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

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1. Background

According to the World Health Organization (WHO), the two main routes of transmission of the SARS-CoV-2 is droplet and direct contact transmission. Respiratory droplets are generated when an infected person coughs or sneezes and any person who is in close contact is at risk of being exposed to these droplets. Droplets may also land on surfaces where the virus could remain viable. Therefore, the immediate environment of an infected individual can serve as a source of contact transmission [1].

Kampf et al., (2020) reviewed the literature of 22 studies addressing the persistence of human and veterinary coronaviruses on inanimate surfaces as well as inactivation strategies with biocidal agents [2]. Their analysis revealed that, human coronaviruses such as the Severe Acute Respiratory Syndrome (SARS) coronavirus, the Middle East Respiratory Syndrome (MERS) coronavirus or endemic human coronaviruses (HCoV) can persist on inanimate surfaces like metal, glass or plastic for up to 9 days. However, these coronaviruses can be efficiently inactivated within 1 minute of contact time by surface disinfection procedures containing either ethanol (62 - 71%) [3], hydrogen peroxide (0.5%) [4] or sodium hypochlorite (0.1% or 0.5%) [5]. It is expected that SARS-CoV-2, the virus strain that causes coronavirus disease 2019 (COVID-19) would have similar characteristics of other coronaviruses. Therefore, as no specific therapies are available for SARS-CoV-2, the authors suggest that early containment and prevention of further spread is crucial to stop the ongoing outbreak of SARS-CoV-2.

Moreover, van Doremalen et al., (2020) have evaluated the stability of SARS-CoV-2 specifically under experimental settings [6]. The authors have estimated the decay rates of SARS-CoV-2 in aerosols and on various surfaces (i.e. plastic, stainless steel, copper, and cardboard) and showed that SARS-CoV-2 was more stable on plastic and stainless steel than on copper and cardboard, and survived for up to 72 hours. On copper and cardboard, no viable SARS-CoV-2 was measured after 4 hours and after 24 hours, respectively. Chin et al., (2020), on the other hand, showed that no viable SARS-CoV-2 could be detected on day 7 from stainless steel and plastic, on day 4 from glass and banknotes, on day 2 from treated wood and cloth and after 3 hours from printing and tissue paper [7]. They could also show that a very low but yet detectable level of virus could be present on the outer layer of a surgical mask on day 7 [7]. It is therefore critical to conduct regular cleaning and disinfection of surfaces in workplaces and public places to control the contact transmission and the spread of COVID-19 [8].

2. Aim

The aim of this document is to provide guidance on routine cleaning of non-health care and health care workplaces as well as deep cleaning when COVID-19 positive cases have been identified. The document starts with definitions of terms used frequently (Section 3) and then provides general principles for cleaning and disinfection in Sections 4 and 5, respectively. Section 6 lists approved disinfectants for both non-health care and health care settings and Section 7 addresses the frequency of cleaning and disinfection. Section 8 gives a detailed description of the requirements for routine, day-to-day environmental cleaning while Section 9 delves more on the requirements for deep cleaning in non-health care settings and terminal cleaning in health care settings. Proper personal protective equipment (PPE) and hand hygiene are discussed in Section 10 and advances in cleaning are discussed in Section 11. The document concludes with training cleaning staff on proper cleaning and disinfection methods (Section 12), important measures required for the workplace (Section 13), the use of disinfection tunnels and spray booths (Section 14) and lastly, considerations for waste generated in the workplace (Section 15).

The information sources consulted for the compilation of this document included national sources i.e. National Department of Health[1] and National Institute for Communicable Diseases (NICD)[2] as well as international sources i.e. the Occupational Safety and Health Administration (OSHA)[3], the Centers for Disease Control and Prevention (CDC)[4], the National Institute for Occupational Safety and Health (NIOSH)[5], the World Health Organization (WHO)[6], United Nations[7] and the Australian government[8].

[1] http://www.health.gov.za/
[2] https://www.nicd.ac.za/
[3] https://www.osha.gov/
[4] https://www.cdc.gov/
[5] https://www.cdc.gov/niosh/index.htm
[6] https://www.who.int/
[7] https://www.un.org/en/
[8] https://www.health.gov.au/

3. Definitions of terms

- **General cleaner:** Worker employed to clean and disinfect communal, administrative and non-laboratory spaces, which includes corridors, offices, bathrooms, kitchens, tearooms etc.
- **Laboratory-based cleaner:** Research assistants, medical scientists, lab managers, lab technologists, lab technicians and lab assistants who are responsible for cleaning and disinfecting laboratory-based spaces containing specialized laboratory equipment, research-related and routine chemicals and reagents.
- **Chemical cleaners:** Chemicals that remove dirt through wiping, scrubbing or mopping [9].
- **Cleaning:** The physical removal of dirt and impurities, including germs and microorganisms, from surfaces and involves using soap and water.
- **Deep cleaning:** A complete and enhanced cleaning procedure involving both thorough cleaning (using detergents) and disinfection (using disinfectants) of the workplace. Referred to as terminal or infectious clean in health care settings and is conducted following the discharge or transfer of a patient with a communicable disease [10]. There are different types/forms of deep cleaning. The most common type of deep cleaning involves wiping all surfaces using a cloth wetted with disinfectant only - this type of deep cleaning may not require the use of an external company but rather in-house Covid-19 Cleaning Staff members who have been trained on the safety and effective use of disinfectants and who have been provided with the correct personal protective equipment (PPE) and cleaning material by the employer. Another type/form of deep cleaning involves fogging (definition below) and requires the assistance of external services. Deep cleaning is required every time a COVID-19 positive case is suspected/identified. The surfaces/areas selected for deep cleaning will be those that were most likely in contact with the COVID-19 positive case and these surfaces must be identified by conducting a risk assessment first.
- **Decontamination:** The removal of pathogenic microorganisms from objects so they are safe to handle, use, or discard [11]. “Umbrella” term for pre-cleaning followed by sanitizing, sterilizing or disinfecting. Often, decontamination is used interchangeably with disinfection. However, disinfection is a form of decontamination as is sanitization and sterilization etc. Therefore, it is important to note that disinfection is not the only form of decontamination and the two terms should not be used interchangeably.

- **Detergents:** Water-soluble chemicals that have no killing ability but do remove organic matter, which contain microbes and thereby reduce environmental contamination [8], [12]. Most of the detergents used in health care are pH neutral and are specifically designed for use in health facilities [12].
- **Disinfection:** Type of decontamination. First clean the area or item with soap and water or another detergent if it is dirty. Then, use a household disinfectant, for example chemical disinfectants to kill pathogenic microorganisms on surfaces. The process does not necessarily clean dirty surfaces or remove pathogenic microorganisms. However, killing pathogenic microorganisms remaining on a surface after cleaning further reduces any risk of spreading infection [13].
- **Disinfectants:** Contain chemicals that destroy or inactivate microorganisms that cause infections. Disinfectants are critical for infection control in hospitals, laboratories and other health care settings.
- **Electronics:** Includes but not limited to cell phones, desktop computers, printers, laptops and tablets, touch screens, keyboards, remote controls, ATM machines.
- **Fogging:** Disinfection involving the spraying of a disinfectant using a fogging machine. Also known as spraying, fumigation or misting.
- **Highly-touched surfaces:** Are frequently touched surfaces. Includes but not limited to tables, chairs, countertops, desks, working surfaces, doorknobs, door handles, window handles, light switches, lift buttons, railings, handles, phones, keyboards, toilets, faucets, sinks, bed rails, intravenous pumps, water/beverage pitchers, trays, mobile cart rails etc. High-touched surfaces are a high-risk for cross-transmission by pathogens that are transferred from individuals [8], [14].
- **Laundry:** Includes but not limited to clothing, towels, linens, lab coats and other items.
- **Minimally (or low)-touched surfaces:** Includes but not limited to floors, walls, ceilings, blinds, etc. [8].
- **Sanitizers:** Contains chemicals that reduce, but do not necessarily eliminate, microorganisms such as bacteria, viruses and moulds from surfaces. Regarded as "lower level" of disinfection. Public health codes may require cleaning with the use of sanitizers in certain areas, like toilets and food preparation areas. In general, disinfectants and sanitizers are more hazardous to human health and the environment than detergents [14].

