

ENVIRONMENTAL CLEANING, DISINFECTION, AND MONITORING

DEVELOPING AN ENVIRONMENTAL SERVICES PROGRAM





WEBINAR OBJECTIVES

- DESCRIBE HOW THE ENVIRONMENT CAN IMPACT RESIDENT SAFETY
- RECOGNIZE ENVIRONMENTAL CLEANING AND DISINFECTION PROGRAMS HAVE MULTIPLE COMPONENTS
- DESCRIBE VARIOUS ENVIRONMENTAL MONITORING METHODS
- DEVELOP OR EXPAND THE FACILITY ENVIRONMENTAL SERVICE'S PROGRAM BY INCORPORATING INFORMATION LEARNED TODAY

ENVIRONMENTAL CONTAMINATION

- Environmental surfaces are frequently contaminated by microorganisms.
- Contamination plays a role in the transmission of healthcare-associated infections (HAIs) in healthcare settings.

Weber DJ, Rutala WA. Understanding and preventing transmission of healthcare-associated pathogens due to the contaminated hospital environment. *Infect Control Hosp Epidemiol* 2013;34:449–452.



Environmental Contaminants

The number and types of microorganisms present on environmental surfaces are influenced by the following factors:

- a. number of people in the environment,
- b. amount of activity,
- c. amount of moisture,
- d. presence of material capable of supporting microbial growth,
- e. rate at which organisms suspended in the air are removed, and
- f. type of surface and orientation [i.e., horizontal or vertical.



ENVIRONMENTAL TRANSMISSION

Environmental contamination has been significantly associated with transmission of pathogens...the ***immediate patient care environment—particularly, environmental surfaces within the resident or patient zone that are frequently touched by or in direct physical contact with the patient*** such as bed rails, bedside tables and chairs.



most TOUCHED most CONTAMINATED

While many of the most-touched parts of a patient's room receive extra cleaning attention, many remain highly contaminated. The deadly combination of high-touch and high-contamination is believed to lead

to cross-contamination, which can in turn lead to infections. On this chart, you can see where these two categories overlap: **The most contaminated and the most touched.**

Parts of a typical hospital room that are

Most touched¹

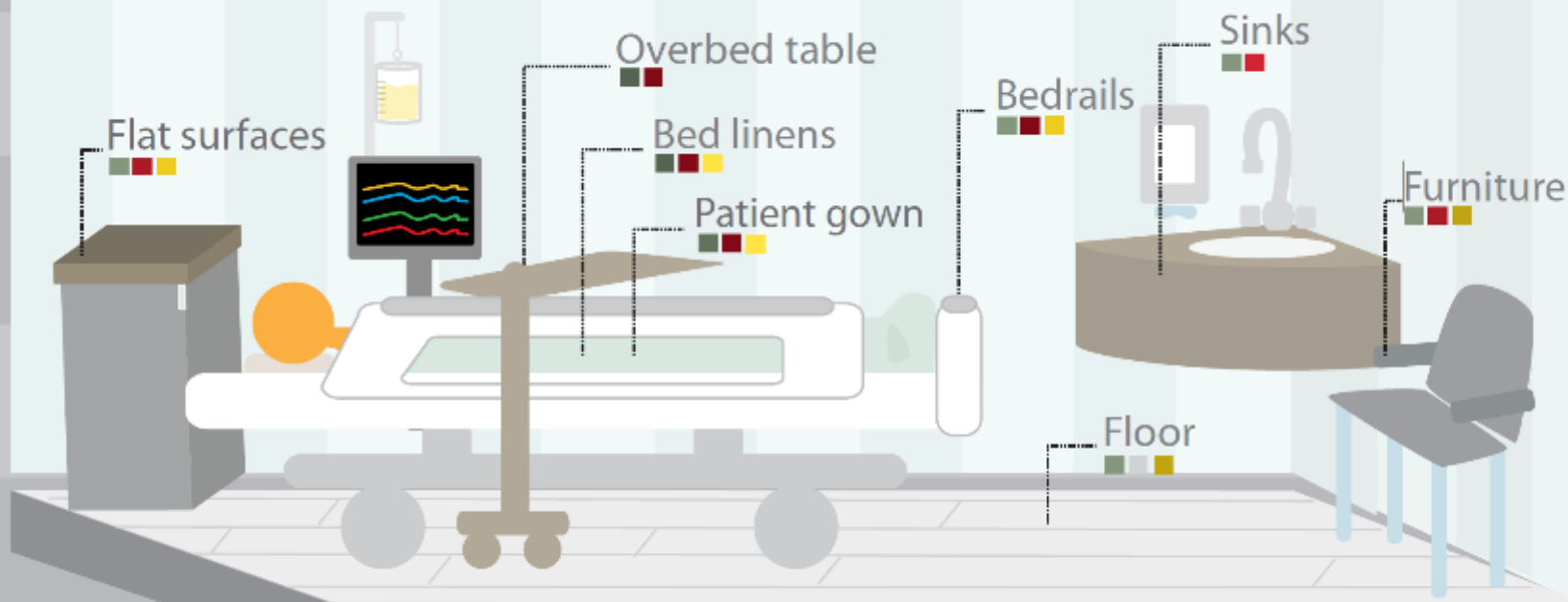
Frequency of touch

Most MRSA-contaminated²

Degree of contamination

Most C. diff-contaminated^{3,4}

Degree of contamination



¹ Huslage K, Rutala W A, et al. *JCHE* 2010;31(8):850-853

² Dancer SJ et al. *Lancet ID* 2008;8(2):101-13

³ Samore MH, Venkataraman L, et al. *Am J Med* 1996;100(1):32-40

⁴ Faires CM, Pearl DL, et al. *BMC Infect Dis* 2013;13:342



PATHOGEN SURVIVAL

Table 1. Summary of survival time *versus* prior room occupancy risk for healthcare-associated infections.

