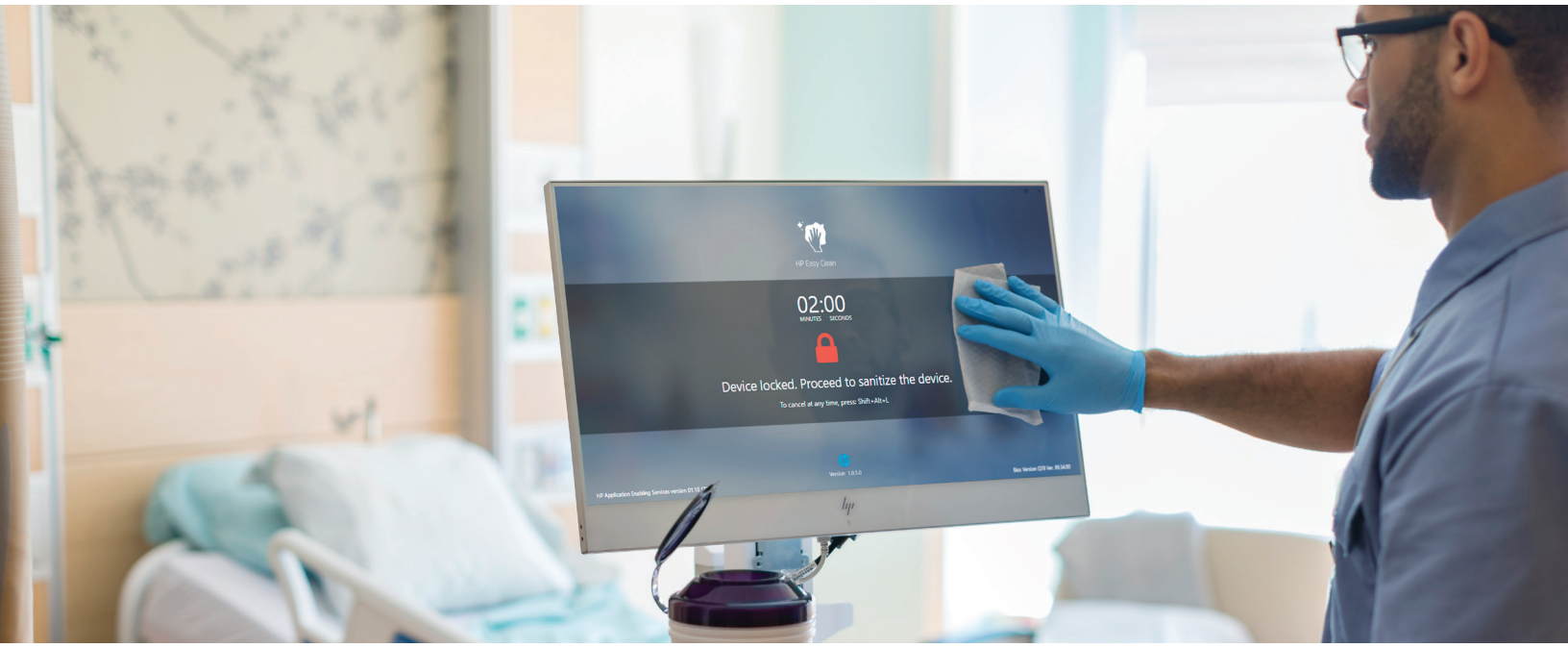
White paper

Infection prevention and control recommendations

Cleaning and disinfecting computers, displays, multi-function printers (MFPs), and accessories used in healthcare settings



This set of recommendations for computers, displays, multi-function printers (MFPs), and accessories in healthcare facilities was developed by a team of board-certified infection preventionists working on behalf of APIC Consulting Services Inc., a wholly-owned subsidiary of the Association for Professionals in Infection Control and Epidemiology (APIC), for HP.

IT and IoT devices may be sources of pathogen transmission

Rationale

Computers, displays, MFPs, and accessories (e.g., keyboards and mice) are valuable clinical and instructional tools for healthcare clinicians to view and transmit patient data, access and print healthcare literature, provide patient and family education, and facilitate learning. These devices fall into the classification of non-critical medical equipment, requiring low-level disinfection as recommended by the Centers for Disease Control and Prevention (CDC) Guideline for Disinfection and Sterilization in Healthcare Facilities (2008).[1]

As these electronic devices are used at the point of care (e.g., emergency department, operating room, intensive care, hemodialysis, and long-term care) or in common areas where patient care is delivered, contamination of pathogenic bacteria and epidemic viruses from the hands of healthcare providers or the environment has been demonstrated in numerous studies.[2,3,4,5] Ensuring the cleaning and disinfecting of these devices is an important component of environmental hygiene and eliminates a potential source of pathogen transmission.



