrative workloads. Workplace risk assessments should be revised and appropriate measures set by employers in accordance with the legislation governing risks from biological agents at work and the Directive 2004/54/EC on the protection of workers from exposure to biological agents (available from https://eur-lex.europa.eu/legal-content/EN/LSU/?uri=celex:32000L0054) [see Annex]. The occupational health and safety measures should be adapted in agreement with occupational safety and health services and workers taking into account all types of risks (also taking into account the additional physical load when wearing personal protective equipment). The safety and health committee should be consulted, where there is one in place. The risk to healthcare workers and other staff that belong to medically vulnerable groups and potential mitigation measures need to be addressed in collaboration with the occupational health services or health and safety committee.

Non-binding guidelines developed at EU level aim to help employers and workers to stay safe and healthy in a working environment that has changed significantly because of the COVID-19 pandemic. They give advice on risk assessment and appropriate measures such as minimising exposure, resuming work, coping with absences and taking care of workers that have been ill. They also contain useful links to national guidance in specific sectors, including the health and care services. More information on occupational safety and health in the context of COVID-19 is available by EU-OSHA [24].

General infection prevention and control measures

Due to the likelihood of virus transmission by persons with few or no symptoms, healthcare facilities should ensure that physical distancing measures are implemented by staff, visitors and patients, particularly in settings with widespread community transmission. The use of medical masks by healthcare workers for personal protection and source control should be strongly considered in clinical areas during all routine activities as a measure for reducing transmission within healthcare settings in areas with community transmission.

Standard precautions, and in particular meticulous hand and respiratory hygiene, should be emphasised.

Triage, initial contact and assessment (primary and emergency care)

Emergency services and primary care staff, including physicians, nursing and administrative staff having contact with patients, should:

- Be made aware of the current COVID-19 epidemiological situation in their country and globally, including:
  - known risk factors for infection;
  - clinical symptoms and signs of COVID-19;
  - recommended IPC measures, including those in this document;
  - procedures for reporting and transferring people under investigation and probable/confirmed cases.
- Liaise with the hospital employer to assess the onsite availability of appropriate PPE for all personnel at the point-of-care.

- Create a separate area in the emergency department for the assessment and management of patients with respiratory symptoms in order to spare PPE.
- Perform a point-of-care risk assessment to assess the likelihood of COVID-19 infection, including the clinical presentation of the patient and a review of clinical and epidemiological information. The assessment should be based on the latest case definitions [15].
- Create a separate area in the emergency department/hospital for swabbing possible cases in accordance with the existing protocol. This should allow rational use of PPE and safer collection of diagnostic respiratory samples.
- Map and develop policies for prioritising stocks of PPE, available equipment for the administration of oxygen, including nasal cannulas, non-invasive ventilation devices, and mechanical ventilators, and necessary medication, given that COVID-19 patients may present with significant hypoxemia and need oxygen support.
- For patients requiring intubation for mechanical ventilation, plan ahead and avoid emergency intubations as much as possible. Consider performing all the necessary procedures such as central venous catheter and arterial line insertions during one session, in order to conserve PPE.
- If possible, provide for triage by telephone or telemedicine and online services to reduce the number of people with symptoms of COVID-19 who come into contact with healthcare services.
- Be aware of requirements for testing and the case definitions [25] for reporting cases.

Personal protective equipment for assessment and collection of diagnostic respiratory samples

The recommended PPE for the clinical assessment of possible COVID-19 cases can be adapted as follows:

- Healthcare workers performing the first assessment without direct contact: the patient should wear a medical mask if available and keep a distance of at least 1.5 metres.
- If possible, a physical barrier such as glass or a plastic panel can be used to avoid direct contact and keep a distance. In this case no PPE is necessary [26].
- Collecting diagnostic respiratory samples (e.g. nasopharyngeal swab) can provoke coughing and/or sneezing and therefore lead to the production of aerosols [27]. Healthcare workers collecting diagnostic respiratory samples in enclosed spaces [28] should wear a respirator, eye protection, gloves and gown. A medical mask can be used in place of a respirator in the event of shortage of respirators and for drive-through or outdoor testing facilities[29].