- **Soft (porous) surfaces:** Includes but not limited to soft surfaces such as carpeted floors, rugs, upholstered chairs, and drapes.

4. General cleaning principles

- The use of soap, water and friction is effective and inexpensive and is the first step in the cleaning process [12].
- Cleaning alone does not kill microorganisms; however, removal decreases their number and therefore any risk of spreading infection [13], [15].
- Routine environmental cleaning of highly-touched surfaces in workplaces is an essential part of disinfection. Organic matter and dirt (including blood, faeces, cotton mops and hard water [12]) can inactivate many disinfectants or reduce the disinfectants ability to kill germs. Cleaning reduces the soil load, allowing a disinfectant to work i.e. reduces bioburden. Removal of SARS-CoV-2 requires thorough cleaning followed by disinfection. Practice routine cleaning of frequently touched surfaces [11].
- Do not use compressed air or water to clean potentially contaminated surfaces, as these may aerosolize infectious material [14].
- Cleaning schedules and procedures must be planned so that cleaning progresses from the least soiled to the most soiled area.
- In addition, cleaning must be conducted from the top to the bottom within a room so that debris may fall on the floor, which is then cleaned last [12], [15].
- All areas must be cleaned systematically to avoid missing areas.
- No additives (such as scouring agents, disinfectant, or floor polish) are necessary during cleaning since this will deactivate the active cleaning ingredients in the detergent. These are usually applied after cleaning has taken place [12].
- Attention in cleaning must be paid to both highly-touched and minimally-touched surfaces [8], [13].
- Detergent must be freshly prepared daily
- No additives must be mixed with detergents as it will inactivate the cleaning ingredients in the detergent.
- For health care facilities [12]:
    - Damp dusting or wiping of surfaces (i.e. no dry dusting with cloths or feather dusters) as well as damp mopping of floors (i.e. no sweeping with brooms) is recommended. Cloths and mops should be wetted with clean water containing

a detergent. The water must be changed frequently for every bed space in high-risk areas or as soon as solution becomes turbid.

- Five different colours are used for cleaning equipment e.g. red, blue, green, white and yellow for highly contaminated areas, general use areas, bathrooms, kitchens and isolation areas, respectively.
- Cleaning checklist must be put up in all areas. Cleaners must sign the checklist after having cleaned. After carrying out checks, supervisors must co-sign the checklists at least daily [12].

5. General disinfection principles

- Disinfectants are strongly discouraged for routine cleaning in non-health care and health care settings:
  - There is no added benefit of using disinfectants routinely as thorough cleaning removes up to 80% of organic contamination
  - Disinfectants cannot improve more than cleaning on reducing the level of environmental contamination with microbes
  - Disinfectants contribute to increasing resistance to antimicrobial agents among pathogens
  - Certain non-biodegradable disinfectants are not eco-friendly
  - Disinfectants have little or no direct effect on biofilms
  - Disinfectants are expensive.
  - Health workers, patients and community members can develop allergies to some disinfectants [12].
- For health care facilities, the Infection Prevention and Control (IPC) team at the health facility should be consulted on the correct selection of disinfectant [12].
- Follow the instructions on the label (e.g. contact time, concentration, volume and protective measures) to ensure safe and effective use of the disinfectant.
- All solutions must be diluted according to manufacturer's instructions for maximum effectiveness. Increasing the strength of disinfectants does not increase the antimicrobial activity. Decreasing the strength of disinfectants may lead to antimicrobial resistance [12].

- Surface disinfectants should be wiped directly onto surfaces and left on as directed before being wiped systematically and carefully i.e. the 'contact time' of the disinfectant with the surface must be followed as per manufacturer's recommendation.
- Disinfectants should not be sprayed onto surfaces as it may cause respiratory irritation and aerosolize any contamination on the surface. If needed, spray disinfectant directly onto cloth.
- Disinfectant solutions must be prepared daily to maintain disinfectant strength.
    - Chlorine-based solutions (e.g. calcium/sodium hypochlorite also known as bleach or jik) are unstable and need to be prepared daily or changed on becoming dirty/turbid [12]
- Disinfectant solutions (as well as detergents) become contaminated during cleaning and therefore less effective when the organic load is too high. Continued use may transfer microorganisms to each subsequent surface [15].
- Do not use expired products.
- Never mix chlorine-based solutions with ammonia or any other cleanser as dangerous gases may be released.
- Chlorine-based solutions will be effective for disinfection up to 24 hours.
- Discard detergent and/or disinfectant solutions after each use, particularly in areas with suspected/confirmed COVID-19 cases [15].
- Disinfectant containers (buckets) must be cleaned daily after use.
- Disinfectant containers should be washed with detergent, rinsed, dried and stored inverted to drain fully when not in use [16].
- Store and use disinfectants in a responsible and appropriate manner according to the label.
- Humans must never be sprayed with chemical disinfectants such as chlorine as it may cause serious adverse health effects.
- Spraying of walls, floors, ceilings and passages in health care facilities with chlorine is not recommended as there is no evidence that COVID-19 transmission from these areas occurs [17].

6. Approved disinfectants for SARS-CoV-2

- SARS-CoV-2 is an enveloped virus with a fragile outer lipid envelope and is therefore inactivated by many common disinfectants [15].

- Non-health care settings:
    - Use disinfectants registered with the National Regulator for Compulsory Specifications (NRCS; Appendix A).
    - Appendix B lists the active ingredients recommended by the Department of Trade and Industry.
    - 70 - 90% ethyl alcohol (ethanol) to disinfect small areas and between uses of reusable equipment [8], [15].
    - Chlorine-based solution:
        - 0.1% (1000 ppm) for general environmental disinfection [15].
        - 0.5% for vomit, blood or other bodily fluid spillages [8], [15].
- Health care settings [12]:
    - Chlorine-based solution (0.1 - 1%).
    - Alcohol-based (75 - 90%) solutions e.g. 70 - 90% ethanol [15].
    - NRCS-registered, hospital-grade disinfectants (Appendix A).
    - Hydrogen peroxide $\geq$ 0.5% [15].
    - No-touch disinfection technologies, for example vaporised hydrogen peroxide used in a fogging-type of application and UV disinfection [15]
        - These no-touch technologies may be used as an addition to cleaning with a detergent and water and disinfection and do not replace these two processes.
        - Disadvantages of these technologies should be carefully considered before use. Fogging applications are discussed in Section 9. The efficacy of UV disinfection on the other hand is dependent on several factors, some of which include distance as well as direct/indirect line of sight of surface from UV source, irradiation dose, wavelength and exposure time, lamp placement and age, duration of use, and room size and shape.
        - No-touch technologies can only be applied in health-care settings during terminal cleaning when the areas are unoccupied [15].
- The contact time for ethanol, chlorine-based solutions and hydrogen peroxide to ensure inactivation of SARS-CoV-2 is 1 minute [15].