Organism	Survival time*	Prior room occupancy risk increase [§]
MRSA	7 days to >12 months	1.5
VRE	5 days to >46 months	2.25
<i>Pseudomonas aeruginosa</i>	6 h to 16 months	1.75
<i>Clostridium difficile</i>	>5 months (spores)	2.5
<i>Acinetobacter baumannii</i>	3 days to 11 months	3.5
CRE	19 days	
<i>Norovirus (feline calicivirus)</i>	8 h to 7 days	Limited data
<i>Rotavirus</i>	6–60 days	Limited data

Adapted from Kramer *et al.* [2006], Otter *et al.* [2013], and Havill *et al.* [2014].

*Survival times of multidrug-resistant organisms (MDROs) on dry inanimate objects. Range depends on experimental design and methods of assessing contamination.

[§]Ratio of increased risk associated with the room being previously occupied by patients infected with common MDROs.

Ther Adv Infect Dis. 2014 Jun;2(3-4):79-90. doi: 10.1177/2049936114543287.

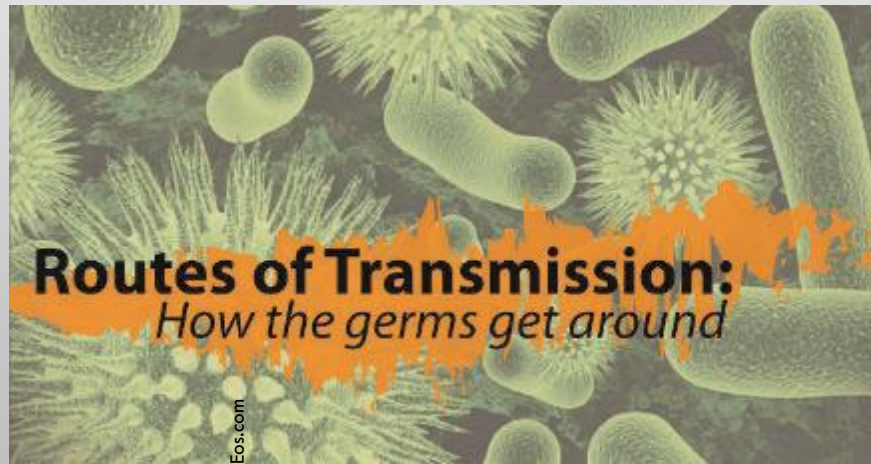
The role of the healthcare environment in the spread of multidrug-resistant organisms: update on current best practices for containment.

Chemaly RF1, Simmons S2, Dale C Jr2, Ghantaji SS3, Rodriguez M2, Gubb J2, Stachowiak J2, Stibich M2.

Transfer of Environmental Contaminants

The transfer of microorganisms from environmental surfaces to patients is largely via hand contact with the surface.

Cleaning and disinfection of environmental surfaces is fundamental in preventing healthcare-associated infections.





ENVIRONMENTAL SERVICES PROGRAM

ENVIRONMENTAL
CLEANING &
DISINFECTION

~~SHOULD~~ **CAN** NOT
BE A STAND-ALONE
INTERVENTION

ENVIRONMENTAL CLEANING AND INFECTION PREVENTION & CONTROL (IPC)

- Environmental cleaning is part of Standard Precautions, which should be applied to all patients in all healthcare facilities.
- Must be implemented within the framework of the facility Infection Prevention & Control Program





Best Practices for
**Environmental Cleaning
in Healthcare Facilities:**
in Resource-Limited Settings

VERSION 2



Centers for Disease
Control and Prevention
National Center for Emerging and
Zoonotic Infectious Diseases
Division of Healthcare Quality Promotion

