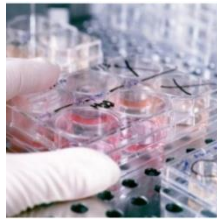




NATIONAL HEALTH
LABORATORY SERVICE



Guidance on routine and deep cleaning of workplaces when COVID-19 positive cases have been identified

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Important terms

- **Decontaminate:** Removal of pathogens from objects so they are safe to handle, use, or discard. “Umbrella” term for pre-cleaning followed by sanitizing, sterilizing or disinfecting.
- **Clean:** Water, detergent (soap) and mechanical friction to reduce pathogen load, organic matter and dirt. Detergent does not kill pathogens.
- **Sanitize:** Lowering the number of pathogens to a safe level by either cleaning or “lower level” disinfection.
- **Disinfect:** Type of decontamination using disinfectants to kill ~ 100% of pathogens. Easily deactivated by organic matter and dirt.
- **Sterilize:** Type of decontamination using heat and steam often via autoclaving.
- **Clean first** (to reduce pathogen load, organic matter and dirt), **then disinfect** (to kill remaining pathogens).
- Recommended for lowering spread of COVID-19: Routine cleaning and disinfection of surfaces
Routine cleaning of hands (soap and water) and sanitization (in absence of soap and water)

How long the new coronavirus can live on surfaces

SURFACE	LIFESPAN OF COVID-19 VIRUS
 Paper and tissue paper**	3 hours 
 Copper*	4 hours 
 Cardboard*	24 hours 
 Wood**	2 days 
 Cloth**	2 days 
 Stainless steel*	2–3 days 
 Polypropylene plastic*	3 days 
 Glass**	4 days 
 Paper money**	4 days 
 Outside of surgical mask**	7 days 

*At 69.8 to 73.4°F (21 to 23 °C) and 40% relative humidity **At 71°F and 65% relative humidity

Source: New England Journal of Medicine*; The Lancet Microbe**

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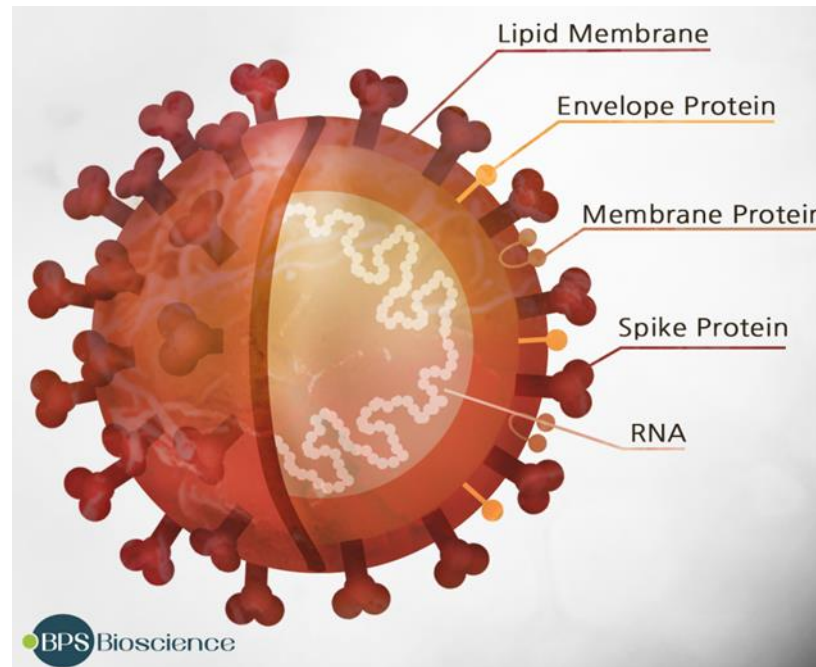
A.W.H. Chin et al., "Stability of SARS-CoV-2 in different environmental conditions. The Lancet Microbe 2020 S2666524720300033 ([https://doi.org/10.1016/S2666-5247\(20\)30003-3](https://doi.org/10.1016/S2666-5247(20)30003-3)).