7. Frequency for cleaning and disinfection in the workplace

7.1. Non-health care settings

- Should be cleaned at least daily [18].
- The frequency of cleaning will increase due to the following factors:
    - If the workplace operates in shifts, workplaces should be cleaned between shifts.
    - If equipment is shared between workers, it should be cleaned between uses.
- When and how often the workplace, or certain surfaces, should be disinfected will depend on the likelihood of contaminated material being present, for example:
    - Any time there has been a case or suspected case of COVID-19 at the workplace.
    - At workplaces with a high volume of workers, customers or visitors that are likely to touch surfaces [18].
- The frequency and methods for cleaning and disinfection during routine cleaning and following a suspected/confirmed COVID-19 case of materials and items encountered at the workplace is available in Table 1 and Table 2, Appendix C.
- Recommendations on handling paper records and documents are discussed in Appendix E.
- Cleaning and disinfection of public transportation (i.e. company vehicles) to be done daily and frequently, at the start of every shift, during breaks (i.e. after every trip) and at the end of each shift [8] (see Table 2, Appendix C).

7.2. Health care settings

- In general, each area of the health care facility must be cleaned at least twice daily, with a proper schedule, checklist and programme. In high-risk areas (COVID-19 triage, isolation ward and ICU settings), the environment must be cleaned and disinfected at least 3-4 times per day and checked by the supervisor each time [17].
- Recommended frequency of cleaning and disinfection of items during routine cleaning as well as in COVID-19 patient areas in health care settings are provided in Appendix D (Table 1 and Table 2, respectively).
- Recommendations on handling paper records and documents are discussed in Appendix E.

8. Routine day-to-day environmental cleaning

Routine cleaning using water and detergents and other housekeeping practices as well as disinfection procedures (i.e. applying disinfectant to highly-touched surfaces after cleaning) are appropriate for SARS-CoV-2 in non-health care and health care workplace settings including patient care areas or laboratories and where aerosol-generating procedures are performed [11], [15].

8.1. Non-health care settings

Hard (non-porous) surfaces

- Dirty surfaces should be cleaned using a detergent or soap and water prior to disinfection.
- Use a suitable product for the type of surface to be cleaned. See Table 1, Appendix C for suitable cleaning and disinfection methods based on surface type.

Soft (porous) surfaces

- Remove visible contamination if present and clean using soap and water or with appropriate cleaners indicated for use on these surfaces.
- Clean items (if possible) according to the manufacturer's instructions. Use the warmest appropriate water setting and dry items completely. Refer to Appendix A for NRCS-approved disinfectants suitable for soft porous surfaces [11].

Laundry

- Do not shake dirty laundry in order to minimize the possibility of dispersing virus through the air.
- Launder items according to the manufacturer's instructions.
- Use the warmest appropriate water setting and dry items completely.
- Dirty laundry from an ill person can be washed with other people's items.[11]
- Clean and disinfect plastic clothes hampers according to the guidance above for hard, non-porous surfaces [6] or fabric clothes hampers according to the guidance above for soft (porous) surfaces.

Electronics

- Consider putting a wipeable cover on electronics.
- Follow manufacturer's instruction for cleaning and disinfecting.
- If no guidance, use alcohol-based wipes/cloth containing at least 70% alcohol. Dry surface thoroughly [11].

Minimally-touched surfaces

- The frequency of routine cleaning of minimally-touched surfaces e.g. walls, blinds, ceilings etc. is specified in Table 2, Appendix C.

Highly-touched surfaces

- Highly-touched areas should be cleaned and disinfected according to the frequencies specified in Table 2, Appendix C.
- Clean general surfaces and fittings immediately when visibly soiled.
- Detergent-impregnated wipes may be used but should not be used as a replacement for the mechanical cleaning process [8].

8.2. Health care settings [10]

- Clean and disinfect the general patient areas of the facility e.g. waiting rooms, wards etc. twice daily (at least once per shift).
- Clean and disinfect ICUs 6 hourly
- In triage and testing units, chairs must be cleaned/disinfected between each patient use
- Sampling booths must be cleaned/disinfected between each patient use
- Areas should be thoroughly cleaned and then wiped with a 0.1% chlorine-based solution or 70% alcohol surface cleaner or disinfectant wipes.
- Focus on high touch surfaces, from cleanest to dirtiest, from the highest to the lowest, eventually ending around the bed.
- Clean and disinfect bed rails, bedside cabinet, over-bed trolley, nurse call system and clinical equipment around the patient before and after touching; wipe with disinfectant cloth or wash with soap and water first if visibly soiled and thereafter with disinfectant cloth.
- Clean and disinfect frequently touched surfaces with disinfectant wipe/solution every 30 - 60 minutes depending on frequency of use.

- Clean and disinfect toilets every 3 hours [10] or at least three times daily for shared toilets [15].

9. Deep cleaning when COVID-19 positive cases have been identified

This section of the document provides recommendations on the cleaning and disinfection of rooms or areas after a confirmed COVID-19 case has been isolated.

9.1. Non-health care settings

Deep cleaning of non-health care settings is not required in areas that were unoccupied for more than 7 days as the possibility of viable (i.e. infectious) SARS-CoV-2 on surfaces would be negligible, if at all possible [13], [19]. The National Department of Health has stated that deep cleaning is only required for a specific area in the work environment that was occupied by a COVID-19 case to enable reoccupation of the affected area as soon as possible (i.e. in less than 7 days) for essential services to resume [19]. In addition, the National Department of Health recommends that the positive COVID-19 case would have had to spend a considerable amount of time in the workplace, touched and handled many objects, equipment and surfaces and had close contact with several fellow workers to warrant more comprehensive manual surface cleaning and disinfection of the workplace. If the positive COVID-19 case simply passed through the workplace without touching any surfaces and without spending much time in face-to-face communication with other employees, then simple manual surface cleaning measures would be appropriate [19].

Deep cleaning by surface wiping has proven to be successful for COVID-19 and is recommended in both non-health care settings and heath care settings (then referred to as terminal cleaning) [10], [20] and can be carried out by general housekeeping staff [12] or laboratory-based cleaners, provided that suitable PPE is made available by the employer (see Section 10).

General steps for deep cleaning of a non-health care setting:

1. Do a risk assessment of potentially exposed areas.
2. Close off risk identified areas visited, used or occupied by the ill person.
3. Companies do not need to close operations if they can successfully close off affected areas. Work may be directed to another clean facility in the interim.
4. Open outside doors and windows and use ventilating fans to increase air circulation.

5. Wait 24 hours or as long as practical before commencing with deep cleaning to minimise exposure to possible viable or infectious SARS-CoV-2 on surfaces and within suspended air droplets.
6. Clean and disinfect all communal areas and shared electronic equipment used by the ill person, focusing especially on high-touched surfaces [6].
7. Refer to Tables 1 and 2 in Appendix C for cleaning and disinfection methods of common surfaces and items encountered in the workplace following suspected/confirmed COVID-19 case.
8. Most surfaces may be wiped down and washed at least twice, with 0.05% (500 ppm %) chlorine-based solution [8] or once with 0.1% chlorine-based solution [15].
9. Avoid exposure to contaminated items from the ill person's work environment (pens, computers, eating utensils, dishes) [8].
10. Vomit, blood or other spillage should be flooded with 0.5% chlorine-based solution , covered with paper towels or absorbent material and left for at least 30 minutes before cleaning [8].
11. Cleaning equipment (e.g. buckets) should be well maintained and separated from other equipment [15].
12. The closure period of the workplace will depend on how long it takes for disinfectant vapours to disappear and all surfaces to air-dry.
13. Continue routine cleaning and disinfection. This includes everyday practices that businesses and communities normally use to maintain a healthy environment [13].