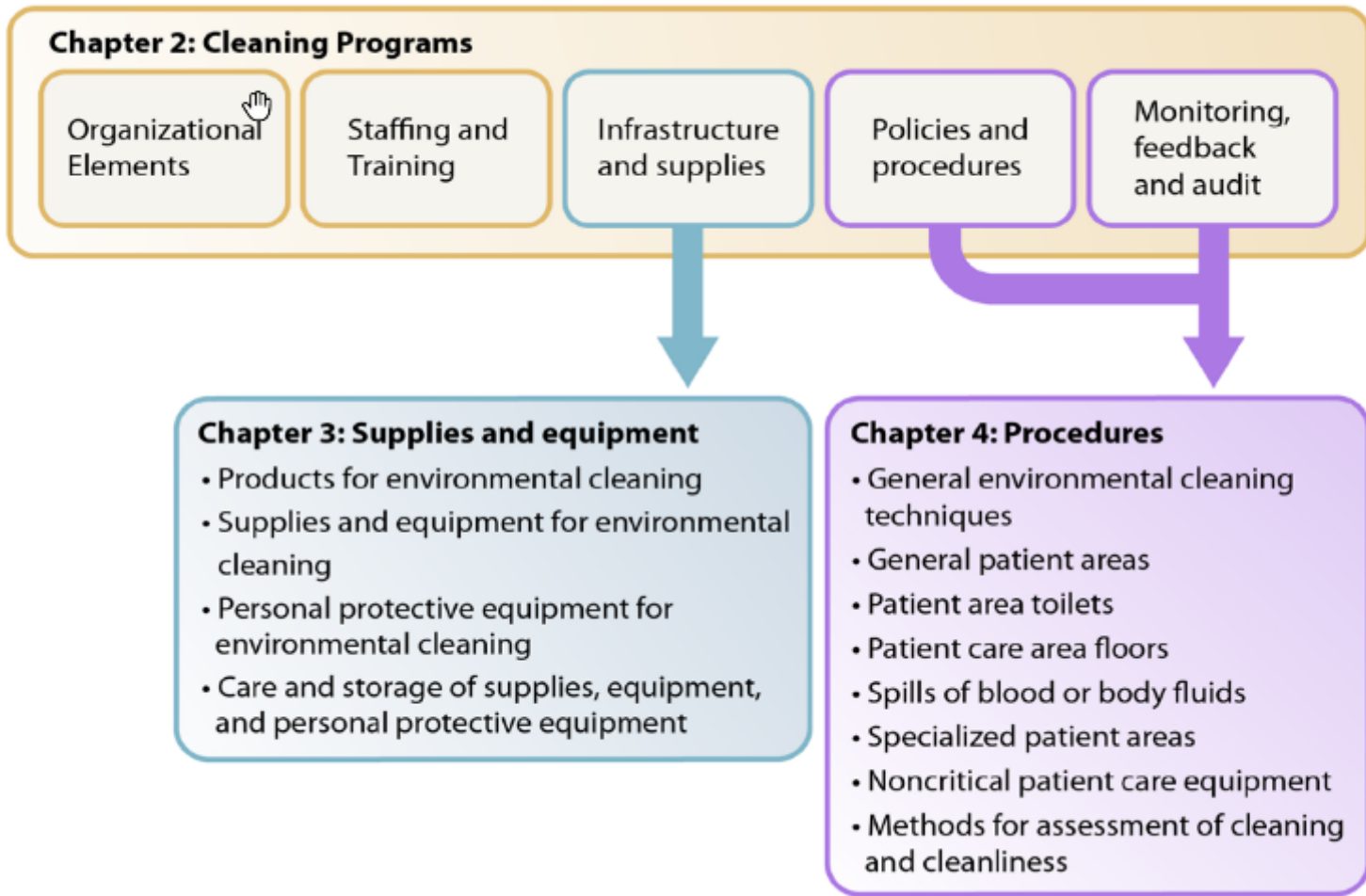
[HTTPS://WWW.CDC.GOV/H
AI/PREVENT/RESOURCE-
LIMITED/ENVIRONMENTAL-
CLEANING.HTML](https://www.cdc.gov/hai/prevent/resource-limited/environmental-cleaning.html)

COMPONENTS OF AN ENVIRONMENTAL SERVICE PROGRAM

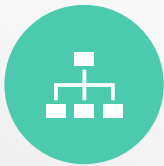
- Leadership Support
- Staffing & Training
- Infrastructure/supplies
- Policies and procedures
- Monitoring and Feedback



Figure 2. Chapter outlines and overall framework for the best practices



ELEMENTS OF AN ENVIRONMENTAL SERVICES PROGRAM



Organizational elements



Staffing and training



Infrastructure & supplies



Policies and procedures



Monitoring, feedback, and auditing

A hand is shown writing the word "Leadership" on a dark green chalkboard. The word is written in a light-colored, textured font that looks like chalk. The hand is holding a white piece of chalk and is positioned at the end of the word, having just finished writing the letter 'i'. The background of the chalkboard is dark green and has several water droplets of various sizes scattered across it.