N. van Doremalen et al., "Aerosol and Surface Stability of SARS-CoV-2 as Compared with SARS-CoV-1," The New England journal of medicine. NLM (Medline), Mar. 17, 2020, doi: 10.1056/NEJMc2004973.

G. Kampf, D. Todt, S. Pfaender, E. S.-J. of H. Infection, and U. 2020, "Persistence of coronaviruses on inanimate surfaces and its inactivation with biocidal agents," *Elsevier*, 2020, Available: <https://www.sciencedirect.com/science/article/pii/S0195670120300463>

Approved disinfectants

- The coronavirus (SARS-CoV-2) is an enveloped virus (contains a fragile lipid membrane).
- Easily inactivated by most registered and approved disinfectants.



Approved disinfectants

- National Regulator for Compulsory Specifications (NRCS)-approved list (South Africa):
 - <https://www.nrcs.org.za/siteimgs/CMM/LOA/Disinfectant/Registration%20Database%20Chemical%20Disinfectants%202009-2020.pdf>
- EPA-approved N-list (USA):
 - <https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2>
- Department of Trade and Industry list of active ingredients in approved disinfectants:
 - “Government Gazette, 20 October 2017, No 41186, Department of Trade and Industry No 1119 Annexure D.” pp. p112-114, 2017.

If approved disinfectants are unavailable...

- Use 70-90% ethanol (or other types of alcohol e.g. isopropyl alcohol, activities are similar)
- Use chlorine solution (sodium/calcium hypochlorite aka bleach/jik)
 - 0.1% (1000 ppm) for general environmental disinfection
 - 0.5% (5000 ppm) for blood and bodily fluid spills
- Hydrogen peroxide at $\geq 0.5\%$
- Contact time for above disinfectants: 1 minute
- Contact time: Time for disinfectant to be in contact with surface in order to kill pathogen
- Type of disinfectant will be determined by type of surface to be cleaned (contact manufacture if unsure)

Calculation of liquid sodium hypochlorite concentrations

$[\% \text{ chlorine in liquid sodium hypochlorite} / \% \text{ chlorine desired}] - 1 = \text{Total parts of water for each part sodium hypochlorite.}$

Ex: $[5\% \text{ in liquid sodium hypochlorite} / 0.5\% \text{ chlorine desired}] - 1 = 9 \text{ parts of water for each part sodium hypochlorite}$

Calculation of powdered calcium hypochlorite concentrations

$[\% \text{ chlorine desired} / \% \text{ chlorine in hypochlorite powder or granules}] \times 1\,000 = \text{grams of calcium hypochlorite powder for each litre of water.}$