In order to optimise the use of PPE, staff should be assigned to carry out procedures in designated areas. For example, a dedicated area for collecting diagnostic respiratory samples can be set up. While collecting the sample, healthcare personnel can use the same respiratory protection equipment for several patients for a longer period of time without removing it, provided that it is not damaged or soiled, unless the manufacturer explicitly advises against this and in accordance with Occupational Safety and Health (OSH) regulations, codes of practice and in agreement with the occupational physician or health and safety committee [16].

Management of possible cases

Possible COVID-19 cases should be isolated, or at least separated from other patients as far as possible. They should wear a medical mask, if available, or at least cover their mouth with a tissue when coughing and practise appropriate hand hygiene. If possible, dedicated toilet facilities should be made available. Non-essential contacts between possible cases and other persons should be minimised.

Appropriate response routines should be set, e.g. reporting to a designated 24/7 response service, such as the local public health authorities, arrangement of diagnostic testing and, if appropriate following initial assessment, arrangement for safe transfer to a designated acute care unit for further diagnostic evaluation.

Patient transport

It is important to ensure the availability of a preparedness plan for ambulance transfers of possible or confirmed COVID-19 cases, addressing the temporal and geographical coverage of adequately trained staff and equipment.

For ambulance transfers of possible or confirmed COVID-19 cases, it is important to ensure that healthcare staff are provided with appropriate PPE, set decontamination measures for the ambulance after the transfer of the patient in accordance with the recommendations on environmental cleaning (see below), and practise safe waste management in accordance with local procedures.

Appropriate PPE for healthcare workers accompanying/monitoring a patient during transport includes a respirator and eye protection (visor or goggles), gloves and gown. A medical mask should be provided for patients with respiratory symptoms.

Persons sitting in the front of the ambulance, including the driver, should not come into contact with the patient. If there is no physical separation between the front and the back of the ambulance, they should be provided with appropriate PPE [16].

Hospitals

The following measures should be considered to reduce the risk of COVID-19 transmission among patients, healthcare workers, and other staff in hospitals.