Leadership

ORGANIZATIONAL ELEMENTS-OFTEN REFERRED TO AS LEADERSHIP SUPPORT

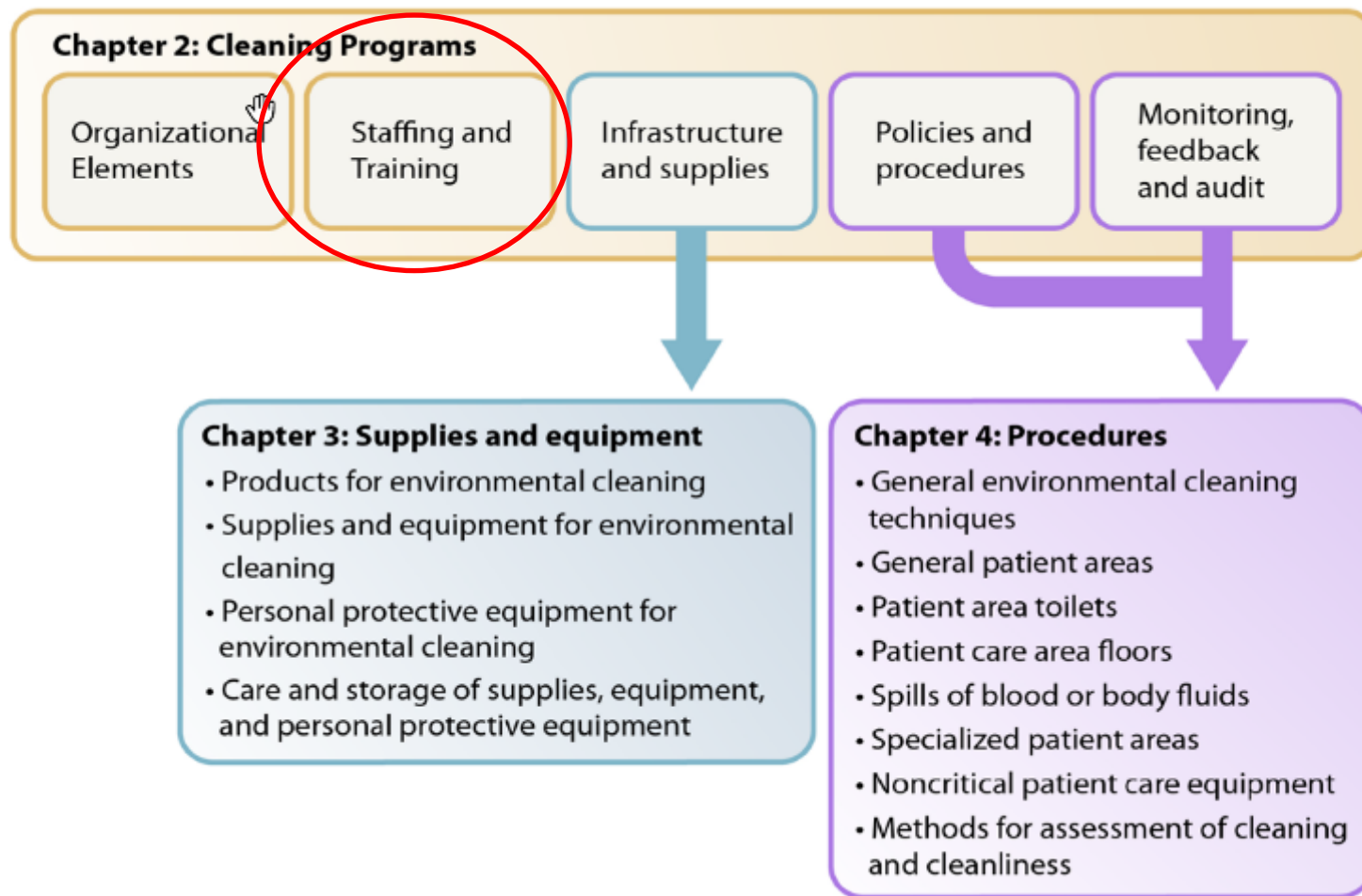
AN ENVIRONMENTAL
SERVICES PROGRAM MUST
INCLUDE:

ADMINISTRATIVE AND
LEADERSHIP SUPPORT

FORMALIZED
COMMUNICATION
PROCESSES AND
INTEGRATION OF THE
ENVIRONMENTAL
SERVICES CLEANING
PROGRAM AND THE
IPCP

DEFINED MANAGEMENT
STRUCTURE

Figure 2. Chapter outlines and overall framework for the best practices



TRAINING

- SHOULD INCLUDE ORIENTATION
- SHOULD BE ONGOING ESPECIALLY IF NEW PRODUCT OR EQUIPMENT
- SHOULD BE DONE ANNUALLY OR MORE OFTEN IF NEEDED
- USE OF ORIENTATION CHECKLIST AS EVIDENCE OF COMPETENCY
- MAINTAIN DOCUMENTATION OF ALL TRAINING



STAFFING & TRAINING ELEMENTS

- ENVIRONMENTAL SERVICES STAFF SHOULD:
 - BE FAMILIAR WITH THEIR JOB DESCRIPTIONS AND PERFORMANCE STANDARDS
 - BE ASKED TO PERFORM DUTIES ONLY FOR WHICH THEY WERE TRAINED (E.G., CLEANING STAFF SHOULD NOT BE ASKED TO CLEAN AREAS UNLESS THEY HAVE RECEIVED SPECIFIC TRAINING FOR THAT RESIDENT/PATIENT CARE AREA)
 - KNOW THE CHEMICALS AND THE HAZARDS THAT THEY COULD BE EXPOSED TO IN THE WORKPLACE
 - HAVE SUPPLIES AND EQUIPMENT, INCLUDING PERSONAL PROTECTIVE EQUIPMENT (PPE), TO PERFORM THEIR DUTIES