Cleaning and disinfection protocol

Responsibility

The responsibility for routine cleaning and disinfection of the devices and accessories shall be dictated by the facility and clearly communicated along with appropriate training as defined in this document. Collaboration between Infection Prevention and Control, nursing, environmental services (EVS), and Information Technology (IT) is critical for defining this responsibility and ensuring that training occurs.

If the electronic devices become visibly soiled or contaminated with blood or other bodily fluids, it is the responsibility of the user of the device(s) to perform immediate cleaning and disinfection using the recommended protocols below.

General recommendations

- **Users of the computers, displays, MFPs, and related accessories should not touch the equipment with contaminated hands. Hand hygiene should be performed before accessing the device and/or accessories (e.g., keyboard, mouse).**
- Users must ensure that they are using germicidal wipes that have been approved for use with the devices. Device manufacturers typically provide the details in their user guides. The facility Information Technology (IT) and Infection Prevention and Control staff should also be familiar with the germicidal wipe brands (or formulations) that have been approved for use with computers, displays, MFPs, and related accessories in use.
- Presaturated germicidal wipes are preferred for cleaning and disinfection rather than spray disinfectants applied to a cloth, to avoid the dripping of solution into the ventilation or other points of ingress, which can damage the equipment.
- Fibrous materials (e.g., paper towels) should not be used for cleaning and disinfection of the equipment to avoid scratching the display or control panel.
- The use of keyboard covers does not replace the need for cleaning and disinfection of the accessory.
- Routine cleaning and disinfection of the computers and displays should start with the top of the display monitor, proceed to accessories (e.g., keyboard, mouse), and finish with the cables. Routine cleaning and disinfection of the MFPs should start with the top of the control panel and finish with the keyboard. Ensure that the germicidal wipes remain wet during application.
- Turn off the equipment to prevent electrical shock or damage to the components.

Cleaning

If visible soiling of the devices occurs, cleaning is required prior to disinfection.

- Perform hand hygiene.
- Don clean (non-sterile) gloves.
- Remove soil from the device or accessory with a manufacturer-approved cleaning or cleaning and disinfecting germicidal wipe (commonly used formulations listed in **Table 1: HP Healthcare Edition compatibility-tested formulations for cleaning and disinfecting), or a water-dampened cloth. Microfiber cloths, chamois (static-free cloth without oil), or static-free cloth wipes are preferred.**[6]
- Allow to air dry.

Disinfection

Refer to the germicidal wipe manufacturer's recommended instructions for use (IFU) for the product(s) used at the facility to ensure appropriate application and contact time of the product.

- Perform hand hygiene.
- Don clean (non-sterile) gloves.
- Disinfect all exposed surfaces of the computer and display including the accessories. Disinfect the surface of the control panel and keyboard of the MFP.
  - Ensure that the germicidal wipe remains wet during the application process. Replace, if necessary.
  - Ensure that the surfaces remain treated with the disinfectant for the contact time specified by the germicidal wipe manufacturer.
- Allow to air dry.
- Remove gloves.
- Perform hand hygiene.
- If contamination with *Clostridioides difficile* or norovirus is suspected, a sporicidal agent (e.g., hypochlorite or bleach) is required.

Frequency

- Routine cleaning and disinfection of the devices and accessories should, at a minimum, be performed daily. Increased frequency of cleaning and disinfection to once per shift is recommended for clinical areas where patient acuity is high (e.g., ICUs, bone marrow transplant), patient volume is high, or the devices will be handled by multiple healthcare providers.
- Computers, displays, MFPs, and related accessories that are present in patient rooms, shared clinical areas or procedural rooms should be cleaned and disinfected with the same frequency that occurs for the room environmental surfaces (e.g., daily for patient rooms, after each patient use for procedural rooms).
- If the devices are part of a mobile workstation, cleaning and disinfection should be performed between each patient use.
- Facility policies (e.g., nursing, information technology, EVS) should be referenced, as needed, for additional cleaning and disinfection guidance, (e.g., cleaning and disinfection responsibility matrix).