Administrative measures

- Ensure appropriate training on IPC for healthcare workers and other staff and regular updates to ensure that emerging evidence and changing guidance are taken into account.
- Provide appropriate information and training to workers recruited for surge capacity (for example agency staff, student doctors/nurses, and retired health professionals).
- Set up a hospital 'COVID-19 preparedness and response committee' (or adapt an existing emergency management committee) with representatives from all the main clinical and support departments as well as senior administrators. The preparedness and response committee should liaise with a health and safety committee if established or with the Occupational Safety and Health experts at enterprise level and take into account their advice on OSH requirements. Participate in a local healthcare coalition; this should include neighbouring hospitals, local public health agencies, and emergency healthcare services. Members of multi-hospital health systems should integrate system-wide planning and local planning with that of other local hospitals [30].
- Be aware of the minimum requirements for designated units managing confirmed COVID-19 patients: staff adequately trained in the safe diagnostic evaluation and management of COVID-19 patients; availability of appropriate PPE and hand hygiene products; adequate laboratory support, appropriate cleaning, and appropriate waste management procedures (see section 'Environmental cleaning and waste management' below).
- Plan for surge capacity, estimate the needs in terms of patient beds, respiratory support, PPE, staff and diagnostics. Laboratory capacity and therapeutics should also be included in these estimates. Ensure the workplace risk assessment is revised regularly to ensure measures are adapted to take into account changes to work procedures that may incur an additional risk to staff. This includes higher physical and mental workload.
- To ensure preparedness for a surge in critically ill patients, identify rooms for these patients. In addition, identify non-urgent outpatient visits for re-scheduling or cancellation, and elective in-patient diagnostic and surgical procedures that can be moved to an outpatient setting, re-scheduled or cancelled [29,31].
- Identify and designate additional separate units that can be used for diagnostic evaluation and treatment of COVID-19 patients.
- Ensure that virological investigations can be arranged in a timely manner in accordance with the algorithm for laboratory diagnosis of COVID-19 (see Laboratory testing for coronavirus disease 2019 (COVID-19) in suspected human cases [32]).
- Define a strategy for testing, management and follow-up of healthcare workers with respiratory symptoms in alignment to national/regional authorities. Ensure that testing for COVID-19 is available for healthcare workers and patients. Ensure notification of an infection or COVID-19 case in staff as occupational accident or disease according to national regulations, as the case may be.
- In areas with any kind of community transmission, all staff who provide care for patients or have contact with patients should consider wearing medical masks in addition to practising meticulous hand hygiene.
- All staff with symptoms compatible with COVID-19 should be dispensed from their duties and isolated while symptomatic, and they should be prioritised in the national testing policy in order to be able to return to work as soon as possible once they are SARS-CoV-2 free in accordance with guidance for discharge and ending isolation [33]. Ill workers should be replaced as much as possible for the duration of their absence to avoid excess physical and mental workload on other staff.
- Ensure that visits to COVID-19 patients are limited to the absolute minimum and that visitors are aware of the need for hand and respiratory hygiene, including suitable cough etiquette. Visitors should wear a medical mask and keep a distance of at least 1.5 metres from a patient for the duration of the visit [26].
- If feasible, maintain a register of visitors for the purposes of contact tracing. Visitors to a confirmed COVID-19 case should self-monitor for symptoms of COVID-19 for 14 days after the visit, if periodic active monitoring (e.g. by telephone every few days) is not possible.

Patient management

With a small number of cases, patients should preferably be admitted to an isolation room with a dedicated toilet if available. If possible, patients should be placed in single, airborne-precaution rooms with negative pressure and anteroom, especially those patients requiring AGPs.

In the event of widespread community transmission and large numbers of COVID-19 cases requiring hospitalisation, hospitals should consider placing confirmed COVID-19 patients in a separate ward or section of the hospital with dedicated staff (cohorting). This makes it possible to spare PPE, since healthcare workers can wear the same respiratory protection while providing care to the cohorted patients while respecting the OSH requirements on the use of PPE.

The use of dedicated or, if possible, disposable medical equipment (e.g. blood pressure cuffs, stethoscopes and thermometers) is recommended.

Personal protective equipment

Healthcare workers in contact with a possible or confirmed COVID-19 case should wear a respirator tested for fitting, eye protection (i.e. visor or goggles), gloves and a long-sleeved gown [29]. In case of respirator shortage, the use of medical masks and options for prolonged use of respirators, decontamination and reuse of respirators can be considered in agreement with the health and safety committee or OSH experts at facility level. In case of shortages of gloves and gowns, these should be prioritised for procedures that are associated with contact of body fluids and splashes or contact with sterile sites (for sterile gloves).

Healthcare workers should strictly follow the procedures for putting on and safely removing PPE in the correct sequence [29]. The hands should be washed immediately after the removal of PPE. It is essential to ensure that all staff assigned to treat COVID-19 patients are trained in the proper use of PPE. Quality assurance should be promoted before assigning staff to COVID-19 patient care.

Aerosol generated procedures

These procedures include: endotracheal intubation, bronchoscopy, open suctioning, manual ventilation before intubation, non-invasive positive pressure ventilation, tracheotomy, and cardiopulmonary resuscitation [34]. These procedures have been linked with an increased transmission risk of coronaviruses and require respiratory protection measures [35]. The infectious risk of other procedures that have been linked to the production of aerosols, such as administration of nebulised treatment, is unclear and there is not consensus on their classification as AGPs [36].