9.2. Health care settings

- The terms deep cleaning and terminal cleaning in the health care setting should not be confused:
    - **Deep cleaning** in health care facilities, particularly hospitals, involves cleaning walls, ventilation shafts and grills and storage areas, floors, windows, ceilings, etc in all clinical and non-clinical areas. In some situations, temporary closure of such areas is required whilst deep cleaning is taking place.
    - **Terminal cleaning** is specifically carried out by cleaners after a patient with an infectious disease has been discharged either from a ward or a single (isolation) room. While terminal cleaning is similar to routine cleaning, it is recommended that transmission-based PPE should be worn before entering the room [12].

General steps for terminal cleaning of a health care setting:

1. Terminal cleaning should be performed carefully with minimum dispersing of dust.
2. Remove and discard all unused consumables (including left-over lotions and solutions e.g. liquid soap and hand disinfectant) and PPE from the room.
3. Remove all linen and waste in the room
4. Remove all medical equipment and items used by the patient (drip stands, etc.)
5. Only use cleaning equipment marked/colour coded for the cleaning of isolation rooms.
6. Cleaning equipment must be cleaned and disinfected after cleaning each isolation room.
7. Cleaning of furniture:
    - Clean all surfaces of the bed frame, over-bed tables, chairs, lamps and lockers with a detergent, dried and wiped down with 70% alcohol.
    - The inside of the bedside cabinet and storage closet must be damp-wiped with a detergent.
    - Windows (including sills and frames), storage cupboards, curtain rails, doors, and hand wash basins must be wiped down with detergent and water.
8. Linen:
    - Remove all sheets, bed linen, curtains, bed screens and any other washable item in the room and place in appropriate colour bags or containers.
    - Linen and waste bags must be closed and labelled inside the isolation room before removal and sent to the laundry.
    - All surfaces of the plastic covers of mattresses and pillows must be damp-wiped with a hospital approved detergent before the bed is made.
    - If plastic covers are torn or damaged, these should be replaced and the mattresses and pillows sent for decontamination.
    - If the plastic covers of the pillows and the mattresses are intact and there are no visible signs of contamination then these should be washed down with soap and water, dried and wiped off with alcohol.
9. Mattress:
    - Inspect the mattress and cover to ensure integrity (no tears or damage).
    - Wipe both sides of the mattress and the edges with a damp cloth soaked in water and detergent, carefully removing all visible dirt.
    - Wipe over with appropriate concentration of a recommended disinfectant (alcohol or chlorine). Replace mattress if torn.

- Certain institutions recommend carbolising the mattress with phenol (also known as carbolic acid) as a disinfectant [10].

10. Medical equipment:
    - These include ventilators, infusion pumps, monitors, leads, drip stand, oxygen regulator, stethoscope, saturation monitors, sonar machines and ECG probes and the emergency trolley equipment must be thoroughly cleaned with detergent and water (without soaking) and wiped down with alcohol or chlorine.
11. Other equipment:
    - For example suction bottles, silicone tubes (if not single use), circuits, inhalation masks, puriton bottles, other bottles, transducer domes and used procedure packets.
    - Must be rinsed out with water, packed in a transparent plastic bag that is marked infectious and send to the sterile services department.
    - Blood pressure cuffs should be washed in warm water and detergent and dried.
    - Thermometers should be washed, dried and disinfected.
12. Walls and floors:
    - Walls to a height of 2 m or at partitioning to hand height, gabbler rails must be wiped down with detergent and water [10] and if there are any bloodstains, wipe over with 1% chlorine solution after the wall is clean.
    - Floors must be mopped
13. Patient care articles:
    - Bedpans, urinals, bowls and jugs should be washed and heat disinfected.
14. Catering:
    - Wash in automated dish washer or wash in hot water and allow to dry.
    - No additional precautions required
    - Disposable cutlery and crockery not recommended
15. Closure period of health care facility: The room should ideally be left unoccupied until all surfaces are dry.
16. Checklists must be completed and signed by the IPC co-ordinator or unit/health facility manager before another patient can be admitted to the room.
17. All PPE must be discarded inside the isolation area and hand hygiene carried out before exiting the room.

The Department of Health does not endorse deep cleaning by fogging, nor does the Department of Health require a 'certificate of cleaning' [19] after deep cleaning by a designated company. In addition, the WHO [15], United Nations [21], EPA [21] and CDC [22], [23] does not recommend fogging in both health-care and non-health care settings for the following reasons:

- Simply fogging an area with a disinfectant does not meet EPA-registered label requirements without proper pre-cleaning as disinfectants are easily inactivated by organic matter [24].
- Fogging may miss surfaces shielded by objects/folded fabric etc. [15]
- Fogging of a disinfectant may change its safety (or toxicological profile) and effectiveness [23].
- Fogging increases the inhalation exposure to workers and community [15].

These governmental institutions therefore recommend 'deep cleaning by surface wiping' i.e. applying disinfectant with cloth or wipe after thorough cleaning [15]. Furthermore, 'deep cleaning by surface wiping' ensures maximum contact with the virus, which will lead to the greatest risk reduction [24].

10. PPE and hand hygiene during cleaning and disinfection

- A critical step in the risk assessment of exposure to hazardous biological agents is to identify the most suitable control measures (as far as reasonably practical), which include engineering controls, administrative controls and PPE [25], [26].
- The points below specifically address the PPE required for general and laboratory-based cleaners during routine cleaning as well as the PPE required for deep/terminal cleaning.
- For proper use of PPE refer to the following NIOH video: https://www.youtube.com/watch?v=zN5y1u44RZU&t=40s
- For routine cleaning of small work spaces the following PPE is required [8]:
    - Disposable or utility gloves (aka domestic rubber gloves)
    - Plastic aprons
    - Closed shoes [15]
    - A suitable respirator to mask smell/vapours of disinfectants [8], subject to a risk assessment assessing chemical and biological hazards.

- Additional PPE (in addition to those listed above) would be required in health care settings [12] e.g.
    - Surgical masks when entering areas where droplet precautions, as in the case of SARS-CoV-2, are required.
    - Cloth or cotton gowns when conducting terminal cleaning of patient rooms, which must be used with plastic apron underneath to reduce fluid contamination.