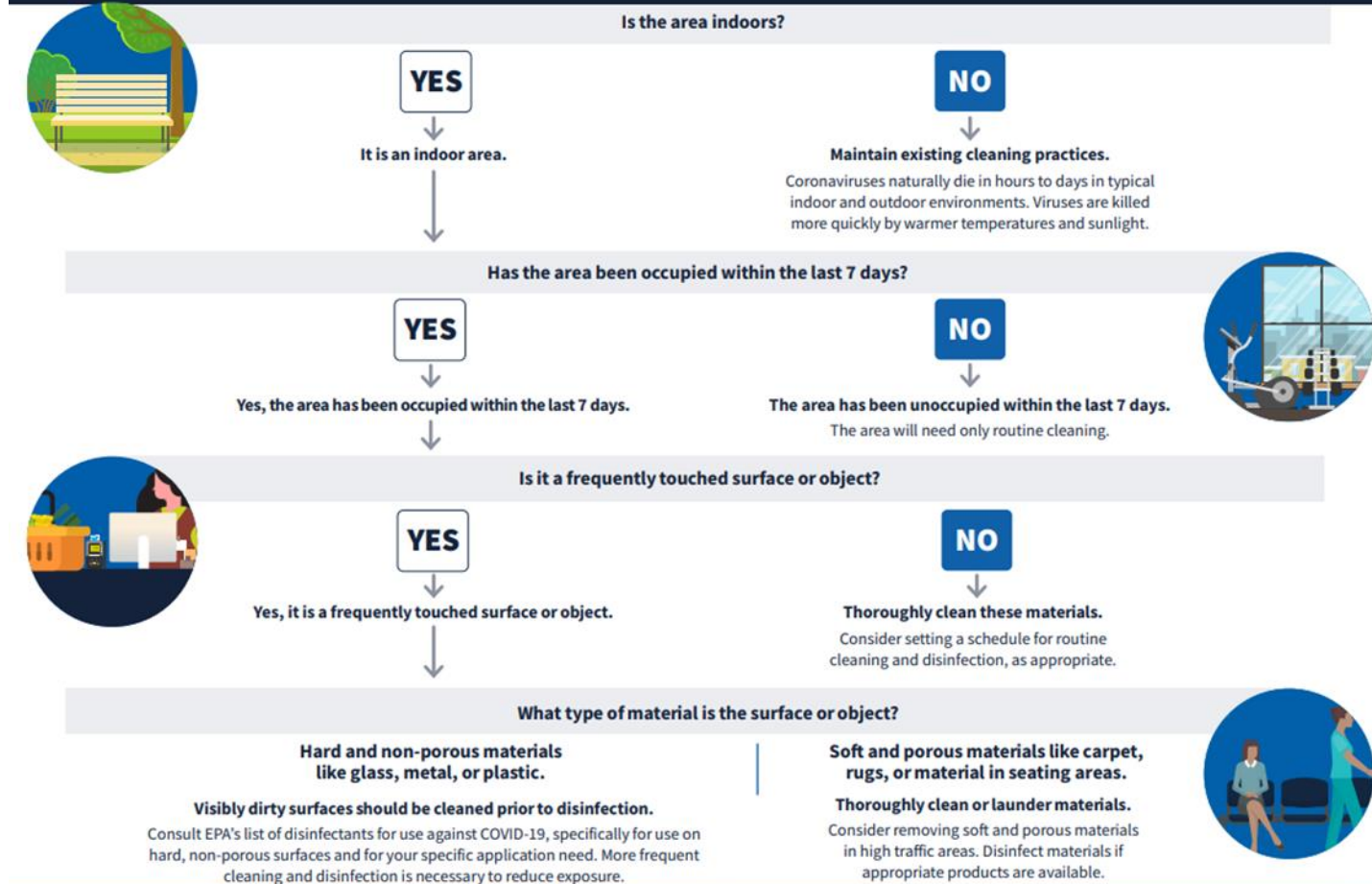
Ex: $[0.5\% \text{ chlorine desired} / 35\% \text{ in hypochlorite powder}] \times 1\,000 = 0.0143 \times 1\,000 = 14.3$

Therefore, you must dissolve 14.3 grams of calcium hypochlorite powder in each litre of water used to make a 0.5% chlorine solution.

MAKING YOUR PLAN TO CLEAN AND DISINFECT

Cleaning with soap and water removes germs, dirt, and impurities from surfaces. It lowers the risk of spreading infection.

Disinfecting kills germs on surfaces. By killing germs on a surface after cleaning, it can further lower the risk of spreading infection.