AGPs should ideally be performed in a negative pressure isolation room. The number of people in the room should be limited to a minimum during such procedures. All those present should wear a well-fitted respirator, visor or goggles, long-sleeved impermeable protective gown, and gloves [37]. If there is a shortage of respirators it is recommended that respirators are prioritised for AGPs.

Approaches for the rational use of PPE in the event of shortages

In the event of shortages, the following approaches can be considered to reduce consumption and maximise the use of PPE, if in accordance with OSH regulations and codes of practice and in agreement with the occupational physician or health and safety committee.

Extended use: The same respirator may be used while caring for multiple patients with COVID-19. This is on the condition that the respirator is not removed between patients and is not damaged, soiled or contaminated, or unless specifically contraindicated by the manufacturer [26].

Reuse and decontamination: Medical masks are designed for single-use. Respirators are usually also discarded after use, but in the event of a shortage, they can be reused a limited number of times unless there is a risk of contamination through the deposition of infectious particles on the surface. Contamination of the surface of respirators and medical masks entails a risk of infection when putting the device on again for reuse. Since SARS-CoV-2 survives in the environment, including on the surfaces of various materials such as tissue, there is a risk that the outer surface of respirators and medical masks used during patient care may become contaminated. The risk of the surface of medical masks and respirators becoming contaminated by respiratory droplets is considered to be lower when they are covered with a visor. In such cases, reuse of the respirator/medical mask may be considered as a last-resort option to spare PPE. Several different procedures have been tested for decontamination of respirators in the event of shortage [38]. Such options are only to be considered as an extraordinary last resort in the event of imminent shortages of PPE, depending on availability and feasibility after other approaches for the rational use of PPE (such as extended use) have been applied. Any countries and groups studying such methods are encouraged to share results as soon as they are available.

Health monitoring and management of exposed staff

- Staff providing care to COVID-19 patients need to be actively followed-up for development of symptoms and provided with occupational health support. Hospitals should maintain a record of all staff providing care for possible and confirmed COVID-19 cases. These staff should be trained in reporting procedures and report any symptoms, and if developing a fever or any symptoms compatible with COVID-19 within 14 days of their last exposure to a confirmed case, they should be tested and be dispensed of their duties if they become unwell and quarantined according to national requirements.
- Healthcare workers exposed to COVID-19 cases without the recommended PPE should be allowed to stop work, self-monitor for symptoms and self-quarantine for 14 days, in accordance with national regulations.

Release from isolation

The duration of infectivity for COVID-19 patients is not yet known with certainty. A number of studies show that most of transmission happens around the onset of symptoms and that SARS-CoV-2 can be initially detected in upper respiratory samples one to two days before the onset of symptoms. In studies of mild cases, the virus has not been successfully isolated after eight days from the onset of symptoms [39-41]. However, in a recent study among 129 hospitalised/severe COVID-19 patients, virus isolation was possible until day 20 after onset of symptoms, with a median of eight days (IQR 5-11 days) [42]. In this study, the risk of having a positive virus culture was three times higher in immunocompromised patients. A study of the duration of viral shedding (defined as positive RT-PCR test) in 41 severe COVID-19 cases found a median duration of 31 days from illness onset [43]. Two negative PCR tests are recommended for discontinuation of isolation in hospitalised cases [33], with the caveat that some individuals continue to have positive tests for longer time periods and the interpretation of such

results in terms of transmissibility is not clear. Some evidence is emerging that these cases are not linked with secondary transmission [44]. However, the significance for transmission of prolonged shedding among immunocompromised patients remains unclear. In settings with limited testing capacity, patients can be discharged from isolation when the following criteria are fulfilled: 1. resolution of fever for at least three days, 2. clinical improvement of other symptoms and 3. after eight days from symptom onset for mild cases or 14 days from symptom onset for severe cases [33]. WHO recommends that patients are released from isolation 10 days after symptom onset, plus at least 3 additional days without symptoms [45]