- The CDC recommends that gowns should be worn during routine cleaning. However, if gowns are not available then coveralls, aprons (as recommended by the Department of Health) or work uniforms can be worn during cleaning and disinfecting. Washable clothing should be laundered afterwards.
- PPE should be compatible with the disinfectant products being used.
- Additional PPE might be required based on the cleaning/disinfectant products being used and whether there is a risk of splash.
- Gloves and other PPE should be removed carefully after cleaning a room or area occupied by ill persons.
- Wear appropriate PPE for all tasks in the cleaning process, including handling trash.
- After use, utility gloves should be cleaned with soap and water and decontaminated with 0.5% chlorine-based solution. Single-use gloves (e.g. nitrile or latex) should be discarded after each use [8].
- Wash hands often with soap and water for 20 seconds (NIOH hand wash video https://www.youtube.com/watch?v=AlsONBKKO1M).
- Hand sanitizer: If soap and water are not available and hands are not visibly dirty, an alcohol-based hand sanitizer that contains at least 70% alcohol may be used [27] (NIOH hand sanitize videos: https://www.youtube.com/watch?v=W73Qmimbcjg; https://www.youtube.com/watch?v=B2Q3_41Zy0w; https://www.youtube.com/watch?v=2EyUpWwoLv4). However, if hands are visibly dirty, always wash hands with soap and water first before disinfecting.
- If an alcohol-based hand rub and soap are not available, then using chlorinated water (0.05%) for handwashing is an option, but it is not ideal because frequent use may lead to dermatitis, which could increase the risk of infection and asthma and because prepared dilutions might be inaccurate [1].
- Key times to wash or sanitise hands include:

- After blowing one’s nose, coughing, or sneezing.
- After using the toilet.
- Before eating or preparing food.
- After contact with animals or pets.
- Before and after providing routine care for another person who needs assistance (e.g., a child).
- After handling dirty laundry
- Before putting on (don) PPE
- After removing (doff) PPE
- When changing gloves
- After any contact with a patient with suspected or confirmed COVID-19 infection or patient waste
- After contact with any respiratory secretions [1]
- Additional hand hygiene is required in health care settings such as the five moments of hand washing, which include, (1) before touching a patient, (2) before a procedure, (3) after a procedure or body fluid exposure risk, (4) after touching a patient, and (5) after touching a patient's surroundings [12].

11. Advances in cleaning

Employers should note recent advances in safe cleaning practices and the availability of modern cleaning equipment that minimizes the use of chemicals. Practices and equipment to consider include:

- Walk-off mats placed inside and outside of entryways (to prevent dirt from being tracked into the building);
- Microfiber mops, cloths and dusters;
- Vacuum cleaning equipment with a high filtration efficiency (HEPA)
- Walk-behind hard floor auto-scrubbers;
- Hands-free mops;
- Chemical free cleaning systems [9].

Note that consideration of the abovementioned list should include suitability and availability in light of the current COVID-19 pandemic.

12. Training of in-house COVID-19 cleaning staff

- In-house cleaning staff may be trained on how to conduct deep cleaning of a facility provided that deep cleaning is conducted via thorough surface cleaning followed by surface wiping with disinfectants only.
- Staff, including management, must be trained in the effective cleaning processes, appropriate equipment and use of detergents and disinfectants and proper cleaning methods for various areas in a facility, including IPC [8].
- For management roles and responsibilities refer to the following link: https://www.youtube.com/watch?v=uJhVJrKWdtk
- Develop policies for worker protection and provide training to all cleaning staff on site prior to providing cleaning tasks.
    - Training should include when to use PPE, what PPE is necessary, how to properly don, use, and doff PPE, and how to properly dispose of PPE.
- Records of cleaning staff training must be kept and be available for inspection [8].
- Employers must obtain and maintain Safety Data Sheets (SDSs) for all hazardous cleaning products and chemicals that they use. SDSs must be readily accessible to workers [9]. Employers can use the information contained in the SDSs to ensure that workers are properly protected. SDSs include the following important information [28]:
    - Product and Company Identification
    - Composition
    - Hazards Identification
    - First-aid Measures
    - Fire-fighting Measures
    - Accidental Release Measures
    - Handling and Storage
    - Exposure Control/Personal Protection
    - Physical and Chemical Properties
    - Stability and Reactivity
    - Toxicological Information
    - Ecological Information
    - Disposal Considerations
    - Transport Information
    - Regulatory Information

    - Other Information
- When cleaning chemicals are hazardous, employers must train workers on safe work practices for using these chemicals. Safe work practices when using cleaning chemicals include the following [9]:
    - Warning workers[9] not to mix cleaning products that contain sodium/calcium hypochlorite and ammonia;
    - Making sure that workers know which cleaning chemicals must be diluted and how to correctly dilute the detergents/disinfectants they are using;
    - Thoroughly reviewing and training workers on the use, storage and emergency spill procedures for cleaning chemicals;
    - Reviewing the proper PPE needed, such as gloves and goggles, and providing PPE to the workers using the cleaning product according to Section 8 of the Occupational Health and Safety Act [29];
    - Ensuring that all containers of cleaning products and chemicals are labelled to identify their contents and hazards;
    - Operating ventilation systems as needed during cleaning tasks to allow sufficient air flow and to prevent build-up of hazardous vapours;
    - Providing workers with a place to wash up after using cleaning chemicals.
    - Cleaning chemicals should not be used to wash hands. Wash hands with water after working with a cleaning chemical, especially before eating, drinking or smoking.
    - Employers must provide training to workers at a level and in a language and vocabulary that they can understand [9].
- No eating, drinking, or smoking is allowed except in specific designated areas.
- Educate workers performing cleaning, laundry, and general waste pick-up to recognize the symptoms of COVID-19.
- Workers should immediately report breaches in PPE such as a tear in gloves or any other potential exposures to their supervisor.
- If workers develop skin irritation after using hand sanitizers or surface disinfectants then they should inform their supervisor immediately who would need to inform the occupational health practitioner/specialist or contracted dermatologist to determine source of irritation and recommend another product.

[9] General and laboratory-based cleaner

13. Important measures for workplaces

- Placing sanitizing hand rub dispensers at entry points around the workplace, and make sure these dispensers are regularly refilled;
- Making sure that staff, contractors and customers have access to hand washing facilities with soap and clean water.
- Promoting hand-washing by employees, contractors and customers as explained under 'key times to wash hands' (in Section 10).
- Briefing employees, contractors and customers that if COVID-19 starts spreading in their community, anyone with even a mild cough or low-grade fever (37.3 °C or more) needs to stay at home. They should also stay home (or work from home) if they have had to take simple medications, such a paracetamol/acetaminophen, ibuprofen or aspirin, which may mask symptoms of infection.
- Utilizing other communication measures such as offering guidance from occupational health and safety officers, briefings at meetings and information on the internet to promote hand-washing (see Section 10 for hand-wash videos) and provide additional general information on COVID-19.
- Display posters promoting hand-washing and sanitization, which can be accessed at http://www.nioh.ac.za/wp-content/uploads/2020/03/Handwashing-poster-1.pdf and http://www.nioh.ac.za/wp-content/uploads/2020/03/Hand-Sanitiser-Poster_v1.pdf.
- Promote good respiratory hygiene in the workplace, and display posters promoting respiratory hygiene.
- Ensure that paper tissues are available at your workplaces, for those who develop a runny nose or dry cough at work, along with closed bins for hygienically disposing of them because good respiratory hygiene prevents the spread of COVID-19.
- 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 [29].
- 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.

- For health care settings, the responsibilities of carrying out proper cleaning and disinfection and validation thereof must be stipulated and made accountable [12]. Possible delegation of duties are:
    - The IPC team are responsible for monitoring and validation of routine environmental cleaning and can be validated using visual inspection as well as fluorescent markers [17].
    - If terminal cleaning is required, checklists (specifying availability of PPE, areas to be terminally cleaned etc.) must be completed and signed by the IPC co-ordinator or unit/health facility manager before another patient can be admitted to the room. The IPC team should be available to carry out final checks on the cleaning and disinfection of the room and to give final clearance for occupancy by the next patient [12].
    - For general workplace facilities and public communal areas, the Environmental Health Services manages environmental cleaning and disinfection.