Frequency of cleaning/disinfection

- Workplaces to be cleaned daily.
- The frequency of cleaning will increase if:
 - Workplace operates in shifts (clean between shifts).
 - Equipment is shared (clean between uses).
- Disinfect when there is likelihood of contamination:
 - Suspected/confirmed case of COVID-19 at the workplace.
 - At workplaces with high volume of workers, customers or visitors that are likely to touch surfaces.
- Frequency of cleaning and disinfection for items in non-health care workplace:
 - <https://www.safeworkaustralia.gov.au/doc/how-clean-and-disinfect-your-workplace-covid-19>
- Frequency of cleaning and disinfection for items in health care workplace:
 - <https://www.who.int/publications-detail/cleaning-and-disinfection-of-environmental-surfaces-in-the-context-of-covid-19>

Guidelines on frequency and methods of cleaning/disinfection by item

Item	Routine cleaning			Following suspected/confirmed case	
	Highly-touched surfaces	Minimally-touched Surfaces	Method	Highly/Minimally-touched	Method
Floor (non-slip vinyl)	Damp mop daily	Damp mop daily	Detergent	Clean and disinfect as soon as you become aware	Detergent + Disinfectant
Curtains and Blinds	Clean weekly	Clean monthly	Refer to manufacturer recomm. Steam clean curtains or blinds in place or machine wash curtains	As above	Damp dust [†] + Detergent Steam clean curtains or blinds
Light and Power point Switches	Clean at least daily	Clean weekly	Damp dust [†] + Detergent	As above	Detergent + Disinfectant Damp dust [†]
Push/pull doors (with and without a push plate)	As above	Clean weekly	Detergent + Disinfectant	As above	Detergent + Disinfectant
Door knob/handles	As above	Clean daily	Detergent	As above	Detergent + Disinfectant
Elevator buttons	As above	Clean weekly	Detergent	As above	Detergent + Disinfectant
Hand rails, stair rails	As above	Clean weekly	Detergent	As above	Detergent + Disinfectant
Telephone	Clean at least daily & more regularly if shared	Clean weekly	Detergent	As above	Detergent + Disinfectant Damp dust [†]
Computer, Keyboard, Mouse Headsets	Clean at least daily or when visibly soiled, and between users if shared	Clean weekly or when visibly soiled	Add wipeable cover to device/screen. Refer to manufacturer recomm. Detergent	As above	Detergent + Disinfectant on wipeable cover, or isopropyl alcohol-based wipes/sprays
Kitchen appliances (toasters, kettles etc.)	Clean at least daily	Clean weekly	Refer to manufacturer recomm Isopropyl alcohol-based wipes/sprays. Detergent	As above	Detergent + Disinfectant
Microwave	Clean frequently touched points on microwave at least daily	Clean daily	Refer to manufacturer recommendations. Detergent	As above	Detergent. Disinfectant on outside surfaces only.
Toilet + doors and locks	Clean at least daily	Clean weekly	Detergent + disinfectant	As above	Detergent + Disinfectant
Company vehicles (door handles, gear knobs, seat belts, steering wheel)	Clean at least daily or between users if shared	Clean weekly	Detergent	As above	Detergent + Disinfectant
Vehicle switches and other controls	Clean at least daily	Clean weekly	Isopropyl alcohol- based wipes/sprays	As above	Isopropyl alcohol- based wipes/sprays

Guidelines on frequency and methods of cleaning/disinfection by surface type

Material	Routine cleaning			Following suspected/confirmed case	
	Highly-touched surfaces	Minimally- touched surfaces	Method	Highly/Minimally-touched	Method
Hard plastics	Clean at least daily or every shift change	Clean weekly	Detergent	Clean and disinfect as you become aware	Detergent + Disinfectant
Soft plastics	As above	As above	Damp dust [†] + Detergent	As above	Detergent + Disinfectant
Metal surfaces(stainless steel, uncoated steel, zinc coated steel, aluminium)	As above	As above	Detergent	As above	Detergent + Disinfectant* *uncoated steel more susceptible to rust when disinfected. Disinfect only when necessary, and treat for rust as appropriate
Deliberately Greased or Oiled metal surfaces	As above	As above	Clean according to manufacturer recomm.	As above	Clean according to manufacturer Recommendations
Wood	As above	As above	Damp dust [†] + Detergent	As above	Detergent + Disinfectant
Laminate	As above	As above	Detergent	As above	As above
Glass	As above	As above	Detergent	As above	As above
Concrete (polished)	As above	As above	Detergent	As above	As above
Concrete (rough)	As above	As above	Vacuum (HEPA) or Detergent	As above	As above
Leather	As above	As above	Clean according to manufacturer recomm.	As above	Clean and disinfect according to manufacturer recomm.
Fabric	As above	As above	Vacuum (HEPA) Damp dust [†] + Detergent If launderable, wash on warmest possible setting according to anufacturer recomm. with laundry detergent	As above	Detergent + Steam clean. If launderable, wash on warmest possible setting according to manufacturer recomm. with laundry detergent
Paper	Not suitable for cleaning	Not suitable for cleaning	Use alternate, cleanable options, such as electronic tablets. If use is un-avoidable, and individual use is not feasible, use a plastic protective sheet over page.	Not suitable for cleaning. Leave undisturbed for a minimum of 72 hours.	Dispose of in the bin (double-bagged), or leave undisturbed for a minimum of 72 hours, longer if possible.

