



The following information resources have been selected by the National Health Library and Knowledge Service Evidence Virtual Team in response to your question. The resources are listed in our estimated order of relevance to practicing healthcare professionals confronted with this scenario in an Irish context. In respect of the evolving global situation and rapidly changing evidence base, it is advised to use hyperlinked sources in this document to ensure that the information you are disseminating to the public or applying in clinical practice is the most current, valid and accurate.

YOUR QUESTION

How long can the COVID-19 virus exist on surfaces and what infection control precautions should be implemented?

What does the World Health Organization say?

[Infection prevention and control of epidemic- and pandemic-prone acute respiratory infections in health care¹](#)

The viruses and bacteria that cause ARIs can survive in the environment for variable periods of time (hours to days). The bioburden of such microorganisms can be reduced by cleaning, and infectious agents can be inactivated by the use of standard hospital disinfectants. Environmental cleaning and disinfection is intended to remove pathogens or significantly reduce their numbers on contaminated surfaces and items, thus breaking the chain of transmission. Disinfection is a physical or chemical means of killing microorganisms [but not spores], and should be used for non-critical medical equipment used or shared by patients.

[Report of the WHO-China Joint Mission on Coronavirus Disease 2019 \(COVID-19\)²](#)

Transmission in closed settings: there have been reports of COVID-19 transmission in prisons (Hubei, Shandong, and Zhejiang, China), hospitals and in a long-term living facility. The close proximity and contact among people in these settings and the potential for environmental contamination are important factors, which could amplify transmission. Transmission in these settings warrants further study.

What does the European Centre for Disease Prevention and Control say?

[ECDC Technical Report: Infection prevention and control for COVID-19 in healthcare settings³](#)

In most instances, coronaviruses are believed to be transmitted through large respiratory droplets from person to person, through inhalation or deposition on mucosal surfaces. Other routes implicated in transmission of coronaviruses include contact with contaminated fomites and inhalation of aerosols produced during aerosol generating procedures. Regular cleaning followed by disinfection is recommended, using hospital disinfectants active against viruses; cleaning in patient rooms is particularly important for frequently touched surfaces.



What do the Centers for Disease Control and Prevention (United States) say?

Interim Infection Prevention and Control Recommendations for Patients with Suspected or Confirmed Coronavirus Disease 2019 (COVID-19) in Healthcare Settings⁴

Routine cleaning and disinfection procedures – eg using cleaners and water to pre-clean surfaces prior to applying an EPA-registered, hospital-grade disinfectant to frequently touched surfaces or objects for appropriate contact times as indicated on the product's label – are appropriate for SARS-CoV-2 in healthcare settings, including those patient-care areas in which aerosol-generating procedures are performed. In general, only essential personnel should enter the room of patients with COVID-19. Healthcare facilities should consider assigning daily cleaning and disinfection of high-touch surfaces to nursing personnel who will already be in the room providing care to the patient.

Interim Recommendations for US Households with Suspected/Confirmed Coronavirus Disease 2019⁵

There is much to learn about the novel coronavirus that causes coronavirus disease 2019 (COVID-19). Based on what is currently known about the novel coronavirus and similar coronaviruses that cause SARS and MERS, spread from person-to-person with these viruses happens most frequently among close contacts within about 6 feet. This type of transmission occurs via respiratory droplets. On the other hand, transmission of novel coronavirus to persons from surfaces contaminated with the virus has not been documented. Transmission of coronavirus occurs much more commonly through respiratory droplets than through fomites. Current evidence suggests that novel coronavirus may remain viable for hours to days on surfaces made from a variety of materials. Cleaning of visibly dirty surfaces followed by disinfection is a best practice measure for prevention of COVID-19 and other viral respiratory illnesses in households and community settings.

Clean and disinfect high-touch surfaces daily in household common areas: eg tables, hard-backed chairs, doorknobs, light switches, remotes, handles, desks, toilets, sinks.

What does the Health Protection Surveillance Centre (Ireland) say?

Interim Infection Prevention and Control Precautions for Possible or Confirmed 2019 novel Coronavirus (2019 nCoV), Middle East Respiratory Syndrome Coronavirus (MERS-CoV) and Avian Influenza A in Healthcare Settings v2.0 11.02.2020⁶

Pay special attention to thorough cleaning of frequently touched sites – door handles, bed rails hospital mobiles, TV remotes, etc. – and horizontal surfaces. Pay special attention to thorough cleaning/disinfection of frequently touched sites and equipment close to the patient.

