DISINFECTION DIGEST
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PIDAC Best Practices for Environmental Cleaning for Prevention and Control of Infections (2nd Edition, May 2012)

The original document was published in 2009 and a technical bulletin was constructed to highlight the key recommendations pertaining to cleaning and disinfection. The following document has been modified to reflect only the changes or additions made in 2nd edition as per the May 2012 revision. To access the entire document refer to www.virox.com.

Abstract

This document was developed by the Provincial Infectious Diseases Advisory Committee (PIDAC). PIDAC is a multidisciplinary scientific advisory body who provide to the Chief Medical Officer of Health in Ontario evidence-based advice regarding multiple aspects of infectious disease identification, prevention and control. PIDAC's work is guided by the best available evidence and updated as required. Best Practice documents and tools produced by PIDAC reflect consensus positions on what the committee deems prudent practice and are made available as a resource to the public health and health care providers.

Background

These best practices address the cleaning of the physical environment in health care as it relates to the prevention and control of infections and only includes the cleaning of medical equipment that comes into contact with intact skin (i.e., non-critical equipment). It does not include recommendations pertaining to the disinfection and sterilization of invasive medical equipment.

Designed for administrators, supervisors of Environmental Services departments, infection prevention and control professionals, supervisors of construction/maintenance projects and public health investigators, this document is targeted to those who have a role in the management of cleaning/housekeeping services for the health care setting and it therefore provides infection prevention and control practices for:

a) understanding the principles of cleaning and disinfecting environmental surfaces;
b) infection transmission risk assessment to guide level of cleaning;
c) cleaning practices for different types of care areas, including specialized cleaning for antibiotic-resistant microorganisms;
d) frequency of cleaning;
e) cleaning strategies for spills of blood and body substances;
f) cleaning practices for non-critical equipment and furnishings;
g) handling of laundry and bedding;
h) management of contaminated waste; and
i) cleaning practices during and following completion of construction projects

Summary of Key General Recommendations with Respect to Cleaning and Disinfection

1. Surfaces, furnishings, equipment and finishes including items that are donated in health care settings should be cleanable with hospital grade cleaners and disinfectants.
2. Antimicrobial treated surfaces are NOT recommended. Little data exists to show how these antimicrobial coatings will endure after exposure to hospital grade cleaners and disinfectants or whether they will prevent disease. According to various studies, only copper had demonstrated to significantly reduce bacterial load in the field but has not been shown to be effective on *C. difficile* spores. Copper containing materials in hospital environments may be used to aid in the prevention of HAI's but requires more assessment and should not replace routine cleaning and disinfection in health care settings (pg. 72).
3. Pre-Saturated disinfectant wipes should not be used for routine cleaning and disinfection (i.e., daily patient room cleaning). It is ideal to use a cloth when disinfecting equipment, allowing for adequate contact times. Use disposable wipes for items that cannot be soaked and for point of care disinfection but not for routine cleaning and disinfection because it can be difficult to achieve contact times (pg.33). However, recent research has proven that microbial decontamination of environmental surfaces using pre-saturated disinfectant wipes are effective to decontaminate surfaces and thus are appropriate to use during routine cleaning[i]. When using disinfectant wipes:
    a. Check the active ingredient to make sure it is hospital grade;
    b. Keep wipes wet, toss when dry
    c. Wipes must have an MSDS and it should be consulted for appropriate use of PPE etc.
    d. Use multiple wipes on large surfaces.

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4. EVS, IPAC and OHS must be consulted before making any changes to cleaning and disinfection procedures and technologies in the health care setting.
5. Cleaning schedules should be developed, with frequency of cleaning reflecting the factors that will impact overall risk (Risk Stratification Matrix, pg. 134-135):
    a. Probability of contamination (high, medium or low contamination level)
    b. Vulnerability of population to Infection (more or less susceptible)
    c. Potential for exposure (high touch or low touch surfaces)
6. Fogging/Air Disinfection using Hydrogen Peroxide, Ozone or Super-oxide water systems should only be used to supplement not replace standard cleaning and disinfection practices; further study on the various technologies needs to conducted before it can be considered (pg.67).
7. Ultraviolet Irradiation (UVI) of surfaces should not be used alone for disinfection, but may be a good addition to chemical disinfection to lower the bioburden of microorganisms in isolation units and during outbreaks (pg. 69).
8. Recent advancements in Steam Vapour technologies have shown promise with respect to use in surface disinfection; however, use within Health care settings has not been well studied and requires further research in clinical settings.
9. ATP Bioluminescence testing can be used to provide feedback as to the CLEANLINESS of a surface and demonstrate deficiencies in cleaning protocols, but does not indicate a true infection risk for patients. ATP can be confounded by the presence of bleach; microfiber products and manufactured plastics used in cleaning and require a systematic program that includes data collection and auditing when introducing such a program. Further research is needed before standardized ATP bioluminescence breakpoint can be established for defining surfaces as being adequately cleaned (pg. 78).
10. ES workers have potential exposures to chemicals, typically through inhalation or dermal exposure. Respiratory symptoms increase proportionately to increased exposure time and higher concentrations of certain chemicals such as bleach or ammonia. Tasks such as toilet bowl cleaning, shower cleaning and tile cleaning can expose individuals to concentrations of these chemicals that are in excess of recommended occupational exposure limits.