Instructions for healthcare professionals and healthcare facility staff

This advice is for all staff working in healthcare facilities. Some hospitals will be designated exclusively for the management of COVID-19 patients, however the probability of exposure to the virus should be considered high at all healthcare facilities. The following precautionary measures are recommended:

- Staff who have contact with patients should wear scrubs for the duration of their work. Clean scrubs should be provided daily.
- Staff should also be provided with and wear special shoes at work that can be left at the hospital.
- At the end of the shift and after appropriate doffing (removal) of PPE, staff should wash their hands meticulously. If possible, shower facilities should be available for staff to take a shower before leaving work.
- Regular cleaning and disinfection of electronic equipment such as mobile and desk phones and other communication devices, tablets, desktop screens, keyboards and printers, particularly when these are used by many people needs to be ensured.
- Staff managing COVID-19 patients should consider the following measures when returning home in order to minimise the risk of transmission to other household members:
  - practise physical distancing;
  - wash hands frequently;
  - respiratory hygiene;
  - clean the frequently touched surfaces in their car (e.g. steering wheel, knobs, screens, etc.)
- Family members of health professionals currently involved in the management of COVID-19 patients should:
  - practise physical distancing;
  - consider sleeping in a separate room and using a separate bathroom if they belong to a high-risk group;
  - wash hands meticulously
  - Practice respiratory hygiene.

Environmental cleaning and waste management

The following measures may be considered for staff working in the area of environmental cleaning and waste management. Cleaners should be appropriately trained in cleaning procedures and waste disposal and receive appropriate instructions.

- Staff engaged in environmental cleaning and waste management should wear a medical mask, eye protection (visor or goggles), gloves and a gown [26].
- Regular cleaning followed by disinfection is recommended, using hospital disinfectants active against viruses; cleaning in patient rooms is particularly important for frequently touched surfaces. If there is a shortage of hospital disinfectants, surfaces may be decontaminated with 0.05% sodium hypochlorite (dilution 1:100 if household bleach at an initial concentration of 5% is used) after cleaning with a neutral detergent. Surfaces that do not tolerate sodium hypochlorite may be cleaned with a neutral detergent, followed by 70% ethanol [46].
- Staff engaged in waste management should be provided with and wear appropriate PPE. Waste should be treated as infectious clinical waste Category B (UN3291) [47] and handled in accordance with healthcare facility policies and local regulations. They should be trained in waste management and disposal procedures.

Laboratory testing

All specimens collected for laboratory investigation should be regarded as potentially infectious, and healthcare workers who collect or transport clinical specimens should adhere rigorously to standard precautions in order to minimise the possibility of exposure to pathogens. WHO's aide-memoire on standard precautions in healthcare is available online [32].

Laboratories should adhere to the guidance provided by The European Committee for Standardisation: CWA15793 laboratory biorisk management [48] and WHO Laboratory testing for coronavirus disease 2019 (COVID-19) in suspected human cases [32].

Long-term care facilities

COVID-19 outbreaks in long-term care facilities can have devastating effects since the residents are already vulnerable due to their age and possible underlying health problems, meaning that there is a high likelihood of unfavourable outcomes [49,50].

Long-term care facility administrators and healthcare administrators should implement the following measures for COVID-19 preparedness and infection prevention and control in long-term care facilities.

