

WORKPLACE SOLUTIONS

From the National Institute for Occupational Safety and Health

Safe and Proper Use of Disinfectants to Reduce Viral Surface Contamination in Correctional Facilities

Summary

Workers in correctional facilities, as well as incarcerated persons who are assigned to work details, may be exposed to viral pathogens if communal, high-touch surfaces are not properly cleaned and disinfected [CDC 2020d]. The National Institute for Occupational Safety and Health (NIOSH) recommends steps to reduce viral surface contamination through safe and proper use of disinfectants.

Introduction

According to the Bureau of Labor Statistics, approximately 442,000 correctional officers and jailers work inside correctional facilities in the United States [BLS 2019]. These employees frequently use disinfectants to disinfect their workspaces, offices, gear, and equipment, in addition to supervising the use of disinfectants by incarcerated persons. The total number of people working in these facilities is much higher because correctional facilities may also employ chaplains, healthcare providers, teachers, vocational instructors, drug treatment

specialists, food service personnel, and construction and maintenance personnel.

In addition to employees, incarcerated persons also perform work assignments. For example, in federal prisons, each physically and mentally able incarcerated person is assigned to perform a work activity that contributes to the orderly operation of the institution [BOP 2008]. According to the Occupational Safety and Health Administration (OSHA), all staff and inmates who receive a wage for tasks performed are considered “workers.” They maintain institution operations and services in numerous departments such as food service, laundry, facilities, etc. Incarcerated persons are also largely responsible for conducting daily sanitation tasks in areas such as food service, medical facilities, and inmate housing units.¹

¹Institution operations and services are completed through work by incarcerated persons, and correctional employees are frequently assigned to work inside inmate housing units. The term inmate housing unit is used throughout this document to describe the designated quarters where the inmates sleep and conduct daily personal hygiene tasks. Other terminologies for housing units may include cells, cell blocks, dormitories, pods, etc. Inmate housing

Correctional employees are assigned to work in areas where incarcerated persons are tasked with the responsibility of cleaning effectively. Work injuries among incarcerated persons are reported to OSHA in the same manner as employee injuries are reported.

The Incarcerated Population

Approximately 2 million persons are incarcerated in the United States: 1.3 million are in state or federal prisons and 700,000 are in county jails [Doleac et al. 2020]. Incarcerated persons are often required to share small cells or large dormitory-style barracks and communal bathrooms. These congregate settings and conditions make effective social distancing difficult, especially in small cells. Incarcerated persons frequently have higher rates of chronic conditions compared with the general population [Healthy People 2020]. These factors, combined with the complexities of employees and incarcerated

units frequently have staff offices inside the unit, as well as, phones, computers, bathrooms, showers, and television viewing areas with game tables and chairs.



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persons working in shared spaces, heighten the importance of enhanced cleaning and disinfecting practices through the safe and proper use of chemical disinfectants.

Viral Pathogens

Potential viral pathogens within the correctional environment include but are not limited to the following:

- Common cold viruses (coronavirus, parainfluenza, respiratory syncytial virus, and rhinovirus)
- Hepatitis viruses
- Human immunodeficiency virus (HIV)
- Influenza
- Norovirus
- Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)

Hepatitis A is transmitted through fecal-oral routes. Hepatitis viruses B and C (HBV and HCV), and HIV are blood-borne pathogens and could be transmitted through shared items such as razors, needles, and syringes. If there are bodily fluids from a person infected with any type of hepatitis on a surface in a correctional facility, the area is disinfected. [CDC 2020f; NIOSH 2016].

Other viruses, like influenza, norovirus, parainfluenza, respiratory syncytial virus, and rhinoviruses, are more likely to be transmitted by contact with contaminated surfaces (compared with HBV, HCV, HIV, and coronaviruses). Certain coronaviruses have the potential to spread from contaminated surfaces, but they spread more often via respiratory droplets [CDC 2018, 2019 b,c, 2020a,c,d,f,g]. SARS-CoV-2, the virus that causes coronavirus disease 2019 (COVID-19), is not thought to be commonly spread through surface transmission [CDC 2020c, 2021a,c]. Hard, non-porous surfaces may facilitate virus transmission, especially if they are “high-touch” surfaces, as described below.

Inside the Correctional Work Environment

Correctional employees are required to share and exchange equipment with other employees such as paracentric keys, two-way radios, and handcuffs. Correctional employees also share workspaces (with other employees) inside inmate housing units or direct supervision pods, as well as desks, computers, and phones. Employees and incarcerated persons may also work in shared workspaces (e.g., cubicles).