Summary of Key Recommendations with Respect to Cleaning and Disinfection of Unique or Specialized Areas and Those Under Additional Precautions:

1. Routine cleaning and disinfection may not be adequate to remove VRE from contaminated surfaces. There has been reported success in ending an outbreak of **VRE** using intensive environmental disinfection with **twice-daily cleaning**. To prevent cross-contamination fresh supplies should be used for and room and cloths should not be re-used.
2. Transport equipment or surfaces that have made direct or indirect contact with a patient/client/resident colonized with VRE should be cleaned and disinfected immediately after the individual leaves, following VRE cleaning and disinfection protocols (pg. 109).
3. In designated playrooms or play areas, toys should be cleaned on a weekly basis or when visibly soiled and clearly identified as clean. Measures should be taken to prevent the contamination of clean toys (e.g. dust, water splatter). There should be a bin or storage area where parents or children can place used toys after use. Toys or other items (books, magazines) that are for children on additional precautions should be thrown out or sent home if the items cannot be cleaned and disinfected. Toys should be removed from general waiting rooms if daily inspection and cleaning cannot be done. The procedure for cleaning toys must include: (pg. 97)
    a. Inspection for damage or broken parts
    b. Cleaning according to manufacturer's instructions or local practices (e.g. in hot soapy water)

    Options for disinfection:
    a. A commercial dishwasher/cart washer cycle (must reach 82^{o}C)
    b. Hospital grade, approved low-level disinfectant (follow manufacturer's instructions pertaining to contact times and dilutions)
    c. 70% alcohol solution for 10 minutes
    d. 1/100 dilution of bleach
    e. Rinse thoroughly after disinfection and air dry before storing

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4. For adult activity rooms, hand hygiene should be encouraged and items should be cleaned and inspected on a regular basis. For items that cannot easily be cleaned should be assessed regularly and thrown out if soiled (pg. 98).
5. Specialized cleaning and disinfection practices are required for *C. difficile*:
    a. **Twice daily** cleaning and disinfection of patient/resident room with a hospital grade disinfectant should be conducted at a minimum
    b. **Twice daily** disinfection of patient/resident bathroom with a sporicidal agent (most highly contaminated area = the highest degree of care)
    c. For more significant removal of *C. difficile*, a **sporicidal agent for disinfection should be used** after the room has been cleaned for each CDI patient discharged or transferred to another room and prior to discontinuation of Contact Precautions (omit second step if cleaning product is also a sporicidal disinfectant – pg. 112)
    d. When multiple cases of CDI occur on a unit/ward consider disinfecting their bed/bed space with a sporicidal agent upon discharge or transfer as well as disinfect all high-touch surfaces and shared patient care equipment
6. Clarification of the appropriate concentration and contact times for the use of bleach as a sporicidal agent has been included (pg. 111):
    a. 1000ppm requires 30 minutes
    b. 5000ppm requires 10 minutes
7. Products used for disinfection of Norovirus must have an appropriate virucidal claim. Most QUATs do not have significant activity against noroviruses (pg. 114). Validated efficacy against Norovirus test surrogates (Feline Calicivirus or Murine Norovirus) or Health Canada's General Virucide claim is an indication of effectiveness. Be wary of the contact time required.

Conclusions

The 2nd edition of the PIDAC Best Practices guideline includes some additional research on alternatives to standard cleaning and disinfection practices based on new, existing and emerging technologies with reference to the use of UV, Fogging/ Air Disinfection, steam vapour, ATP bioluminescence, and antimicrobial surfaces. The main message regarding these alternatives is that they may be used to aid in the prevention of HAI's but until further research has been conducted that they should not replace standard cleaning and disinfection practices.