Administrative measures

- Consult and establish communication channels with local health authorities regarding specific locally recommended measures.
- Designate a team or at least one full-time staff member in each facility to be the lead for COVID-19 preparedness and response at that facility. This person should:
  - be familiar with national/regional advice on preparedness and requirements for reporting of residents with symptoms compatible with COVID-19;
  - be aware of the preferred minimum requirements for the management of residents with symptoms compatible with COVID-19: a single room with dedicated bathroom; staff adequately trained in hand hygiene and the use of PPE; availability of appropriate PPE and hand hygiene products, and appropriate cleaning and waste management procedures;
  - be responsible for ensuring that all staff are trained in IPC, including physical distancing (and self-isolation if they have symptoms) and training in hand and respiratory hygiene;
  - liaise with the employer to ensure that the facility has a sufficient number of hand washing facilities;
  - update business continuity plans, if staff members become ill or have to self-isolate;
  - monitor local and national public health sources to understand COVID-19 activity in their community.
- Designate a contact point (e.g. a liaison nurse for IPC) responsible for IPC training (including hand and respiratory hygiene and standard precautions) of all those who work in the long-term care facility, including staff.
- Provide signs at all entrances describing the symptoms compatible with COVID-19 (fever, cough, shortness of breath) [51], informing visitors with any of these symptoms not to enter the long-term care facility.
- Ensure that residents and visitors at the long-term care facility practice appropriate hand hygiene measures – i.e. they should use soap and water, or alcohol-based hand rub.
- Assess new and returning residents for symptoms compatible with COVID-19; strongly consider requesting one negative RT-PCR test before (re-)admission of residents without COVID-19; in line with hospital discharge criteria [33] request two negative RT-PCR before readmission of hospitalised clinically recovered residents with COVID-19, at least eight days after onset of symptoms; in case RT-PCR tests remain positive or in case of insufficient testing capacity, readmission can be considered after 20 days from illness onset [42]; implement IPC practices for symptomatic residents (see 'Management of residents' below). Consider monitoring all residents on a daily basis for symptoms (e.g. measure body temperature).
- Recommend that long-term care facility residents consider, if applicable, reducing their use of transportation methods with potentially large numbers of close contacts and consider minimising attendance at non-essential public events.
- Consider restricting non-essential visits and implementing physical distancing measures, whilst balancing the need of the residents for care and social contact. If visits are allowed, the use of face masks should be strongly considered.
- Establish contact with external public health teams and IPC practitioners (such as local authorities and/or hospitals) that can provide additional advice on IPC. The long-term care facility should seek their advice to calculate its need for PPE and related materials and products. The Health and safety committee or occupational physician should be involved in this process and workers need to be consulted.
- Provide IPC training to all staff, including training in the proper use of PPE. All long-term care facility staff should follow rigorous hand hygiene practices, as outlined in WHO guidance for hand hygiene in outpatient and home-based care and long-term care facilities [47].
- If feasible, long-term care facilities should consider identifying dedicated staff to care for residents with possible/confirmed COVID-19 in order to reduce the likelihood of transmission to other residents.
- Liaise with the employer to ensure that staff with symptoms of respiratory infection are dispensed from work, quarantined and contact a predesignated telephone number or contact point at the long-term care facility to inform of their symptoms.
- In areas with any kind of community transmission, all LTCF staff who provide care for residents or have contact with residents or communal areas of the LTCF should consider wearing medical masks in addition to practising meticulous hand hygiene.
- If possible, make alcohol-based hand rub available in every resident's room, both inside and outside the room, and in all public areas [51]. If there is a shortage of alcohol-based hand rub, prioritise availability at the point-of-care.
- Ensure that soap dispensers and paper towels are available for hand washing [51]. If no paper towels are available, use clean cloth towels and replace them frequently [52].

Management of residents with symptoms of COVID-19

- If a resident in a long-term care facility displays clinical signs or symptoms of COVID-19, urgently contact public health authorities'/healthcare services for notification, assessment and instructions on testing and possible transfer to an acute care hospital.

- Current ECDC guidance recommends, as a minimum, laboratory testing samples from all possible cases in residents and staff as soon as possible after the detection of a possible case and testing all residents and staff if a case is laboratory-confirmed among the LTCF residents [53].
- Residents displaying signs or symptoms of COVID-19 that do not require hospitalisation should be isolated in single rooms with a separate bathroom. If there are more than a few cases, consider placing the residents in a separate ward or section of the facility with dedicated staff.
- Ensure that all long-term care facility staff are aware of the residents displaying symptoms compatible with COVID-19 or having tested positive for the disease.
- If appropriate, consider posting information detailing IPC precautions on the doors of all residents' rooms, especially in those areas that have possible or confirmed COVID-19 cases.
- Healthcare and other workers coming into contact with residents who have respiratory infections should wear a medical mask or an FFP2 respirator if available, eye protection (i.e. visor or goggles), a gown and gloves [29].
- Healthcare workers should strictly follow the procedures for putting on and safely removing PPE in the correct sequence [29].
- Hands should be washed immediately after removing PPE.