TRAINING IS REQUIRED



- ALL EMPLOYEES SHALL ATTEND IN-SERVICE TRAINING PROGRAMS PERTAINING TO THEIR ASSIGNED DUTIES AT LEAST ANNUALLY
- IN-SERVICE TRAINING PROGRAMS SHALL INCLUDE THE FACILITY'S POLICIES, INCLUDING INFECTION PREVENTION AND CONTROL POLICIES REQUIRED IN SECTION 300.696
- TRAINING AND ONGOING EDUCATION TO ENABLE ALL PERSONNEL TO PERFORM THEIR DUTIES EFFECTIVELY. ...IL ADMIN. CODE PART 300 SKILLED NURSING AND INTERMEDIATE CARE FACILITIES CODE. SECTION 300.650 PERSONNEL POLICIES

<https://www.ilga.gov/commission/jcar/admincode/077/077003000C06500R.html>

<https://www.cms.gov/medicare/provider-enrollment-and-certification/guidanceforlawsandregulations/downloads/appendix-pp-state-operations-manual.pdf>

TRAINING & EDUCATION

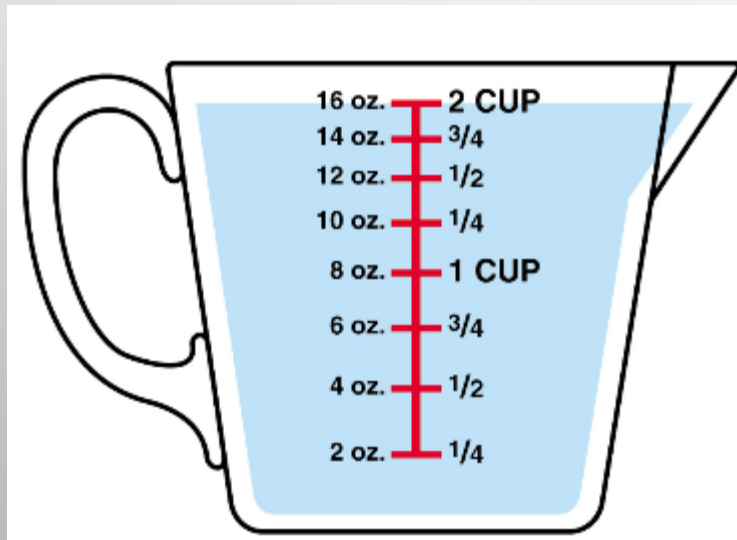
DURING STAFF TRAINING AND EDUCATION, **HIGHLIGHT THE RELATIONSHIP BETWEEN ENVIRONMENTAL CLEANING AND HAND HYGIENE IN PREVENTING ENVIRONMENTAL TRANSMISSION OF PATHOGENS**



TRAINING



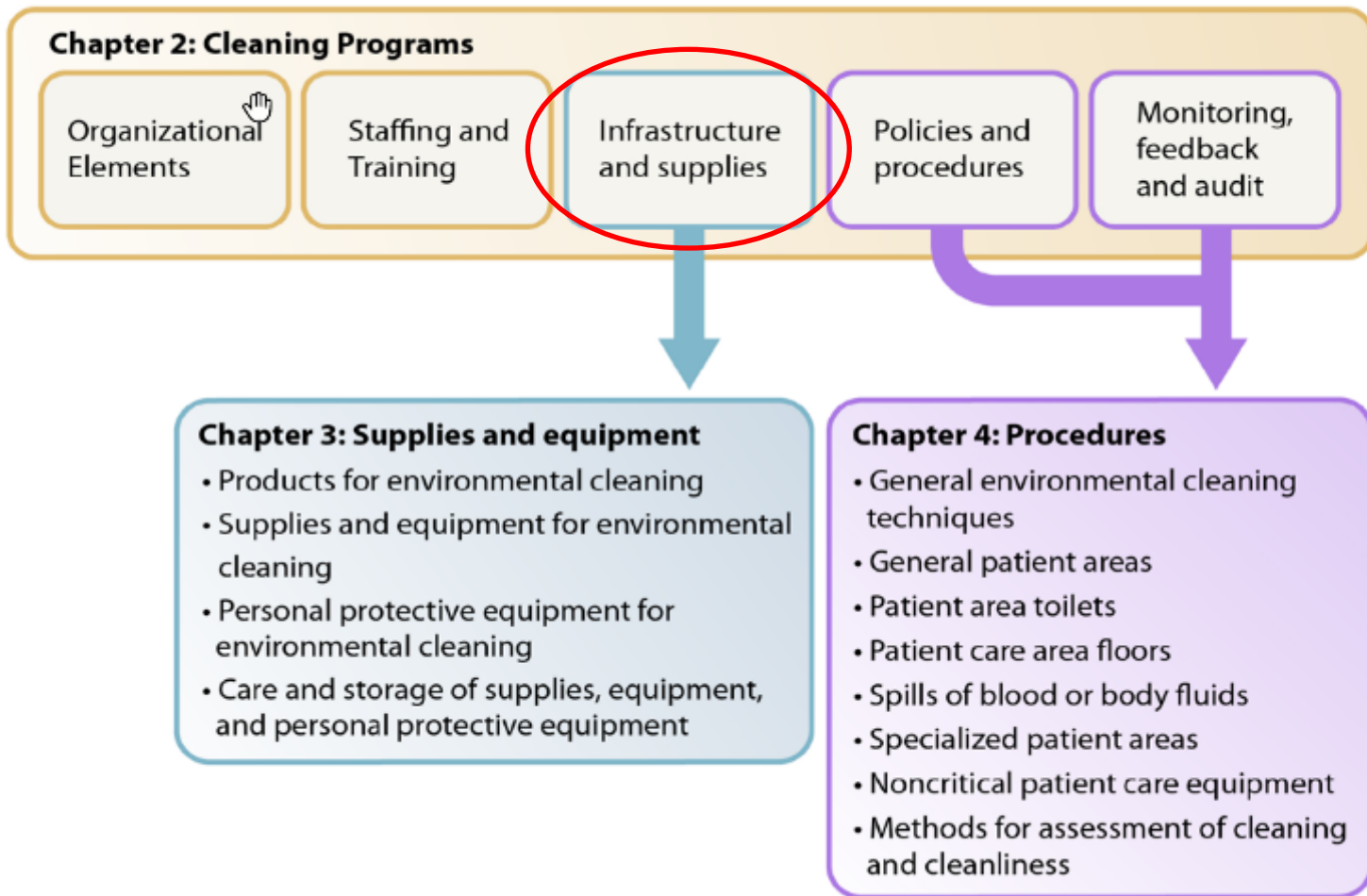
- USE JOB AIDS—POSTERS, SIGNS, “RECIPES” FOR HOW TO PREPARE A SOLUTION OR DISINFECTANTS
- USE STANDARDIZED CONTAINERS (FOR MEASURING SOLUTIONS), “WHERE TO FILL” MARKS, ETC.