With respect to organism specific recommendations, for VRE it suggests fresh cleaning supplies be used after each cleaning to prevent cross-contamination and transport or other equipment that has made direct or indirect contact with an infected client should be disinfected according to VRE protocols. For CDI the guideline recommends using a sporicidal agent upon discharge/transfer , on high touch surfaces and shared equipment. Additional information regarding bleach, appropriate dilution and contact times for use as a sporicidal agent is on pg. 111. When cleaning/disinfecting against norovirus, only products with an appropriate virucidal claim must be used.

Of particular interest is the discussion as to the appropriate use of disinfectant wipes. While there were no significant changes in the document pertaining to the use of disinfectants for environmental surface cleaning and disinfection, the document has made strong recommendations about the inappropriateness of using disinfectant wipes (pre-moistened wipes) for cleaning and disinfection of large surface areas. In accordance to the document, the use of disinfectant wipes for routine cleaning and disinfection is discouraged and only recommended to be used for point of care disinfection of smaller surfaces such as patient care equipment (i.e. Blood Pressure Cuffs, call bells, light switches, faucets, IV poles, bed rails, etc).

The danger, however in making such a statement is that at this time there is no strong scientific evidence to conclusively limit the use of pre-moistened wipes. Instead, the focus should have been the appropriate use of pre-moistened disinfecting wipes to ensure that they are used in such a fashion as to ensure contact time in accordance to the label is met. Many of the leading pre-moistened wipes available on the market are Quat-alcohol based products with 3 to 5 minute contact times and will not remain on the surface for the contact time listed on the label as a result of the rapid evaporation rate of alcohol. A study published by Omidbakhsh in 2010 in the

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Journal of AOAC International investigated the discrepancy between drying time and contact time with respect to product efficacy. Additionally, there have been publications investigating the effects of wipes in contaminating surfaces. Such publications have shown that it is true that using a weak or slow-acting disinfectant in the wipe can actually spread localized contamination over a wider area during wiping which could potentially increase the risk of pathogen transmission.

That said, proper disinfection with such wipes can be achieved with the physical action of wiping provided the disinfectant itself has a good and rapid broad-spectrum microbicidal activity. Therefore, there has to be a change in our thinking with regards to contact time for wipes as opposed to longer contact times needed when just spraying or pouring a liquid on surfaces. Perhaps the conclusion should be that in choosing a pre-moistened disinfectant wipe, one must consider more than just the cost per wipe. There needs to be a more fulsome investigation as to the size of wipe and number of wipes needed to achieve the contact time as listed on the label as well as a review of how the wipes will be utilized to ensure that good physical friction will be applied to help in removal of the pathogens from the surface as well as frequent changing of such wipes to ensure redistribution the removed pathogens is avoided.

Some leading disinfectant wipes carry a one (1) to three (3) minute contact time that can remain wet on the surface long enough to achieve label claims. To address the use of disposable wipes for use by EVS, many disinfectant manufacturers sell larger wipe formats (12x12) to ensure adequate wetness and coverage of larger surfaces.

Implications for AHP®

This document not only legitimizes the use of AHP but it includes a concise summary of best practices that covers cleaning and disinfection of environmental issues. Many of these sections fall directly into the advantages of choosing AHP® over other competitive chemistries.

AHP® Disinfectants are One-Step Disinfectant Cleaners

•AHP® has proven cleaning efficiency resulting in lower costs and faster results adding confidence that disinfection can occur

AHP® Disinfectants provide the perfect balance between safety and efficacy

•AHP® is designed to be easier on employees and occupants resulting in protocol compliance

•AHP® provides a HMIS rating of "0", meaning it has been proven to be non-toxic, non-irritating to eyes and skin and non-skin sensitizing and does not require the use of personal protective equipment to handle

AHP® Disinfectants are environmentally sustainable

•AHP's® active ingredient, hydrogen peroxide, breaks down into water and oxygen leaving no active residues

•AHP® is formulated to ensure that it will not negatively impact indoor air quality and has been approved as an asthma-safe product

AHP® Disinfectants have realistic contact times

•Short contact times ensure surfaces remain wet for the required contact time, providing comfort and confidence that disinfection has occurred

•AHP® has been proven through peer reviewed studies to reduce HAIs

AHP® Disinfectants are compatible

•AHP® formulations are tested to ensure compatibility that preserve your investments in equipment, furniture, and building surfaces

[i] Sattar et al. Journal of Hospital Infection. 2015