

Minimising the risk of SARS-CoV-2 transmission through good cleaning and disinfection practices

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What is SARS-CoV-2?

SARS-CoV-2^{1,2} is a new strain of coronavirus that was discovered in Wuhan, China, in 2019. You may also see it referred to as the Wuhan novel coronavirus; 2019-nCoV; WN-CoV; HCoV-19 (SARS-2). SARS is the acronym for Severe Acute Respiratory Syndrome, and CoV is that for Coronavirus.

What is COVID-19?

COVID-19 is the disease associated with SARS-CoV-2.

This White Paper uses the terms SARS-CoV-2 in reference to the virus, and COVID-19 in reference to the viral infection.

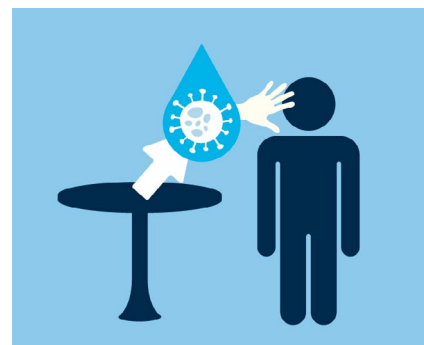
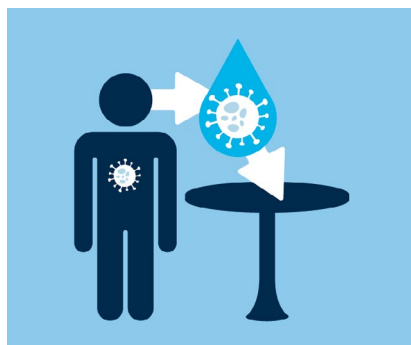
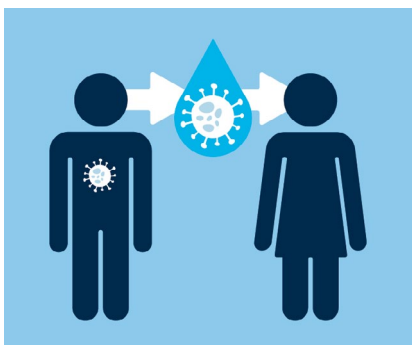
How is it spread?

The primary route of transmission for SARS-CoV-2 is via inhalation of the aerosols and droplets created

when an infected individual coughs or sneezes.



A single cough can produce up to 3,000 droplets. These droplets can land on the surrounding people, textiles and surfaces. Transmission of the virus can then also occur through touching of the contaminated item, and subsequent touching of the mucous membranes of the mouth, nose or eyes.



The European Food Safety Authority (EFSA³) have stated that there is currently no evidence that food is a likely source or route of transmission of COVID-19. Experiences from previous outbreaks of related coronaviruses show that transmission through food consumption did not occur.

However, droplets and aerosols, created when an infected individual coughs or sneezes will settle on to the surface of unwrapped, ready to eat products, like fruit, vegetables and baked goods, and on to the surfaces that these foods are in contact with. Equally, goods like these could have virus transferred to them via contaminated hands when handled. At a recent World Health Organisation (WHO) webinar on coronavirus it was suggested, as a precaution,

- to wash or peel fresh fruit and vegetables prior to consumption; and
- that baked products be wrapped prior to display and sale.

If the products are hand packed, the hands should be thoroughly washed and dried before handling the product.

SARS coronaviruses are easily inactivated by heat. Cooking or heating of food, to a temperature >56°C for a minimum 15 mins, should destroy the virus on the surface of the food.

How long can SARS-CoV-2 remain viable in the environment?

A recent study⁴ has shown that the SARS-CoV-2 virus (specifically) can remain viable on cardboard for up to 24 hours, and for 2-3 days on plastic and stainless-steel surfaces. However, copper surfaces inactivated the virus in about four hours. Viability on clothing and hair is not yet known.

Virus viability on surfaces will depend on several factors including, the type of surface; the presence of organic material (biological fluids, biofilm, food debris); temperature; relative humidity; and the specific strain of the virus.

How can the risk of COVID-19 transmission be minimised through cleaning and disinfection?

Viruses are tiny (up to 50 times smaller than bacteria), non-living particles that need a host (living cell) to reproduce. Their small size aids their transfer to and harbourage on surfaces, and the presence of organic matter, e.g., food and biological fluids, is likely to offer the virus some protection from disinfectants and surface antimicrobials (as it does for bacteria). Fortunately, viruses are effectively removed from surfaces through good cleaning practices and enveloped viruses, such as SARS-CoV-2, are among the weakest or least resistant organisms to disinfection. Many disinfectants achieve their inactivation within minutes.