What does UpToDate say?

Coronavirus Disease 2019 (COVID-19)⁷

Person-to-person spread of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is thought to occur mainly via respiratory droplets, resembling the spread of influenza. With droplet transmission, virus released in the respiratory secretions when a person with infection coughs, sneezes, or talks can infect another person if it makes direct contact with the mucous membranes; infection can also occur if a person touches an infected surface and then touches his or her eyes, nose, or mouth.



What does the international literature say?

Persistence of coronaviruses on inanimate surfaces and their inactivation with biocidal agents⁸

Currently, the emergence of a novel human coronavirus, SARS-CoV-2, has become a global health concern causing severe respiratory tract infections in humans. Human-to-human transmissions have been described with incubation times between 2-10 days, facilitating its spread via droplets, contaminated hands or surfaces. We therefore reviewed the literature on all available information about the persistence of human and veterinary coronaviruses on inanimate surfaces as well as inactivation strategies with biocidal agents used for chemical disinfection, e.g. in healthcare facilities. The analysis of 22 studies reveals that human coronaviruses such as Severe Acute Respiratory Syndrome (SARS) coronavirus, Middle East Respiratory Syndrome (MERS) coronavirus or endemic human coronaviruses (HCoV) can persist on inanimate surfaces such as metal, glass or plastic for up to 9 days, but can be efficiently inactivated by surface disinfection procedures with 62-71% ethanol, 0.5% hydrogen peroxide or 0.1% sodium hypochlorite within 1 minute. Other biocidal agents such as 0.05-0.2% benzalkonium chloride or 0.02% chlorhexidine digluconate are less effective. As no specific therapies are available for SARS-CoV-2, early containment and prevention of further spread will be crucial to stop the ongoing outbreak and to control this novel infectious thread.

Aerosol and Surface Stability of SARS-CoV-2 as Compared with SARS-CoV-1⁹

SARS-CoV-2 was more stable on plastic and stainless steel than on copper and cardboard, and viable virus was detected up to 72 hours after application to these surfaces, although the virus titer was greatly reduced from 103.7 to 100.6 TCID₅₀ per milliliter of medium after 72 hours on plastic and from 103.7 to 100.6 TCID₅₀ per milliliter after 48 hours on stainless steel. Our results indicate that aerosol and fomite transmission of SARS-CoV-2 is plausible, since the virus can remain viable and infectious in aerosols for hours and on surfaces up to days depending on the inoculum shed.

QandA: How long can the virus that is COVID-19 survive on surfaces? Carolyn Machamer, a cell biologist who specializes in coronaviruses discusses the latest research on the virus that causes COVID-19¹⁰

According to a recent study published in the New England Journal of Medicine, SARS-CoV-2, the virus that causes COVID-19, can live in the air and on surfaces between several hours and several days. The study found that the virus is viable for up to 72 hours on plastics, 48 hours on stainless steel, 24 hours on cardboard, and 4 hours on copper. It is also detectable in the air for three hours.

Machamer: "What's getting a lot of press and is presented out of context is that the virus can last on plastic for 72 hours – which sounds really scary. But what's more important is the amount of the virus that remains. It's less than 0.1% of the starting virus material. Infection is theoretically possible but unlikely at the levels remaining after a few days. People need to know this. You are more likely to catch the infection through the air if you are next to someone infected than off of a surface. Cleaning surfaces with disinfectant or soap is very effective because once the oily surface coat of the virus is disabled, there is no way the virus can infect a host cell. However, there cannot be an overabundance of caution. Nothing like this has ever happened before."

Transmission of SARS and MERS coronaviruses and influenza virus in healthcare settings: the possible role of dry surface contamination¹¹