14. Disinfection tunnels and spray booths

The National Department of Health does not endorse the use of disinfection tunnels or spray booths/cabinets/gates/chambers or spraying a person with a disinfectant based on the following [31]:

- Disinfectants used in tunnels and booths pose harmful effects to human health, and could cause skin, eye or respiratory irritation or damage [11]
- Disinfectant dispersion or spray devices can lead to further unintended virus dispersion
- Industrial and medical grade disinfection devices require the use of personal protective gear and strict safety measures by the applicator, which is not currently being utilised for the lay person subjected to these practices
- The use of these structures is likely to induce a false sense of security among those being sprayed leading to non-compliance of the most important general safety precautions of wearing face masks, social distancing and practising personal hygiene
- The assertion that disinfectant manufacturers have adjusted their products to be more "person friendly", does not address the well-known fact that the primary source of virus and its main route of transmission, which is droplet spread, is generated from the upper and lower respiratory system. Therefore, these tunnels or booths are not effective for inactivating viruses present in the respiratory tract or on the skin [30]. The WHO has

also stated that even if an individual who is infected with COVID-19 goes through a disinfection tunnel or booth, as soon as they start speaking, coughing or sneezing they can still spread the virus [31].

- The CDC has also stated that there is no evidence that these disinfection tunnels and booths are effective in reducing the spread of COVID-19 [11].

15. Generation of waste in workplaces/offices and public places

- All waste generated from offices and public places including masks, gloves, paper towels, etc. should be treated as health care general waste as per SANS 10248-1:2008 [8], [32].
- The waste must be placed in clear or black plastic rubbish bags and tied when full.
- These plastic rubbish bags may be placed with the normal waste generated for collection, removal, transportation and disposal by the local municipality.
- If health-screening measures are exercised at work places/offices, all waste generated should be treated as health care risk waste as per SANS 10248-1:2008 and disposed of accordingly.
- Proper hand hygiene practices must be performed/observed during and after the removal of the waste [8].

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Appendix

A. List of Registered Disinfectants by the NRCS

https://www.nrcs.org.za/siteimgs/CMM/LOA/Disinfectant/Registration%20Database%20Chemical%20Disinfectants%202009-2020.pdf

B. List of Active Ingredients used in Chemical Disinfectant Formulations [33]

D.1 This list provided below is non-exhaustive but is provided for use as a guideline.

D.2 The active ingredient may be formulated in combination with other compatible actives.

1. Quaternary Ammonium Compounds (QACs)

- alkyltrimethyl ammonium bromide
- dialkyldimethyl ammonium chloride
- domiphen bromide
- benzethonium chloride
- cetylpyridinium chloride
- alkyl (dichlorophenyl)methyldimethyl chloride
- polymeric quaternary ammonium compound

2. Phenols (Clear soluble, white and black fluid) and chlorinated phenols

- Phenol
- Cresol
- Xylenol
- Ethyiphenol
- Phenylphenol
- Chlorometaxylenol
- Dichlorometaxylenol
- Chloro-o-phenylphenol
- Benzylchlorophenol
- Benzylchlorophenol
- Parachlorometaxylenol

3. Halogen- releasing compounds

- Sodium hypochlorite
- Potassium hypochlorite

- Lithium hypochlorite
- Calcium hypochlorite
- Trichloroisocyanuric acid
- Sodium dichloroisocyanurate
- Dichlorod imethyihydantoin
- Chloramine -T,
- Halozone,
- N- chlorosuccinimide
- Chlorinated trisodium phosphate
- Chlorine dioxide
- Bromine releasing products
    - Bromochlorodimethylhydantoin
    - Sodium bromide

4. Aldehydes

- Formaldehyde
- Glutaraldehyde
- Glyoxaldehyde
- Glycidaldehyde
- Succindialdeyhyde

5. Biguanides and polymeric biguanides

- Alexidine,
- Chiorhexidine
- Polymeric Biguanides.

6. Amphoterics

- Amphoteric compounds formulated with either anionic or cationic substances.

7. Iodine-based compounds

- Iodophors stabilised with either acids or acidic buffers

8. Alcohols

- Ethyl alcohol
- Isopropyl alcohol
- M- propyl alcohol
- Terpene alcohols

- Phenoxyethanol
- Phenylethyl alcohol

9. Acids

- Organic acids e.g. formic, citric, lactic, mallic, glutaric and propionic acids
- Inorganic acids e.g. nitric, hydrochloric, sulphuric, phosphoric and suiphamic acids

10. Peroxygen -based compounds

- Hydrogen peroxide
- Peracetic acid
- Sodium and potassium monopersulphates
- Sodium metaperiodate

11. Alkalis

- Sodium and potassium hydroxide
- Quicklime (calcium oxide)
- Sodium carbonate
- sodium metasilicate

C. Frequency and methods for cleaning and disinfection of common materials (Table 1) and items (Table 2) encountered in the non-health care workplace setting. Modified from Safe Work Australia [18].

Table 1: Common surfaces in the workplace

Material	Routine cleaning			Following suspected/confirmed case	
	Highly-touched Surfaces	Minimally-touched surfaces	Method	Highly/Minimally-touched	Method
Soft plastics	Clean at least daily or every shift change	Clean weekly	Damp dust† + Detergent	Clean and disinfect as you become aware	Detergent + Disinfectant
Hard plastics	Clean at least daily or every shift change	Clean weekly	Detergent	Clean and disinfect as you become aware	Detergent + Disinfectant
Metal surfaces(stainless steel, uncoated steel, zinc coated steel, aluminium)	Clean at least daily or every shift change	Clean weekly	Detergent	Clean and disinfect as you become aware	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	Clean at least daily or every shift change	Clean weekly	Clean according to manufacturer Recommendations	Clean and disinfect as you become aware	Clean according to manufacturer recommendations

Material	Routine cleaning			Following suspected/confirmed case	
	Highly-touched Surfaces	Minimally-touched surfaces	Method	Highly/Minimally-touched	Method
Wood	Clean at least daily or every shift change	Clean weekly	Damp dust† + Detergent	Clean and disinfect as soon as you become aware	Detergent + Disinfectant
Laminate	Clean at least daily or every shift change	Clean weekly	Detergent	Clean and disinfect as soon as you become aware	Detergent + Disinfectant
Glass	Clean at least daily or every shift change	Clean weekly	Detergent	Clean and disinfect as soon as you become aware	Detergent + Disinfectant
Concrete (polished)	Clean at least daily or every shift change	Clean weekly	Detergent	Clean and disinfect as soon as you become aware	Detergent + Disinfectant
Concrete (rough)	Clean at least daily or every shift change	Clean weekly	Vacuum (HEPA) or Detergent	Clean and disinfect as soon as you become aware	Detergent + Disinfectant
Leather	Clean at least daily or every shift change	Clean weekly	Clean according to manufacturer recommendations	Clean and disinfect as soon as you become aware	Clean and disinfect according to manufacturer recommendations
Fabric	Clean at least daily or every shift change	Clean weekly	Vacuum (HEPA) Damp dust† + Detergent If launderable, wash on warmest possible setting according to manufacturer recommendations with laundry detergent	Clean and disinfect as soon as you become aware	Detergent + Steam clean. If launderable, wash on warmest possible setting according to manufacturer recommendations 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.

† Damp dust: Wet a cloth with detergent and wring out, such that the cloth remains damp, but does not drip water.

