

## International Journal of Biology and Medicine

Review Article

Open Access

### Coronavirus Disease 2019 (COVID-19): Prevention and Disinfection

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#### Abstract

The successful prevention of spread of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection depends on the routine application of preventive measures taken to prevent this spread. Strategies for preventing transmission of the disease include practices such as social / physical distancing, self-quarantine and isolation when appropriate, maintaining overall good personal hygiene practices like handwashing and protecting others from coughs and sneezes by wearing Personal Protective Equipment (PPE). Moreover, transmission of coronavirus occurs through contaminated surfaces where it may remain viable for hours to days. It is recommended to clean visibly dirty surfaces followed by disinfection through applying surface-appropriate disinfectants. In this review, we summarized the recommendations on the prevention, cleaning, and disinfection of the novel beta-coronavirus, SARS-CoV-2, in order to help lower the chances of contracting Covid-19 and spreading it to someone else.

**Keywords:** SARS-CoV-2; Coronavirus Disease; COVID-19, Disinfection**Cite this article as:** Nabih Mohammad Lawand, Samaa Al Tabbah. 2020. Coronavirus Disease 2019 (COVID-19): Prevention and Disinfection. *Int J Biol Med.* 2: 10-14.**Copyright:** This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited. Copyright © 2020; Nabih Mohammad Lawand

#### Introduction

The 2019-20 coronavirus pandemic which initially began in China, has spread to many countries around the globe, with the number of confirmed cases increasing every day, leading to a public health emergency of international concern [1]. Coronavirus disease (COVID-19) is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) [2], and typically leads to upper respiratory tract infection manifested by fever, cough and shortness of breath [3], pneumonia, and acute respiratory distress syndrome [4]. The virus is mainly spread between people during close contact, often via small droplets produced during

coughing, sneezing, or talking [5-7]. While these droplets are produced when breathing out, they usually fall to the ground or onto surfaces rather than being infectious over large distances [8,9]. People may also become infected by touching a contaminated surface and then their face [5,6]. The virus can survive on surfaces for up to 72 hours [10]. Considering there is neither specific antiviral treatment nor vaccine to prevent COVID-19, one has to pay extreme attention to avoid being exposed to the virus [5,11]. Authorities worldwide recommend preventive measures including hand washing, covering one's mouth when coughing, wearing Personal Protective Equipment (PPE), maintaining distance from other people, and

self-isolation for people with suspected infection [12]. Moreover, cleaning and disinfection to limit the survival of SARS-CoV-2 in key environments is also a worldwide recommendation [13]. In this review, we summarized the recommendations on the prevention, cleaning, and disinfection of the novel beta-coronavirus, SARS-CoV-2, in order to help lower the chances of contracting Covid-19 and spreading it to someone else.

### **Coronavirus Disease Prevention**

The successful prevention of spread of SARS-CoV-2 infection depends on the routine application of measures taken to prevent this spread [14]. Strategies for spread prevention include: social/physical distancing, self-quarantine and isolation, good personal hygiene, and use of Personal Protective Equipment (PPE). [15].

#### ***Social / Physical Distancing***

Social and Physical distancing measures are recommended to prevent Coronavirus transmission [16]. Staying at least six feet away from other people lessens the chances of catching COVID-19 [17]. Many public measures and actions were taken to cancel or postpone major events like sports events, festivals, ceremonies, conferences, and other types of events which involve gatherings. These actions were taken to help stop or slow down the spread of Coronavirus thus fewer people will need treatment, and this will decrease the pressure on the health care system giving it more readiness to care for patients over time [18]. Other actions taken to apply the social and physical distancing include: working from home, online home-based learning for school and university students, teleconferencing instead of face-t-face meetings [19].

#### ***Self-Quarantine***

People who have recently returned from traveling to a part of the country or the world where COVID-19 is spreading rapidly, or those who have knowingly been exposed to an

infected person are at a higher risk for coming down with COVID-19 and thus are recommended to practice self-quarantine [20]. It is recommended that self-quarantine lasts for two weeks. These two weeks are important to provide enough time to be sure that the person haven't developed an infection that could be spread to others. Self-quarantine involves: staying at home, not having visitors, staying at least 6 feet away from other people at the same home, using standard hygiene and washing hands frequently, not sharing things with other members at home like towels and utensils .Once the quarantine period has ended, if they do not have symptoms, they should follow their doctor's instructions on how to return to their normal routine [21].

#### ***Personal Hygiene and Hand Washing***

To prevent the spread of the disease, it is recommended to maintain an overall good personal hygiene, to wash hands frequently, avoid touching the eyes, nose, or mouth with unwashed hands, to cough or sneeze into a tissue [16,22,23]. The Centers for Disease Control and Prevention (CDC) recommends that people wash hands often with soap and water for at least twenty seconds, especially after blowing one's nose, coughing, or sneezing, after using the restroom, before eating or preparing food, and before and after providing routine care for another person who needs assistance such as a child. This is because soap bursts the protective bubble of the virus and kills it [12].