Terminal/Deep cleaning when COVID-19 case identified/suspected

- The National Department of Health (NDoH), WHO, CDC, EPA etc. **do not recommend fogging**:
 - Disinfectant inactivated by organic matter (cleaning still required)
 - May miss surfaces shielded by objects/folded fabric etc.
 - Increased inhalation exposure of disinfectant to workers and community.
- The NDoH and WHO recommend **deep cleaning via wiping disinfectant on surface after thorough cleaning** (differs from regular cleaning in that deep cleaning involves cleaning and disinfection of all possible surfaces).
 - No formal accredited training needed.
- Deep cleaning not needed if **more than 7 days** have elapsed since ill person was present in facility.
 - Possibility of viable (i.e. infectious) SARS-CoV-2 on surfaces would be negligible, if at all possible
- Deep cleaning only required if reoccupation of affected area is necessary for **essential services** to resume (i.e. in less than 7 days).
 - COVID-19 positive case must have had spend **considerable amount of time** in workplace, touched and handled many objects, equipment and surfaces and had close contact with several co-workers
 - Deep cleaning not necessary if positive COVID-19 case simply passed through workplace without touching any surfaces or spending much time in face-to-face communication with others.

Deep cleaning after COVID-19 case identified/suspected

1. **Close off area** and direct work to another clean facility (it is not necessary to close entire business).
2. Increase **air circulation** (open doors/windows/air-con with outside air intake).
 - If no windows available, wait for as long as possible before cleaning.
3. **Wait** 24 hours before cleaning. If 24 hours not feasible, wait as long as possible.
 - To minimize exposure to possible viable SARS-CoV-2 on surfaces and within suspended air droplets from coughing/sneezing/talking.
4. Personal protective equipment (PPE): mask, disposable or utility gloves, dedicated overall (plastic aprons), closed shoes.
5. **Clean and disinfect all** communal areas and equipment (focus on highly-touched surfaces).
6. Wipe twice with **0.05%** (500 ppm) chlorine solution (or once with **0.1%**).
7. **Avoid exposure** to ill person's fomites (i.e. pens, computer, eating utensils, dishes).
8. Flood bodily fluid spillage with **0.5%** (5000 ppm) chlorine solution, cover with absorbent material, leave for 30 min before cleaning.
9. Cleaning equipment (e.g. buckets) must be **separated** from regular cleaning equipment.
10. Closure period of workplace: Disinfectant vapours have disappeared and all surfaces air-dried.
11. **Thereafter, continue routine**, everyday cleaning and disinfection practices.