Table 1: Cleaning and disinfecting products

Select HP Healthcare Edition compatibility-tested formulations for cleaning and disinfecting

Type of agents	Select HP Healthcare Edition compatibility-tested products	Manufacturer contact time for Select HP Healthcare Edition compatibility-tested products	Comments
Cleaning agents*			
	Ethyl alcohol: 0.10–1.00% and cellulose Isopropanol: 60–70% and water	Not applicable	Required only if electronic device is visibly soiled. These products should not be used for disinfection.
Cleaning and disinfection agents: one-step products*			
Alcohol-free quaternary ammonium compounds (QAC)	Benzyl-C12-18-Alkyldimethyl ammonium chlorides: < 0.1%, Quaternary ammonium compounds, C12-14-alkyl[(ethylphenyl) methyl]di methyl, chlorides: < 0.1%	10 minutes**	
	Quaternary ammonium compounds, C12-18-alkyl [(ethylphenyl) methyl] dimethyl, chlorides: < 0.5%, Benzyl-C12-18-alkyldimethyl ammonium chlorides: < 0.5%	3 minutes**	
QAC/alcohol	Isopropanol: 10–20%, 2-Butoxyethanol: < 5%, Quaternary ammonium compounds, C12-18-alkyl [(ethylphenyl) methyl] dimethyl, chlorides: < 0.5% Benzyl-C12-18-alkyldimethyl ammonium chlorides: < 0.5%	3 minutes**	

	Isopropyl alcohol: 55.0%, Alkyl dimethyl benzyl ammonium chlorides: 0.250%, Alkyl (68% C12, 32% C14) dimethyl ethylbenzyl ammonium chloride: 0.250%	2 minutes**	
	Isopropanol: 10–20%, Ethylene Glycol Monobutyl Ether (2-Butoxyethanol): 1–5%, Diisobutylphenoxyethoxyethyl dimethyl benzyl ammonium chloride: 0.1–0.5%	2 minutes**	
Hypochlorite (bleach)	Sodium hypochlorite 0.1%–1.0%	3 minutes**	Required for use if devices are suspected or known to be contaminated with *C. difficile* or norovirus.
Improved hydrogen peroxide	Hydrogen peroxide: <1%	1 minute**	

* Neither APIC nor APIC Consulting Services endorse any commercial product or service.

** Contact times listed correlate to the one-step germicidal wipe products that are HP-compatibility tested. Refer to the HP equipment specifications for germicidal wipe product names. Refer to other manufacturer Instructions for Use (IFU) and product labels to determine the recommended contact time for products used at your facility.

Note: Use of wipes soaked in peracetic acid or hydrogen peroxide may be an alternative to quaternary ammonium compounds (QAC) and bleach for low-level surface disinfection, but studies supporting their effectiveness have only recently emerged. Augmentation of manual surface cleaning and disinfection with automated disinfection technologies (e.g., UV light and hydrogen peroxide vapor machines) is being adopted for use in operating rooms and patient rooms where electronic devices may be present.[7, 9]

Definition of terms[7,8]

Contact time: A specific length of time a chemical disinfectant must remain in contact with a microorganism to achieve complete inactivation. Contact times for each microorganism are clearly listed on the label of U.S. Environmental Protection Agency (EPA)—registered liquid disinfectants. The treatment time for a wipe and spray disinfectant consists of the wet time plus wiping as well as the undisturbed "dry" time.[8]

Hydrogen peroxide: Improved hydrogen peroxide is a disinfectant. Manufacturers will add cleaning agents to improve cleaning efficiency. These agents are bactericidal, virucidal, fungicidal, and tuberculocidal.

Hypochlorite (bleach): These agents are bactericidal, fungicidal, virucidal, mycobactericidal, and sporicidal. Used to disinfect blood spills.

Quaternary ammonium compound products (QAC): These agents are bactericidal, virucidal against enveloped viruses (e.g., HIV), and fungicidal. They are not sporicidal and generally not mycobactericidal or virucidal against nonenveloped viruses (e.g., norovirus). Healthcare facilities commonly use EPA-approved QAC products for routine cleaning and disinfection of the environment and non-critical medical equipment.

Contact information

For more information, visit **hp.com/go/healthcareprint**

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