Congregate settings can present unique challenges. Incarcerated persons’ use of communal areas contributes to the

potential for viral transmission onto surfaces such as game tables, desks, door handles, stair rails, light switches, sink fixtures, shower fixtures, toilets, phones, and computer keyboards. Some surfaces are frequently touched by both the employees and the incarcerated persons (door handles, stair rails, etc.). Surface contamination of viral pathogens can be reduced with effective cleaning and disinfecting protocols [CDC 2021b].

Health Effects of Disinfectants

Asthma and reactive airway disease can occur in persons exposed to certain airborne chemicals, including some disinfectants. Clinically important asthma can occur at exposure concentrations below occupational exposure limits regulated by OSHA or recommended by NIOSH [CDC 2016]. Dermatologic diseases are also associated with exposure to cleaning agents [Charles et al. 2009; NIOSH 2013]. In addition, because occupational diseases among cleaning personnel are associated with the use of several disinfectants (e.g., glutaraldehyde and chlorine), precautions should be used to minimize exposure (e.g., gloves and proper ventilation) [CDC 2019a; NIOSH 2020].

Controlling Exposure to Disinfectants

Neutral pH, quaternary disinfectants are very commonly used within the correctional environment. Detergent disinfectants (quaternary ammonium compounds) are generally used for housekeeping purposes.

The most effective method of reducing exposure to a disinfectant is to eliminate the hazard or substitute a less hazardous substance [Quinn et al. 2015, NIOSH 2015]. If this is not possible, engineering controls such as ventilation should be considered. An example of an administrative control would be to reassign a worker to reduce exposure to a substance. Personal protective equipment (PPE) can be used if the hazard cannot be controlled by other means (elimination, substitution, engineering, or administrative controls) and should be provided by the employer [29 CFR¹1910.132; CDC 2019a; NIOSH 2015].

Recommendations for Employers

Employers should take the following steps to ensure the safe use of disinfectants and reduce exposures to viral contaminants among employees and incarcerated persons assigned to work details.

¹Code of Federal Regulations. See CFR in References

- Purchase and provide appropriate Environmental Protection Agency (EPA)-registered disinfectants for cleaning and disinfection of environmental surfaces and equipment. Ensure the product (chemical) appears on the **EPA-registered disinfectant list** (A–O). The product registration number is used to verify the product’s effectiveness for specific viral pathogens listed on the registered disinfectant list [EPA 2020; CDC 2021a].
 - Lists E and N are for bloodborne pathogens.
 - List N is for COVID–19.
 - List G is for norovirus.
 - Detergent disinfectants (quaternary ammonium compounds) are generally used for housekeeping purposes.[‡]
- Provide and document training and instructions for correctional employees and incarcerated persons to ensure that they read labels carefully and that the correct EPA-registered disinfectant is used for each purpose (the correct product for the correct viral pathogen).
- Ensure that indoor ventilation is adequate when using disinfectants, especially in small, enclosed spaces[§] [NIOSH 2012, 2018]. Open inner doors if the security level allows, or open windows in low-security settings, if the physical plant permits such options.
- Maintain consistent, scheduled housekeeping practices to include the frequent cleaning and disinfection of surfaces and work equipment [CDC 2003, 2021a,b].
- Provide appropriate PPE as recommended by the product’s safety data sheet (SDS) at no cost to the worker [29 CFR 1910.132]. Ensure that correctional employees and incarcerated persons are aware of possible latex allergies [NIOSH 1997].
- Train employees in the use, care, and disposal of PPE.
- Ensure that the SDSs are readily available in the general area where the product is used and stored in accordance with the Hazard Communication Standard [29 CFR 1910.1200].

- Provide access to soap and water stations for hand-washing for employees and incarcerated persons.
- Provide appropriate levels of supervision to ensure chemicals aren’t ingested or used in a manner intended to cause harm to employees or other incarcerated persons.
- Provide facility-specific cleaning instructions where needed for facility furnishings (game tables, bathroom fixtures, beds, mattresses, etc.).

Recommendations for Correctional Workers and Incarcerated Persons

Workers within correctional facilities, as well as incarcerated persons who are assigned to work details, should take the following steps during cleaning and disinfection processes to protect themselves from exposure to disinfectants and prevent or reduce surface viral contamination within the correctional setting:

Use Safe Work Practices

- Ensure that indoor ventilation is adequate when using disinfectants, especially in small, enclosed spaces [NIOSH 2012, 2018]. Open inner doors if the security level allows, or open windows in low-security settings, if the physical plant provides such options.
- Maintain consistent, scheduled housekeeping practices to include the frequent cleaning and disinfection of surfaces and work equipment [CDC 2003, 2021a,b].
- If surfaces are visibly dirty, use cleaning products or soap and water before disinfecting.
- Wear appropriate PPE, as recommended by the product’s SDS when applying disinfectants to surfaces. Ensure that workers are aware when latex gloves are being used, so those with a latex allergy can avoid contact. For more information about latex gloves and allergies, see [NIOSH 1997].
- Clean and disinfect the duty belt and gear (before re-use) using a disinfectant spray or wipe, according to the product label.
- Wash hands with soap and water after using cleaning products or after touching surfaces that may be contaminated.