Shutterstock.com



Figure 2. Chapter outlines and overall framework for the best practices



PRODUCT SELECTION

Things to
consider
when
choosing a
disinfectant:

What organisms does the
product kill or control?

Are the products EPA
registered?

What is the contact time of
the product?

What personal protective
equipment is required?

Is the product ready to use
or does it require dilution?

PRODUCT SELECTION



3.1 Products for environmental cleaning

There are different kinds of products available for environmental cleaning, which all have distinct properties and advantages and disadvantages to their potential use in healthcare.

Ideal Properties

For all products used for healthcare environmental cleaning:

- **Nontoxic:** it should not be irritating to the skin or mucus membranes of the user, visitors, and patients. Everything being equal, choose products with the lowest toxicity rating.
- **Easy to use:** directions for preparation and use should be simple and contain information about PPE as required.
- **Acceptable odor:** it should not have offensive odors to users and patients.
- **Solubility:** it should be easily soluble in water (warm and cold).
- **Economical/Low cost:** it should be affordable.

Additional Ideal Properties

For cleaning products:

- **Efficacious:** should remove dirt, soil, and various organic substances.
- **Environmentally friendly:** should not cause environmental pollution upon disposal; biodegradable.

For disinfectants:

- **Broad spectrum:** it should have a wide antimicrobial range, including those pathogens that are common causes of HAIs and outbreaks.
- **Rapid action:** it should be fast acting and have a short contact time.
- **Remains wet:** it should keep surfaces wet long enough to meet recommended contact times with a single application.
- **Not affected by environmental factors:** it should be active in the presence of trace quantities of organic matter (e.g., blood) and compatible with cleaning supplies (e.g., cloths) and products (e.g., detergents) and other chemicals encountered in use.
- **Material compatibility:** it should be proven compatible with common healthcare surfaces and equipment.
- **Persistence:** it should have residual antimicrobial effect on the treated surface.
- **Cleaner:** it should have some cleaning properties.
- **Nonflammable:** it should have flash point of more than 65°C (150°F).
- **Stability:** it should be stable in concentration and use dilution.

Dr. Rutala and Weber's Considerations for Selecting the Optimal Disinfectant for Your Facility

Directions: When determining the optimal disinfecting product for surface disinfection in your facility, consider each of the 5 components below and give each product a score (1 is worst and 10 is best) in each of the 5 categories.

Select the product with the highest score as the optimal product choice

Consideration	Questions to Ask	Score (1-10) Maximum Score is 50
1. Kill Claims	Does the product kill the most prevalent healthcare pathogens, including those that: <ul style="list-style-type: none">• Cause most HAIs?• Cause most outbreaks?• Are of concern in your facility?	
2. Kill and wet-contact times	How quickly does the product kill the prevalent healthcare pathogens? Does the product keep surfaces visibly wet for the kill times listed on its label?	
3. Safety	Does the product have an acceptable toxicity rating? Does the product have an acceptable flammability rating? Is a minimum level of personal protective equipment required? Is the product compatible with the common surfaces in your facility?	
4. Ease of use	Is the product odor considered acceptable? Does the product have an acceptable shelf life? Does the product come in convenient forms to meet your facility's needs (eg, liquids, sprays, refills, multiple wipe sizes)? Does the product work in the presence of organic matter? Is the product water soluble? Does the product clean and disinfect in a single step? Are the directions for use simple and clear?	
5. Other factors	Does the supplier offer comprehensive training and ongoing education, both in person and virtual? Does the supplier offer 24-7 customer support? Is the overall cost of the product acceptable (considering product capabilities, costs of infections that may be prevented, and costs per compliant use)? Can the product help standardize disinfectants used in your facility?	