Consequently, routine cleaning and disinfection practices, using existing procedures, chemicals and cleaning equipment, should continue as usual, with consideration for the following additional measures.

Cleaning methods and equipment

Visibly dirty surfaces should always be cleaned prior to disinfection. This can be achieved through,

- manual cleaning e.g.,
 - wet cleaning: water; detergent; scrubbing; wiping; or
 - dry cleaning: brushing; scraping; wiping; or
- mechanical cleaning e.g.,
 - wet cleaning: use of floor scrubbers; hoses; foaming; or
 - dry cleaning: use of vacuum cleaners, etc.



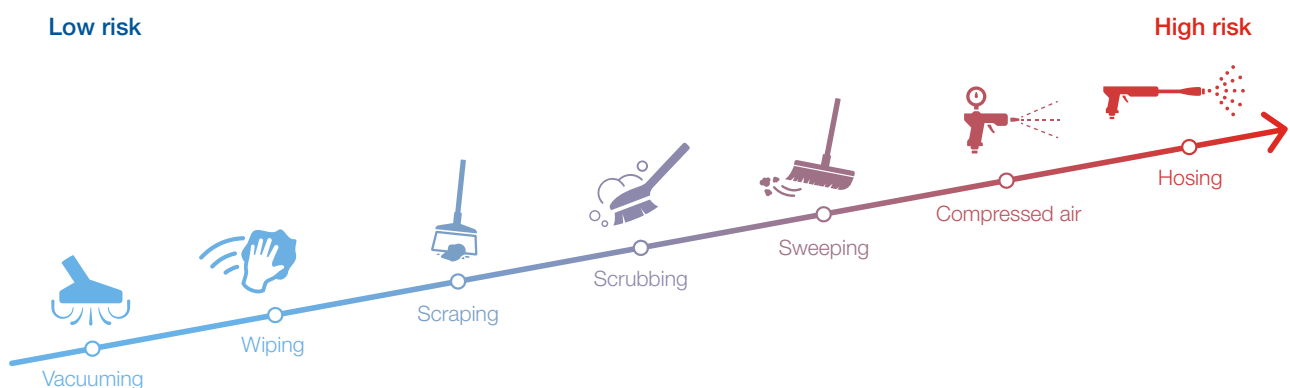
bacteria, i.e., through electrostatic attraction (when used dry), or capillary action (when used damp). There are very few peer reviewed published studies^{5,6} on the use of microfiber for virus removal and none (currently) in relation to SARS-CoV-2. Microfibre (both re-useable and disposable) used damp or dry, without the use of chemical disinfectants, is unlikely to inactivate SAR-CoV-2. Consequently, Vikan recommends the following,

- Disposable microfiber: Use a separate disposable microfiber cloth or mop for each different surface cleaned and dispose of immediately after use.
- Re-useable microfiber: Change frequently, and launder after use, using a minimum wash cycle of 56°C for 15 minutes or thermal equivalent to ensure destruction of the virus before re-use.
- Clean and disinfect hands and equipment, e.g., floor mop frames, thoroughly after use.

All cleaning activities can spread contamination. Choose the right cleaning equipment and method to maximise contamination removal and minimise its spread.

The use of microfiber for cleaning

In principle microfiber should be effective at removing viruses from surfaces, in the same way as it is for



Cleaning equipment and the personal protective equipment (PPE), use during cleaning, can themselves become vectors for SARS-CoV-2 transmission. To minimise the risk of virus harbourage and transfer Vikan recommends,

- cleaning and disinfection of re-useable cleaning equipment and PPE before first use, and between use by different workers;
- choosing equipment that is single use, or hygienically designed (easy to clean and disinfect);
- disposing of single use cleaning equipment and PPE immediately after use. This could include,
 - disposable cloths and mops; gloves; arm covers; aprons; boot covers; hair nets and beard snoods; earplugs.
 - Disposable items that have been used with a disinfectant will be safe to dispose of immediately, through normal waste disposal routes. The residual disinfectant will continue to work to inactivate the virus.
 - For disposable items not used with a disinfectant, these can be double bagged and quarantined for 72 hours as a precaution, before disposal via the normal route.
- Regular inspection and replacement of damaged or worn cleaning equipment and PPE.