Table 2: Common items in the workplace

Item	Routine cleaning			Following suspected/confirmed case	
	Highly-touched Surfaces	Minimally-touched Surfaces	Method	Highly/Minimally-touched	Method
Office access points					
Alcohol-based hand sanitiser dispenser	Clean at least daily	Clean weekly	Detergent	Clean and disinfect as soon as you become aware	Detergent + Disinfectant
Cleaning equipment					
Cleaning Equipment (e.g. buckets)	Clean after use	Clean after use	Detergent	Clean after use	Detergent + Disinfectant

Item	Routine cleaning			Following suspected/confirmed case	
	Highly-touched Surfaces	Minimally-touched Surfaces	Method	Highly/Minimally-touched	Method
Office environment					
Floor (non-slip vinyl)	Damp mop daily	Damp mop daily	Detergent	Clean and disinfect as soon as you become aware	Detergent + Disinfectant
Floor (polished concrete)	Dust removal & clean daily	Dust removal & clean weekly	Detergent	Clean and disinfect as soon as you become aware	Detergent + Disinfectant
Carpet (Soft Floor)	Clean daily	Clean weekly	Vacuum with HEPA filter	Clean and disinfect as soon as you become aware	Carpet shampoo + Steam clean
	Clean annually	Clean annually	Shampoo or steam clean		
Ceiling	Spot clean daily & wash yearly, e.g. access hatches and surrounds	Spot clean weekly & wash every 3 years	Damp dust† + Detergent	Clean and disinfect as soon as you become aware	Detergent + Disinfectant
Curtains and Blinds	Clean weekly	Clean monthly	Refer to manufacturer recommendations. Steam clean curtains or blinds in place or machine wash curtains according to manufacturer recommendations	Clean and disinfect as soon as you become aware	Damp dust† + Detergent Steam clean curtains or blinds
Walls	Spot clean touched walls daily & full clean yearly	Spot clean weekly & full clean yearly	Damp dust† + Detergent	Clean and disinfect as soon as you become aware	Detergent + Disinfectant
Windows	Spot clean touched windows daily	Clean weekly	Detergent	Clean and disinfect as soon as you become aware	Detergent + Disinfectant
Window frames (sliding servery window types)	Clean at least daily	Clean weekly	Detergent	Clean and disinfect as soon as you become aware	Detergent + Disinfectant
Light and Power point Switches	Clean at least daily	Clean weekly	Damp dust† + Detergent	Clean and disinfect as soon as you become aware	Detergent + Disinfectant Damp dust†
Lights/lighting	Clean daily	Clean weekly	Refer to manufacturer recommendations. Detergent	Clean and disinfect as soon as you become aware	Detergent + Disinfectant
Push/pull doors (with and without a push plate)	Clean at least daily	Clean weekly	Detergent + Disinfectant	Clean and disinfect as soon as you become aware	Detergent + Disinfectant
Door frames	Clean at least daily	Clean weekly	Detergent	Clean and disinfect as soon as you become aware	Detergent + Disinfectant
Door knob/handles	Clean at least daily	Clean daily	Detergent	Clean and disinfect as soon as you become aware	Detergent + Disinfectant
Call bell/door bell	Clean at least daily	Clean weekly	Detergent	Clean and disinfect as soon as you become aware	Detergent + Disinfectant
Elevator buttons	Clean at least daily	Clean weekly	Detergent	Clean and disinfect as soon as you become aware	Detergent + Disinfectant

Item	Routine cleaning			Following suspected/confirmed case	
	Highly-touched Surfaces	Minimally-touched Surfaces	Method	Highly/Minimally-touched	Method
Hand rails, stair rails	Clean at least daily	Clean weekly	Detergent	Clean and disinfect as soon as you become aware	Detergent + Disinfectant
Shelves (and items on shelves)	Clean weekly	Clean weekly	Detergent	Clean and disinfect as soon as you become aware	Detergent + Disinfectant
Tables/desks	Clean at least daily	Clean weekly	Detergent	Clean and disinfect as soon as you become aware	Detergent + Disinfectant
Chairs (non-upholstered) e.g. plastic chairs, wooden chairs, other non-padded chairs	Clean at least daily	Clean weekly	Detergent	Clean and disinfect as soon as you become aware	Detergent + Disinfectant
Chairs (upholstered) e.g. fabric padded chairs, sofas, office chairs	Clean at least daily	Clean weekly	Vacuum (HEPA) Damp dust† + Detergent	Clean and disinfect as soon as you become aware	Detergent + Steam clean
Clipboard / Folders	Clean after use	Clean weekly	Detergent	Clean and disinfect as soon as you become aware	Detergent + Disinfectant
Keys and locks and padlocks	Clean daily	Clean weekly	Detergent	Clean and disinfect as soon as you become aware	Detergent + Disinfectant
Remote controls	Clean at least daily	Clean weekly	Detergent	Clean and disinfect as soon as you become aware	Detergent + Disinfectant
Telephone	Clean at least daily & more regularly if shared by multiple users	Clean weekly	Detergent	Clean and disinfect as soon as you become aware	Detergent + Disinfectant Damp dust†
Office electronics					
Electrical equipment	Clean at least daily or between users if shared	Clean weekly	Refer to the manufacturer recommendations	Clean and disinfect as soon as you Become aware	Detergent + Disinfectant
Electronic equipment (sensitive to electrostatic charge) E.g. Ipads, tablets, laptops exterior of computer case and monitors	Clean at least daily or between users if shared	Clean weekly	Consider adding a wipeable cover to the device/screen. Refer to manufacturer recommendations. If no recommendations, use isopropyl alcohol-based solution with non-electrostatic wipes suitable for electronic equipment	Clean and disinfect as soon as you become aware	Detergent + Disinfectant
Touch screens e.g. information	Clean at least daily	Clean weekly	Consider adding a	Clean and disinfect as soon as you	Detergent + Disinfectant

Item	Routine cleaning			Following suspected/confirmed case	
	Highly-touched Surfaces	Minimally-touched Surfaces	Method	Highly/Minimally-touched	Method
screens in buildings			wipeable cover to the device/screen. Refer to manufacturer recommendations. Isopropyl alcohol-based wipes/sprays	become aware	on wipeable covers. Isopropyl alcohol-based wipes/sprays
Computer, Keyboard, Mouse Headsets	Clean at least daily or when visibly soiled, and between users if equipment is shared	Clean weekly or when visibly soiled	Consider adding a wipeable cover to the device/screen. Refer to manufacturer recommendations. Detergent	Clean and disinfect as soon as you become aware	Detergent + Disinfectant on wipeable cover, or isopropyl alcohol-based wipes/sprays
Kitchen					
Kitchen appliances (toasters, kettles, sandwich presses, jaffle makers, ovens)	Clean at least daily	Clean weekly	Refer to manufacturer recommendations Isopropyl alcohol-based wipes/sprays Detergent	Clean and disinfect as soon as you become aware	Detergent + Disinfectant
Fridges	Weekly, & defrost to clean as required Clean frequently touched surfaces on fridge (i.e. handles) at least daily	Monthly & defrost as required Daily spot check- clean when necessary	Refer to manufacturer recommendations. Detergent	Clean and disinfect as soon as you become aware	Detergent + Disinfectant
Microwave	Clean Frequently touched points on microwave at least daily	Clean daily	Refer to manufacturer recommendations. Detergent	Clean and disinfect as soon as you become aware	Detergent. Disinfectant on outside surfaces only.
Sink (hand washing & kitchen)	Clean at least daily	Clean daily	Detergent	Clean and disinfect as soon as you become aware	Detergent Disinfectant on areas around sink only, not in sink
Bathroom					
Toilet	Clean at least daily	Clean weekly	Detergent + disinfectant	Clean and disinfect as soon as you become aware	Detergent + Disinfectant
Toilet doors and locks	Clean at least daily	Clean weekly	Detergent + Disinfectant	Clean and disinfect as soon as you become aware	Detergent + Disinfectant
Transport					
Door Handles	Clean at least daily	Clean weekly	Detergent	Clean and disinfect as soon as you become aware	Detergent + Disinfectant
Gear knobs	Clean at least daily or between users if shared	Clean weekly	Detergent	Clean and disinfect as soon as you become aware	Detergent + Disinfectant
Seat Belts	Clean at least daily or between users if shared	Clean weekly	Detergent	Clean and disinfect as soon as you become aware	Detergent + Disinfectant

Item	Routine cleaning			Following suspected/confirmed case	
	Highly-touched Surfaces	Minimally-touched Surfaces	Method	Highly/Minimally-touched	Method
Steering wheels	Clean at least between shifts or between users	Clean weekly	Detergent	Clean and disinfect as soon as you become aware	Detergent + Disinfectant
Switches and other controls	Clean at least daily	Clean weekly	Isopropyl alcohol- based wipes/sprays	Clean and disinfect as soon as you become aware	Isopropyl alcohol-based wipes/sprays

† Damp dust: Wet a cloth with detergent and wring out, such that the cloth remains damp, but does not drip water.