#### ***Personal Protective Equipment (PPE)***

Personal protective equipment (PPE) refers to the protective clothing or equipment designed to protect the one who uses it from getting infected, or from spreading the infection. [24]. The equipment is necessary for both public and personal health, and it is used by healthcare workers (doctors, nurses, other caregivers) as well as the public. PPE's are one crucial way to both stop the spread of COVID-19 and ensure safety by working as a barrier between an individual's skin, mouth, nose, or eyes and

Coronavirus infection [25]. Personal protective equipment includes the following: gloves, medical masks, face shields, helmets respirators (N95 or FFP2 standard, or equivalent), goggles, gowns, aprons, and boots or closed-toe work shoes [26]. Although the use of PPE is the most visible control used to prevent transmission, it is the last and weakest in the hierarchy of preventive measures and it should not be relied upon as a primary prevention strategy. PPE effectiveness depends on its proper usage, adequate staff training, proper hand hygiene; and in particular, appropriate personal behavior. In the absence of effective controls, PPE has limited benefit [27].

### **Coronavirus Cleaning and Disinfection**

In general, Coronavirus is transmitted through respiratory droplets and through contact with contaminated objects and surfaces. The virus may remain viable for hours to days on surfaces made from different types of materials [28]. The CDC recommends cleaning and disinfecting high-touch surfaces at least once daily, assuming one had contact with the outside world in some way, either a person leaving and returning or goods coming in [13]. The first thing to know is that cleaning and disinfecting are two very different things. Cleaning is about removing contaminants from a surface with soap and water. Disinfecting is about killing pathogens with alcohol. The CDC recommends that the best practice measure for prevention of COVID-19 is by “First Cleaning, Then Disinfecting”. Cleaning of visibly dirty surfaces by wiping them with soapy water (or a cleaning spray) and a hand towel, followed by disinfecting through applying a surface-appropriate disinfectant. The quickest and easiest way to do this is with disinfecting spray or disinfectant wipes [13].

#### ***EPA- Registered Household Disinfectants and Cleaners***

Although the viral load of coronaviruses on inert surfaces is not known during an outbreak situation, it is crucial to reduce it on these surfaces by disinfection, especially on

frequently touched surfaces where the highest viral load can be found. Using the correct disinfectant is an important part of preventing and reducing the spread of COVID-19 along with other critical aspects such as hand washing [29].

Various types of biocidal agents are used worldwide for surface disinfection against coronavirus as listed by the United States Environmental Protection Agency (EPA) [29]:

- Soap and water used for household surfaces (20 seconds scrubbing).
- A simple mix of sodium hypochlorite which is commercially known as Clorox bleach and cold water: four teaspoons of bleach per quart of water - or for larger loads, five tablespoons (1/3 cup) per gallon. Five-minute period exposure to those mixtures should kill coronavirus.
- Isopropyl alcohol or rubbing alcohol (62%-71%) (undiluted) kills Coronavirus in about 30 seconds.
- 3% hydrogen peroxide solution takes six to eight minutes to disinfect coronavirus.
- According to the CDC, the best way to prevent transmission of the virus is still handwashing with soap and water. And when soap and water are not available, they recommend using an alcohol-based hand sanitizer with at least 60 percent alcohol by volume [22].

#### **How to Clean and Disinfect Different Types of Surfaces and Other Material**

Coronavirus is stable for several hours to days in aerosols and on surfaces, according to a new study from National Institutes of Health, CDC, UCLA and Princeton University scientists [30]. This study reported that (SARS-CoV-2) was detectable in aerosols for up to three hours, up to four hours on copper, up to 24 hours on cardboard and up to two to three days on plastic and stainless steel. These results provide key information about the SARS-CoV-2 stability, and suggest that the virus is transmitted through the air and after touching contaminated objects [31]. The best way to kill this virus is by cleaning those surfaces with a solution that's

62% to 72% ethanol, 0.5% hydrogen peroxide, or 0.1% sodium hypochlorite within 1 minute of contamination, according to investigators with University Medicine Greifswald and Ruhr University Bochum in Germany [30].

### ***Hard (Non-porous) Surfaces***

Dirty surfaces should be cleaned using soap and water or a detergent prior to disinfection. For disinfection, most common EPA-registered household disinfectants should be effective. Allow proper ventilation during and after application [28].

### ***Soft (Porous) Surfaces***

For soft (porous) surfaces like carpets, rugs, and drapes, remove visible contamination and clean with cleaners indicated for use on these surfaces. After cleaning: if the items can be washed, wash them in accordance with the manufacturer's instructions using the warmest appropriate water setting for the items and then dry completely [28].

### ***Electronics***

For electronics such as tablets, laptops, touch screens, keyboards, remote controls, and ATM machines, remove visible contamination if present, then use the proper cleaning and disinfecting product according to the manufacturer's instructions. If no manufacturer guidance is available, consider using alcohol-based wipes or sprays containing at least 70% alcohol. Dry surfaces thoroughly to avoid pooling of liquids [28].

### ***Linens, Clothing, and Other Items That Go in the Laundry***

To minimize the possibility of dispersing virus through the air, do not shake dirty laundry. Wash the items following the manufacturer's instructions. Wash items using the warmest appropriate water setting, then dry completely. Dirty laundry that has been in contact with an infected person cannot be washed with other people's items [28].

## **Conclusion**

The COVID-19 pandemic is devastating but every person can help slow down its spread. By following the infection control practices and abiding by the rules and instructions issued by the authorities, one can make a big difference and help in breaking the chain of infection which will ultimately take the pressure off the health care system as it treats the most serious cases.

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