Viruses with pandemic potential including H1N1, H5N1, and H5N7 influenza viruses, and severe acute respiratory syndrome (SARS)/Middle East respiratory syndrome (MERS) coronaviruses (CoV) have emerged in recent years. SARS-CoV, MERS-CoV, and influenza virus can survive on surfaces for extended periods, sometimes up to months. Factors influencing the survival of these viruses on surfaces include: strain variation, titre, surface type, suspending medium, mode of deposition, temperature and relative humidity, and the method used to determine the viability of the virus. Environmental sampling has identified contamination in field-settings with SARS-CoV and influenza virus,

although the frequent use of molecular detection methods may not necessarily represent the presence of viable virus. The importance of indirect contact transmission involving contamination of inanimate surfaces is uncertain compared with other transmission routes, principally direct contact transmission independent of surface contamination, droplet, and airborne routes. However, influenza virus and SARS-CoV may be shed into the environment and be transferred from environmental surfaces to hands of patients and healthcare providers. Emerging data suggest that MERS-CoV also shares these properties. Once contaminated from the environment, hands can then initiate self-inoculation of mucous membranes of the nose, eyes or mouth. Mathematical and animal models, and intervention studies suggest that contact transmission is the most important route in some scenarios. Infection prevention and control implications include the need for hand hygiene and personal protective equipment to minimize self-contamination and to protect against inoculation of mucosal surfaces and the respiratory tract, and enhanced surface cleaning and disinfection in healthcare settings.

Produced by the members of the National Health Library and Knowledge Service Evidence Team.[†] Current as at 23 March 2020. This evidence summary collates the best available evidence at the time of writing. Emerging literature or subsequent developments in respect of COVID-19 may require amendment to the information or sources listed in the document. Although all reasonable care has been taken in the compilation of content, the National Health Library and Knowledge Service Evidence Team makes no representations or warranties expressed or implied as to the accuracy or suitability of the information or sources listed in the document. This evidence summary is the property of the National Health Library and Knowledge Service and subsequent re-use or distribution in whole or in part should include acknowledgement of the service.

The following PICO(T) was used as a basis for the evidence summary:

P Population person location condition/patient characteristic	Inanimate surface contamination
I Intervention length location type	SARS-CoV-2
C Comparison another intervention no intervention location of the intervention	
O Outcome Length of survival of virus?	Length of survival of virus?

The following search strategy was used:

[ABBREVIATED] COVID-19 OR coronavirus or "corona virus" or (Wuhan N3 virus) or ("2019-nCoV" or "2019 ncov") or "severe respiratory syndrome coronavirus2" or ("2019" and (new or novel) and coronavirus)
 (HCoV-19) AND (surface or surfaces or transmission or "surface exposure" or "environmental transmission" or contamination or "inanimate surface" or "hard surface" or "soft surface" or "dry surface") AND (survival or lifecycle or "life cycle" or existence or survive or "life span")

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- ¹ World Health Organization (2014). https://apps.who.int/iris/bitstream/handle/10665/112656/9789241507134_eng.pdf?sequence=1. [Accessed 25 March 2020].
- ² World Health Organization (2020) <https://www.who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf> [Accessed 25 March 2020].
- ³ European Centre for Disease Prevention and Control (2020) <https://www.ecdc.europa.eu/sites/default/files/documents/COVID-19-infection-prevention-and-control-healthcare-settings-march-2020.pdf> [Accessed 25 March 2020].
- ⁴ Centers for Disease Control (2020) <https://www.cdc.gov/coronavirus/2019-ncov/infection-control/control-recommendations.html> [Accessed 25 March 2020].
- ⁵ Centers for Disease Control (2020) https://www.cdc.gov/coronavirus/2019-ncov/prepare/cleaning-disinfection.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fcommunity%2Fhome%2Fcleaning-disinfection.html [Accessed 25 March 2020].
- ⁶ Health Protection Surveillance Centre. <https://www.hpsc.ie/a-z/respiratory/coronavirus/novelcoronavirus/guidance/infectionpreventionandcontrolguidance/Infection%20Prevention%20and%20Control%20Guidance%20for%20novel%20coronavirus%20MERS%20and%20Avian%20Influenza%20V2.0.pdf> [Accessed 25 March 2020].
- ⁷ UpToDate (2020) <https://www.uptodate.com/contents/coronavirus-disease-2019-covid-19#H3784053209> [Accessed 25 March 2020].
- ⁸ Kampf et al. (2020) <https://www.ncbi.nlm.nih.gov/pubmed/32035997/> [Accessed 25 March 2020].
- ⁹ Van Doremalen et al. (2020) <https://www.nejm.org/doi/full/10.1056/NEJMc2004973> [Accessed 25 March 2020].
- ¹⁰ Volkin (2020) <https://hub.jhu.edu/2020/03/20/sars-cov-2-survive-on-surfaces/> [Accessed 25 March 2020].
- ¹¹ Otter et al. (2016) <https://www.ncbi.nlm.nih.gov/pubmed/26597631> [Accessed 25 March 2020].