PRODUCTS

- Always prepare solutions according to the manufacturer's instructions.
- Always prepare environmental cleaning products in designated environmental cleaning services areas (i.e., a dedicated, secured space not used for any other purposes)
- Provide training and simple instructions (e.g., standard operating procedures {SOPs}) for preparing solutions according to manufacturer's instructions.

BEST PRACTICES

Best Practices for Environmental Cleaning in Healthcare Facilities in Resource-Limited Settings

- Minimize the number of different environmental cleaning products in use at the facility. Clearly stating this in the facility cleaning policy will:
 - simplify the environmental cleaning process
 - minimize the training requirements for cleaning staff
 - reduce the potential for errors in preparation and use
- Store environmental cleaning products in a manner that:
 - eliminates contamination risk and degradation
 - minimizes contact with personnel (e.g., inhalation, skin contact)
- Manage environmental cleaning products according to the product's safety data sheet (SDS). Display the SDS where these products are stored and prepared.
- Prepare cleaning and disinfectant solutions according to manufacturer's instructions; preparing higher-strength concentrations or diluting beyond recommendations may pose unnecessary risk to patients, staff, visitors, and the environment.
- Ensure that environmental cleaning products are selected which do not damage the surfaces and equipment to be cleaned and disinfected.
- Ensure that standard operating procedures or instructions are available for the preparation, use, and disposal of environmental cleaning products

SUPPLIES AND EQUIPMENT

- Ensure there are standardized containers (for measuring solutions) and easy to use job aids (e.g., visual posters) for preparation of solutions.
- Provide enough cleaning cloths or microfiber cloths
- When possible, prepare solutions with an automatic dispensing system that is calibrated regularly. Manual dilution and mixing are more subject to error.



PERSONAL PROTECTIVE EQUIPMENT

Ensure cleaning staff have access to appropriate PPE

PPE is required to prevent:

- exposure to microorganisms
- exposure to cleaning chemicals (e.g., disinfectants)
- reduce the spread of microorganisms from one patient care area to another within the facility (when used correctly)



STORAGE CONTAINERS

All containers used for storing solutions of environmental cleaning products should:

- be clean, clearly labeled, and have an expiration date based on the manufacturer's instructions for stability
- be thoroughly cleaned and dried before refilling
- never be topped up—use them until the indicated expiration date (after which it should be disposed) or until the container is empty, whichever comes first

POLICIES AND PROCEDURES

FACILITIES SHOULD HAVE POLICIES AND PROCEDURES FOR:

- GENERAL ENVIRONMENTAL CLEANING
“HOW TO CLEAN” TECHNIQUES
- DAILY AND TERMINAL CLEANING OF
RESIDENT ROOMS
- RESIDENT BATHROOMS
- COMMON AREAS (LOBBY, DINING
ROOM, LOUNGE AREAS)
- NONCRITICAL PATIENT CARE
EQUIPMENT-SHARED EQUIPMENT
- SPILLS OF BLOOD OR BODY FLUIDS
- METHODS FOR ASSESSMENT OF
CLEANING AND CLEANLINESS



Policy
procedure

POLICIES AND PROCEDURES

Facility Environmental Cleaning Policies should always include the following elements:

- defined lines of accountability and responsibilities for all staff

“WHO CLEANS WHAT?”

- cleaning schedules for every patient care area and noncritical patient care equipment, specifying the frequency, method, and staff(s) responsible

“HOW OFTEN?”

- required cleaning procedures for environmentally hardy organisms and for outbreak management

“ARE WE USING THE CORRECT PRODUCT?”

POLICIES AND PROCEDURES

- Training requirements and performance standards for cleaning staff
- Monitoring methods, frequency, and staff responsible
- List of approved cleaning products, supplies, and equipment and any required specifications on their use
- List of necessary PPE and when hand hygiene action is recommended for staff and patient safety

STANDARD OPERATING PROCEDURES (SOP)

- Supplies and equipment needed to do the job
- Preparatory steps including hand hygiene and required PPE
- Step-by-step instructions for the job and listed in the order they should be done
- Final steps: collection of soiled items, etc. and storage of supplies and equipment upon completion

STANDARD OPERATING PROCEDURES (SOP)

Proceed From High To Low (Top To Bottom)

Proceed from **high to low (top to bottom)** to prevent dirt and microorganisms from dripping/falling down and contaminating already cleaned areas. Practical examples of this strategy include:

- Cleaning bed rails before bed legs
- Cleaning environmental surfaces prior to cleaning floors
- Cleaning floors last to allow collection of dirt and microorganisms that may have fallen

Proceed in a Methodical, Systematic Manner

Proceed in a **methodical, systematic manner** to avoid missing areas—for example, left to right or clockwise (Figure 10).

- In a multi-bed area, clean each patient zone in the same manner—for example, starting at the foot of the bed and moving clockwise.