[‡]Products may appear on multiple lists and may be cross referenced

[§]For more information about ventilation, see <https://www.cdc.gov/niosh/topics/indoorenv/buildingventilation.html> and <https://www.cdc.gov/coronavirus/2019-ncov/community/ventilation.html>

Choose the Correct Product

- Select an appropriate EPA-registered disinfectant for cleaning and disinfection of environmental surfaces and equipment. Check the equipment manufacturer's instructions for cleaning to ensure the product will not damage the equipment. For example, some chemicals may corrode two-way radios, paracentric keys, etc.
- Ensure the product (chemical) appears on the **EPA-registered disinfectant list** (A–O).
- Use EPA-registered disinfectants to disinfect high-touch surfaces [EPA 2020]. Surfaces include tables, chairs, desks, door handles, stair rails, light switches, sink fixtures, showers and fixtures, toilets, phones, and keyboards. Disinfect surfaces at the frequency determined by the facility's infection-control personnel.
- Note that not all disinfectants are effective against every organism or virus found in correctional facilities. Workers (including employees who obtain or dispense disinfectants, medical personnel, or infection prevention and control personnel) should ensure that the correct EPA-registered disinfectant is being used for the intended purpose or a specific viral pathogen.

Follow Product Instructions

- Review the specific product's SDS in its entirety. SDSs contain 16 sections of information about a specific chemical/product, including instructions for use, hazards, and spill-handling procedures [29 CFR 1910.1200; NIOSH 2012].
 - In correctional facilities, SDSs may be stored electronically or in common areas in a yellow binder [affixed on the wall, in a wire basket], or they can be requested from correctional management.
- Review the product label instructions, paying careful attention to the sections that detail the specific uses, surface types, contact/wet time, and shelf life (if applicable). In most instances, a product is designed for a specific purpose and for use in a specific manner [CDC 2019a; NIOSH 2020]. Also review the precautionary statements associated with product use.



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- Follow the manufacturer's instructions for all disinfection products/chemicals:
 - **Concentration/dilution ratio:** Some disinfectants are shipped in concentrated form and must be diluted and/or activated with water (per the Chemical Formulary) before use in a correctional facility. Likewise, these disinfectants may have a shorter shelf life once the disinfectant is activated/diluted with water.
 - **Application method:** Products may contain specific directions for general cleaning. For example, the "directions for use" may list what to use to apply the product (mop, sponge, trigger sprayer, etc.). Products may also have a separate set of directions for disinfecting the surfaces and what to use to apply the product (brush, cloth, etc.).
 - **Contact time:** Some disinfectants may have a longer contact/wet time.
 - **Personal protective equipment (PPE):** Use recommended PPE and follow training guidelines for maintenance and disposal of PPE.
 - **Mixing:** NEVER mix disinfectants with cleaners, other disinfectants, or other chemicals. Mixing some chemical disinfectants with other chemical substances could be hazardous. For example, the toxic gas chlorine can be released if you mix sodium hypochlorite (bleaching solutions) and acidic cleaning agents [NIOSH 2020]. In addition, mixing a disinfectant with anything else could change its properties and it may no longer be effective [NIOSH 2020].

- Follow all facility-specific cleaning instructions for facility furnishings (game tables, bathroom fixtures, beds, mattresses, etc.).

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For More Information about Safe Cleaning Practices, Visit

[Cleaning and Custodial Services | NIOSH | CDC](#)

For More Information about COVID-19 Cleaning and Disinfecting, Visit

[COVID-19 Guidance: Businesses and Employers | CDC](#)

<https://www.cdc.gov/coronavirus/2019-ncov/community/disinfecting-building-facility.html>

EPA Resources

[Six Steps for Safe & Effective Disinfectant Use \(epa.gov\)](#)

[OSHA-NIOSH Infosheet: DHHS \(NIOSH\) 2012126; OSHA 351202 \(cdc.gov\)](#)

For More Information about Bloodborne Infectious Diseases, Visit

[CDC - Bloodborne Infectious Diseases - HIV/AIDS, Hepatitis B Virus, and Hepatitis C Virus - NIOSH Workplace Safety and Health Topic](#)

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