Environmental cleaning and waste management

- Regular cleaning followed by disinfection is recommended. Cleaning personnel should use hospital disinfectants active against viruses for all common care facility areas and residents' rooms (furniture and frequently touched surfaces). If there is a shortage of hospital disinfectants, surfaces may be decontaminated with 0.05% sodium hypochlorite (dilution 1:100 if household bleach at an initial concentration of 5% is used) after cleaning with a neutral detergent. However, it should be noted that no data are available on the effectiveness of this approach against SARS-CoV-2. Surfaces that do not tolerate sodium hypochlorite may be cleaned with a neutral detergent, followed by a 70% concentration of ethanol [29]. Staff should be trained and appropriately protected from hazardous chemical substances.
- Staff engaged in waste management should be trained in adequate waste disposal procedures, provided with and wear appropriate PPE. Waste should be treated as infectious clinical waste Category B (UN3291) [47] and handled in accordance with healthcare facility policies and local regulations.

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Annex

Measures for the protection of workers from exposure to biological agents at the workplace are specified in the Directive 2004/54/EC (available from https://eur-lex.europa.eu/legal-content/EN/LSU/?uri=celex:32000L0054) and include:

- Keeping as low as possible the number of workers exposed or likely to be exposed;
- Design of work processes and engineering control measures so as to avoid or minimise the release of Biological agents into the place of work;
- Organisational measures to limit exposure, such as dedicated areas for the reception of infected patients;
- Technical measures such as appropriate ventilation, physical barriers and the use of appropriate work benches for laboratory work;
- Personal protective measures are a last resort where the above-mentioned measures do not ensure appropriate protection;
- Training of workers, incl. in the use of PPE, disinfection procedures and waste disposal;
- The provision of appropriate PPE;
- Ensure means for safe collection, storage and disposal of waste by workers including the use of secure and identifiable containers, after suitable treatment;
- Ensure that workers are provided with appropriate protective clothing or other appropriate special clothing
- Ensure workers are provided with appropriate and adequate washing and toilet facilities, which may include eye washes and/or skin antiseptics;

- Working clothes and protective equipment, including protective clothing, which may be contaminated by biological agents, must be removed on leaving the working area and, before taking the measures referred to in the second subparagraph, kept separately from other clothing. The employer must ensure that such clothing and protective equipment is decontaminated and cleaned or, if necessary, destroyed;
- Drawing up plans to deal with accidents and incidents and ensure that staff know whom to report to;
- Appropriate measures shall be taken by the employer to ensure that workers and their representatives receive sufficient and appropriate training, concerning: (a) potential risks to health; (b) precautions to be taken to prevent exposure; (c) hygiene requirements; (d) wearing and use of protective equipment and clothing; (e) steps to be taken by workers in the case of incidents and to prevent incidents. The training shall be: (a) given at the beginning of work involving contact with biological agents, (b) adapted to take account of new or changed risks, and (c) repeated periodically if necessary.

Appropriate measures shall be taken in health and veterinary care facilities in order to protect the health and safety of the workers concerned. The measures to be taken shall include in particular: (a) specifying appropriate decontamination and disinfection procedures, and (b) implementing procedures enabling contaminated waste to be handled and disposed of without risk.

In isolation facilities where there are human patients or animals who are, or who are suspected of being, infected with group 3 or group 4 biological agents, containment measures shall be selected from those in Annex V of the biological agents Directive, in order to minimise the risk of infection.

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