Further information on the selection of hygienically designed cleaning tools; and cleaning tool maintenance, can be found at

- <http://viewer.ipaper.io/vikan/food-safety-information/ultra-hygiene/ultra-hygiene-advertorial-en-300/#/>
- <http://viewer.ipaper.io/vikan/white-papers/cleaning-tool-maintenance/cleaning-tool-maintenance-whitepaper-en-300/#/>

Disinfection

Chemical disinfection

Many disinfectants are active against coronaviruses^{7,8} and achieve their effective inactivation within minutes. Those currently recommended by the World Health Organisation (WHO), for environmental disinfection associated with SARS-CoV-2 in healthcare facilities⁹, include:

- 70% Ethyl alcohol to disinfect reusable equipment between uses.
- Sodium hypochlorite at 0.5% (equivalent 5000ppm) for disinfection of frequently touched surfaces.

For those in the US and countries that follow the guidance of the US-EPA, visit <https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2> and use your EPA registration number to identify suitable disinfectants.

For those in Europe and countries using the EN norms, use a disinfectant that has approval (partial approval for enveloped viruses) to EN 14476; EN 1276; or EN 13697.

Further good sources of information for cleaning and disinfection of other environments can be found at,

- <https://www.ecdc.europa.eu/sites/default/files/documents/coronavirus-SARS-CoV-2-guidance-environmental-cleaning-non-healthcare-facilities.pdf>
- <https://www.cdc.gov/coronavirus/2019-ncov/prepare/cleaning-disinfection.html>
- The WHO are currently finalising work on guidance for the food industry in relation to control of SARS-CoV-2. This will be available on their website www.who.int as soon as possible.

Alcohol disinfectants (60 - 85%) can be used for rapid disinfection of relatively small surfaces and can be applied using a spray bottle, or a cloth (preferably disposable) impregnated with the alcohol. Use a fresh cloth for each piece of equipment/surface disinfected.

Sodium hypochlorite (1,000 – 5,000ppm) solutions can also be applied to small surfaces using a spray bottle or cloth. For disinfection of larger equipment and surfaces (at least once a day) it can be applied through use of a larger spray system, or manually using a cloth or wash brush. In all cases the hypochlorite should be left in contact with the equipment/surface, for an *appropriate period, prior to rinsing.

In food and beverage production facilities, due to the materials of equipment and facility construction, levels of hypochlorite around 1,000ppm are suggested, as is the use of Peracetic acid. This will reduce the risk of material corrosion and product taint respectively.

*The contact time of any disinfectant formulation used should be checked with the chemical supplier. The contact time needs to be sufficient to allow it to inactivate the virus.

Whole room disinfection is the use of a fine mist of liquid disinfectant (fogging) or biocidal gas (gassing) to disinfect a whole room. This technique can be used to reduce the level of micro-organisms in the air and on surfaces. Whole room disinfection can be used in addition to normal cleaning and disinfection practices but should not replace them.

Not all disinfectants are suitable for whole room disinfection using fogging (Table 1), including those recommended by WHO for control of SARS-CoV-2.

Table 1: Chemical disinfectants suitable for whole room fogging

Disinfectant	Suitability for fogging
QAC	Yes
Amphoteric	Yes
Biguanide	Yes
Iodophor	Partially
PAA	Partially
Alcohol	No
Chlorine	No

Courtesy of CampdenBRI

Hydrogen peroxide and ozone, both of which can be used for whole room disinfection in gaseous form, are effective against viruses, including the SARS coronavirus^{7,8}.

Use of microfibre for application of chemical disinfectants

If microfibre (both re-useable, and single use, disposable cloths and mops) is used in combination with a chemical disinfectant for SARS-CoV-2 control, the disinfectant should be one that is effective against viruses. These can either be applied directly to the surface and then wiped off with a mop/cloth or dosed onto the mop/cloth.

Note: Microfibre efficacy is based on the ability of the microfibrils to attract and hold contamination through electrostatic (why dry) and capillary (when damp) action. The use of chemicals that contain alcohol, chlorine and strong acids and alkalis may damage the fibres and affect their efficacy.

Thermal disinfection

Heat at 56°C can also be used to inactivate the SARS coronavirus¹⁰. Use wash/rinse water at >56°C for cleaning and disinfection, and steam disinfection after cleaning. Small, washable equipment and utensils can be decontaminated using an industrial or domestic dishwasher, with a wash cycle that utilises a minimum wash temperature of 56°C for a minimum of 15 mins, or thermal equivalent. Laundry (including protective clothing and cleaning cloths), and small washable cleaning tools and utensils can also be decontaminated by using a washing machine with the same minimum cycle settings.