Disinfection spray tunnels/booths

- NDoH does not endorse the use of disinfection tunnels or spray booths/cabinets/gates/chambers or spraying a person with a disinfectant.
- Prof Salim Abdool Karim, chairperson of the Ministerial Advisory Committee on Covid-19, "Human spraying is **harmful** with almost no benefit“.
- CDC “does not recommend the use of sanitizing tunnels. There is no evidence that they are effective in reducing the spread of COVID-19. Chemicals used in sanitizing tunnels could **cause skin, eye, or respiratory irritation or damage.**”
- WHO: “Spraying of individuals with disinfectants (such as in a tunnel, cabinet, or chamber) is not recommended under any circumstances. This practice could be physically and psychologically harmful and would not reduce an infected person’s ability to spread the virus through droplets or contact. **Even if someone who is infected with COVID-19 goes through a disinfection tunnel or chamber, as soon as they start speaking, coughing or sneezing they can still spread the virus.**”
- Most disinfectants are approved based on their application to surfaces by **wiping** and not based on their application onto individuals by **spraying**.



Additional important points

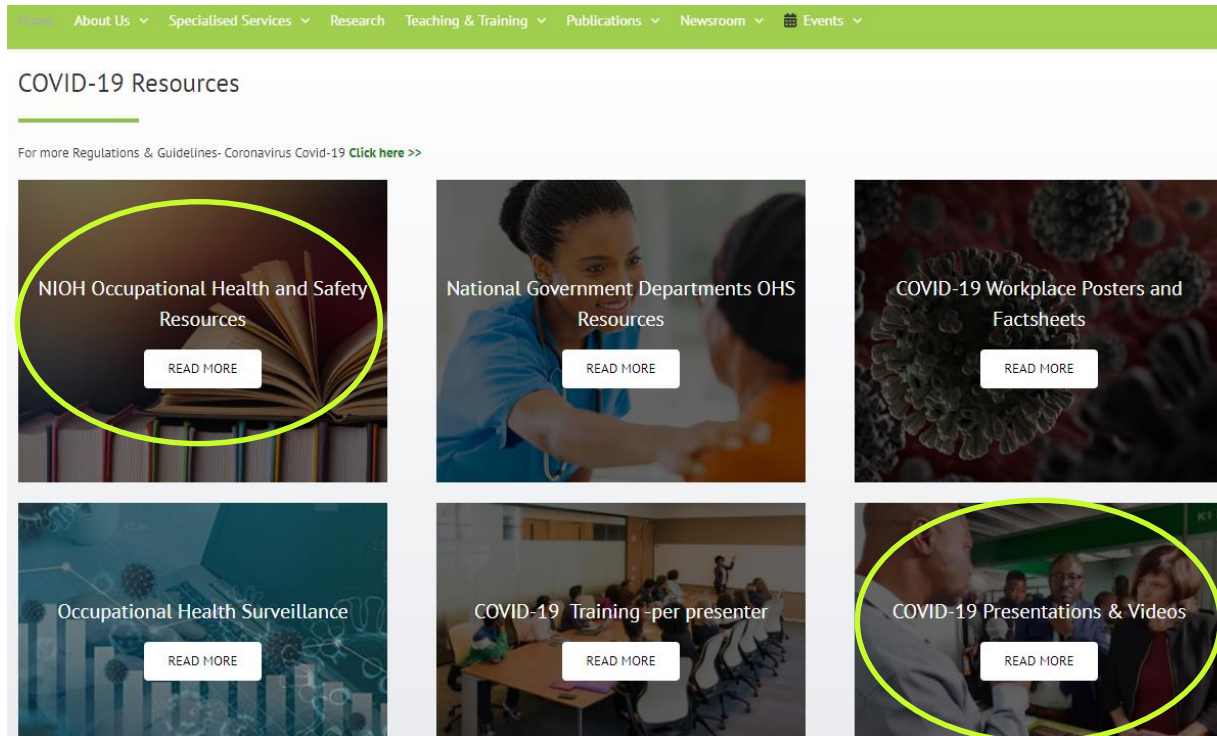
- Never mix different types of disinfectants (e.g. bleach with ammonia as hazardous vapours are released).
- Moisturize hands regularly as alcohol-based hand sanitizers result in dehydration
 - Minimize contamination of moisturizers – use immediately after washing/sanitizing and do not share moisturize bottles/tubes.
- If staff members develop skin irritation after using sanitizers or disinfectants
 - Inform occupational health practitioner/specialist or contracted dermatologist to determine source of irritation and recommend another product.
- Employers have to provide resources such as no-touch refuse bins, hand soap, alcohol-based hand rubs containing at least 70% alcohol, disinfectants, and disposable towels for employees to clean their hands and their work surfaces (Department of Employment and Labour, 17 March 2020).
- Irrespective of workplace size (i.e. < or > 20 employees), it is still the employer's duty to comply with Section 8 of the OHS Act and to ensure that there are funds set aside for the provision of resources. If there is no budget, then the employer must think of alternative methods to raise funds.