D. Frequency and methods for routine cleaning and disinfection (Table 1) of common items encountered in the health care workplace setting as well as in COVID-19 patient areas (Table 2).

Table 1: Routine cleaning (modified from Practical Manual for Implementation of the National Infection Prevention and Control Strategic Framework [12])

Area	Cleaning method	Equipment	Frequency
Floors	**1) Static head mopping:** Remove dirt and dust on the floors before commencing with wet mopping. **2) Wet mopping:** Immerse the mop in the water with detergent, wring out the mop, follow a systematic method, ensuring that all areas of the floor are covered paying particular attention to the corners. **3) Scrubbing/stripping:** Scrub floors frequently. **4) Floor sealing**: It is recommended that scrubbed floors be sealed to ensure that the floors remain clean and shiny but not slippery. Floor sealing is commonly applied to vinyl floors. **5)** Floor polishing: vinyl flooring is recommended for health establishments.	Head mop or microfiber sleeve and detergent	Daily and immediately after spills, excluding blood and bodily fluids Daily and immediately after spills, excluding blood and bodily fluids Monthly Monthly Monthly
Walls	High dusting must be performed using a clean damp duster or vacuum cleaner (for cornices). Walls must be damp-wiped or spot-cleaned as needed.	Clean damp duster Vacuum cleaner	At least weekly
Windows	At least two people stand on both sides of the glass and working simultaneously to clean it. Apply glass cleaner onto the glass surface. Using a squeegee, paper or a cloth, the cleaning chemical is applied liberally onto the surface while ensuring that all edges and corners as well as the centre are cleaned. Use the cloth or paper towel for buffing and removing all smears and wetness.	A non-ammoniated, streak free glass cleaner, squeegee, paper or a cloth	As needed
Patient and communal toilets and bathrooms	Special attention must be given to the toilet, sink, fixtures and the floor. Towel and toilet paper dispensers must be refilled. Soap dispensers must be replaced as needed. All surfaces, fixtures and fittings, including doors and door handles are also washed with detergent. Mirrors are washed with non-ammoniated, streak free glass cleaner thus ensuring that all smears are removed.	Ammonia-based detergent	Bathrooms-Daily Toilets – Schedules cleaning throughout the day

Area	Cleaning method	Equipment	Frequency
Horizontal surfaces - windowsills, chairs, over-bed tables and bedside cabinets	Wiping with damp cloth	Detergent	Daily
Sluice rooms	The flush of sluice pan is pulled to allow entry of clean water in the basin. The area within the rim and bowl of the sluice basin is sprayed with detergent and left for few minutes to activate. All debris is removed using a scourer, rinsed and wiped dry.	Detergent, scourer	Daily or as and when required
Food service areas	Kitchen surfaces should be clearly marked as food preparation areas - uncooked and cooked. All surfaces must be washed with warm, soapy water intermittently. At the end of a session, clean thoroughly and wipe over with a chlorine disinfectant of appropriate strength. Remove all items inside the refrigerators and cupboards and wipe down with a cloth and detergent at least weekly or more frequently when indicated. All the rubber seals around the door and over the outside surface should be wiped clean with a wet cloth. Dishwashers/sterilizers should be emptied and the bottom base removed and cleaned daily.	Water, detergent, chlorine strength disinfectant, cloths,	Daily
High touch surfaces	Wiping of bed railings, door knobs and handles.	Wiping cloths, detergent-disinfectants	Daily
Low touch surfaces	Between the bed frame and mattress, and other low touch surfaces	Wiping cloths, detergent-disinfectants	Daily
Waste baskets/bins	All wastebaskets/bins must be emptied and relined with new impervious plastic liners. Bins must be cleaned with detergent at least weekly and where there are seepage.	Plastic liners	At least three times a week or daily

Table 2: Frequency of cleaning of environmental surfaces according to the patient areas with suspected or confirmed COVID-19 patients (modified from Cleaning and disinfection of environmental surfaces in the context of COVID-19, WHO Interim guidance [15])

Patient area	Frequency	Additional guidance
Screening/triage area	At least twice daily	Focus on high-touch surfaces, then floors (last)
Inpatient rooms / cohort – occupied	At least twice daily, preferably three times daily, in particular for high-touch surfaces	Focus on high-touch surfaces, starting with shared/common surfaces, then move to each patient bed; use new cloth for each bed if possible; then floors (last)
Inpatient rooms – unoccupied (terminal cleaning)	Upon discharge/transfer	Low-touch surfaces, high-touch surfaces, floors (in that order); waste and linens removed, bed thoroughly cleaned and disinfected
Outpatient / ambulatory care rooms	After each patient visit (in particular for high-touch surfaces) and at least once daily terminal clean	High-touch surfaces to be disinfected after each patient visit Once daily low-touch surfaces, high-touch surfaces, floors (in that order); waste and linens removed,

Patient area	Frequency	Additional guidance
		examination bed thoroughly cleaned and disinfected
Hallways / corridors	At least twice daily (Frequency can be once a day if hallways are not frequently used)	High-touch surfaces including railings and equipment in hallways, then floors (last)
Patient bathrooms/ toilets	Private patient room toilet: at least twice daily Shared toilets: at least three times daily	High-touch surfaces, including door handles, light switches, counters, faucets, then sink bowls, then toilets and finally floor (in that order) Avoid sharing toilets between staff and patients

E. Recommendations on handling paper records during the COVID-19 Pandemic

Department of Sports, Arts and Culture (National Archives and Records Service of South Africa Act): http://www.nationalarchives.gov.za/node/2347417

- Paper documents should be handled with care to avoid the risk of contamination
- Staff must wear gloves and masks when handling documents
- After handling these documents, staff should perform hand hygiene
- It is recommended that all incoming paper documents at the risk of contamination from COVID-19 virus should be quarantined for at least 72 hours
- During this period the documents should be placed in boxes, sealed and date marked and where possible stored in a separate location
- Arrange furniture so that officials working with paper documents are situated at least 2 metres from each other
- Avoid touching your eyes, nose and mouth immediately after handling documents
- General environmental cleaning and disinfection of all storage areas should be encouraged regularly
- Liquid disinfectants are usually harmful to paper and should not be used on paper documents. If uncertain as what to do, please contact the relevant authorities at the National Archives and Records Service of South Africa
- Surfaces where paper records at risk of being contaminated with COVID-19 are managed, sorted or handled should be disinfected at least twice a day
- Ensure that pest control is done regularly to avoid pests breeding in the storage areas
- Consumption of food while handling documents is prohibited
- Electronic Document and Records Management systems for the newly created records is highly encouraged.