Ultraviolet disinfection

Short wavelength (264nm) UVC light has been shown to inactivate viruses but no studies have yet been conducted involving SARS-CoV-2.

Antimicrobial surfaces and equipment

The antimicrobials impregnated into some surfaces and equipment may also serve to protect against virus transmission, but no studies have yet been conducted involving SARS-CoV-2. Surface antimicrobials work well on relatively clean surfaces but organic matter (e.g., food; biofilms; biological fluids) shields the virus from the antimicrobial. Importantly, they need time (hours) to work effectively, by which time the virus may have already be transferred. Standard cleaning and disinfection techniques are faster and more effective for minimising the risk of virus transmission, especially for frequently touched surfaces.

What else can be done?

Given the recent scientific findings that SARS-CoV-2 can survive on surfaces for 2-3 days, more frequent cleaning and disinfection of frequently touched surfaces, e.g., door handles; handrails; door push plates; turnstiles; trolley and bucket handles; taps; hoses; cleaning tools and utensils is recommended,

ideally after contact by each different individual. This cleaning and disinfection should also extend to surfaces in non-food handling areas such as toilets; changing rooms; offices; canteens; and vehicles.



If an individual is diagnosed with COVID-19, it may be appropriate to additionally decontaminate all surfaces that the person could have come into contact with.

More frequent hand hygiene practices (washing; drying; use of appropriate hand sanitiser; use of disposable disinfectant wipes) are also recommended. An appropriate method for hand hygiene is shown in Appendix 1. Appropriate hand sanitisers include those containing at least 60% alcohol.

Companies and individuals may like to implement a disposable gloving policy. If this is done, careful consideration must be given to when the gloves are used and removed, to ensure that the gloves themselves do not become a vector for viral transmission.

Gloving and the use of hand sanitisers/wipes should not replace good hand washing and drying practices.

Everyone should be aware of how they themselves

could cause the spread of COVID-19 and of the precautions, recommended by WHO¹¹, that they should take to minimise this,

- wash their hands regularly;
- cover their mouth and nose when coughing and sneezing; and
- avoid close contact (<2 meters) with anyone coughing and sneezing.

They should also understand the sources of contamination, i.e.,

- aerosols and droplets from coughing and sneezing; and
- surfaces,

and how transfer can occur,

- through inhalation of virus particles in aerosols and droplets;
- through transfer of virus particles from coughs, sneezes and surfaces to hand;
- from hands to mucus membranes (nose, mouth, eyes); and
- from hands back to surfaces.

Follow advice from trusted sources, including WHO (<https://www.who.int/>), and Government bodies. For

example, the UK Government have recently issued the following Guidance to the food industry: <https://www.gov.uk/government/publications/covid-19-guidance-for-food-businesses/> and Government bodies.



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11. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public>

APPENDIX 1



HOW TO WASH YOUR HANDS

PROTECT YOURSELF AND OTHERS AGAINST INFECTIONS

 <p>1</p> <p>WET HANDS</p>	 <p>2</p> <p>APPLY SOAP</p>	 <p>3</p> <p>RUB HANDS PALM TO PALM</p>	 <p>4</p> <p>LATHER THE BACKS OF YOUR HANDS</p>
 <p>5</p> <p>SCRUB BETWEEN YOUR FINGERS</p>	 <p>6</p> <p>RUB THE BACKS OF FINGERS ON THE OPPOSING PALMS</p>	 <p>7</p> <p>CLEAN THUMBS</p>	 <p>8</p> <p>WASH FINGERNAILS AND FINGERTIPS</p>
 <p>9</p> <p>RINSE HANDS</p>	 <p>10</p> <p>DRY WITH A SINGLE USE TOWEL</p>	 <p>11</p> <p>USE THE TOWEL TO TURN OFF THE FAUCET</p>	 <p>12</p> <p>YOUR HANDS ARE CLEAN</p>

APPLICATION OF HAND SANITIZER



 <p>1</p> <p>APPLY THE PRODUCT ON THE PALM OF ONE HAND</p>	 <p>2</p> <p>RUB HANDS TOGETHER</p>	 <p>3</p> <p>COVER ALL SURFACES UNTIL HANDS FEEL DRY (20 SEC)</p>
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