Recommended reading

- [1] “Water, sanitation, hygiene and waste management for COVID-19,” 2020. <https://www.who.int/publications-detail/water-sanitation-hygiene-and-waste-management-for-covid-19>.
- [2] “Department of Health COVID-19 NATIONAL PUBLIC HYGIENE STRATEGY AND IMPLEMENTATION PLAN, 2020”.
- [3] “OSHA • NIOSH INFOSHEET Protecting Workers Who Use Cleaning Chemicals.” [Online]. Available: http://www.epa.gov/oppad001/ad_info.htm.
- [4] “Cleaning and Disinfecting Your Facility | CDC.” <https://www.cdc.gov/coronavirus/2019-ncov/community/disinfecting-building-facility.html>.
- [5] “Interim Recommendations for US Community Facilities with Suspected/Confirmed Coronavirus Disease 2019.” <https://www.cdc.gov/coronavirus/2019-ncov/community/organizations/cleaning-disinfection.html>.
- [6] “Safety and Health Topics | COVID-19 - Control and Prevention | Occupational Safety and Health Administration.” <https://www.osha.gov/SLTC/covid-19/controlprevention.html>.
- [7] “Cleaning and disinfection of environmental surfaces in the context of COVID-19,” World Health Organization, 2020. <https://www.who.int/publications-detail/cleaning-and-disinfection-of-environmental-surfaces-in-the-context-of-covid-19>.
- [8] CDC, “Cleaning And Disinfecting Your Facility.”
- [9] “PRACTICAL IMPLEMENTATION MANUAL Draft Practical Manual for Implementation of the National Infection Prevention and Control Strategic Framework,” 2020.
- [10] “Implementation manual to prevent and control the spread of carbapenem-resistant organisms at the national and health care facility level. World Health Organization; 2019,” 2019, [Online]. Available: <https://apps.who.int/iris/bitstream/handle/10665/312226/WHO-UHC-SDS-2019.6-eng.pdf>.
- [11] “Government Notices, 29 April 2020, No 43257, Department of Employment and Labour, COVID-19 Occupational Health and Safety Measures in Workplaces COVID-19 (C19 OHS), 2020.” pp. p3-19, 2020.
- [12] “Occupational Health and Safety Act, 1993 Hazardous Chemical Substances Regulations, 1995.” 1995.
- [13] “Government Gazette, 20 October 2017, No 41186, Department of Trade and Industry No 1119 Annexure D.” pp. p112-114, 2017.
- [14] “How to clean and disinfect your workplace - COVID-19 | Safe Work Australia.” <https://www.safeworkaustralia.gov.au/doc/how-clean-and-disinfect-your-workplace-covid-19>
- [15] <https://www.cdc.gov/coronavirus/2019-ncov/community/disinfecting-building-facility.html>
- [16] <https://www.news24.com/news24/southafrica/news/coronavirus-experts-slam-coronavirus-disinfection-tunnels-20200530>

Recommended reading

- All the information provided in these slides including all links and references will be available in a comprehensive cleaning guideline document, which is currently being revised, on the NIOH website under “NIOH Occupational Health and Safety Resources”.
- PDFs of slides under “COVID-19 Presentations & Videos”.



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