Immediately Attend To Body Fluid Spills

Clean spills of blood or body fluids immediately, using the techniques in the **Spills of blood or body fluids** section.

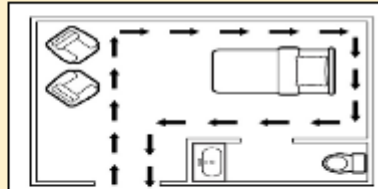


Figure 10. Example of a cleaning strategy for environmental surfaces, moving in a systematic manner around the patient care

How to Clean A Room

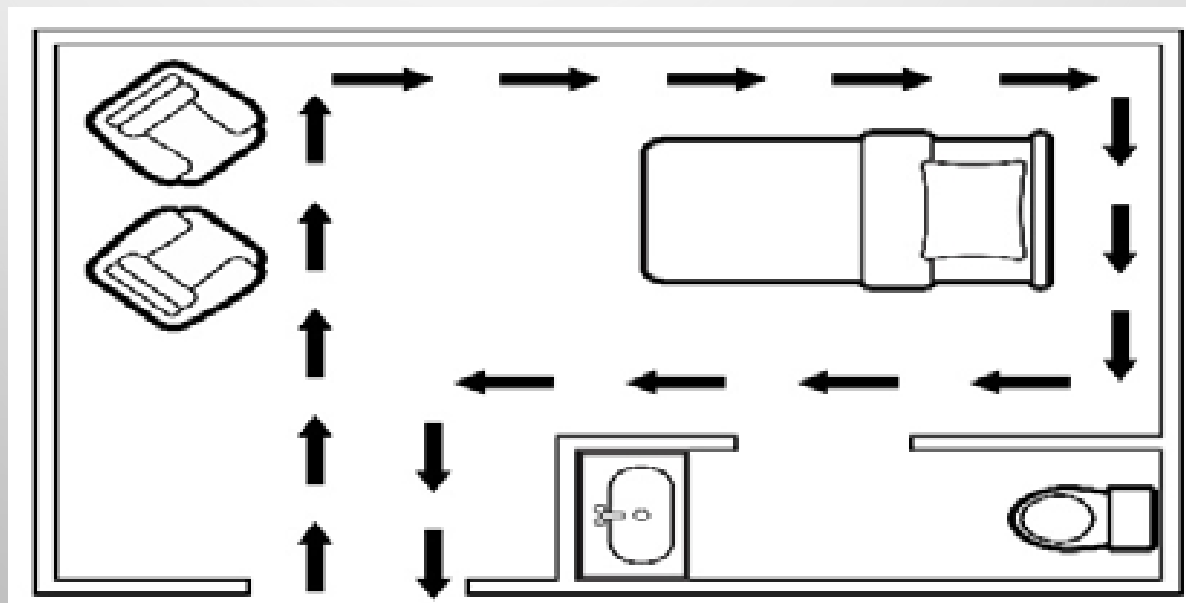
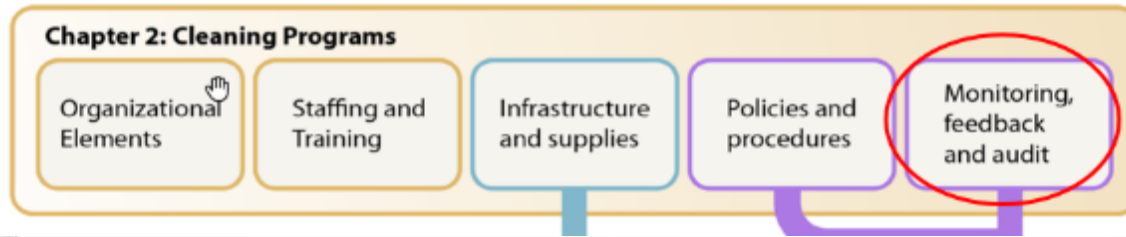


Figure 2. Chapter outlines and overall framework for the best practices



- Structured monitoring programs ensure that environmental cleaning is conducted according to best practices.
- There must be organizational support and resources available to address deficiencies identified during monitoring activities.
- Use a standardized methodology for monitoring, apply it on a routine basis, and provide timely feedback to cleaning staff and program leadership.

FEEDBACK

Feedback needs to be

- Prompt
- Direct
- Shared or reported



METHODS FOR AUDITING

Methods for assessing cleaning practice include:

- direct performance observations
- visual assessment
- fluorescent markers



Methods for assessing the level of cleanliness include:

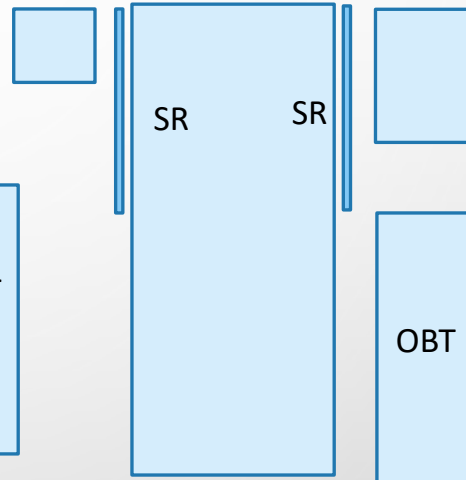
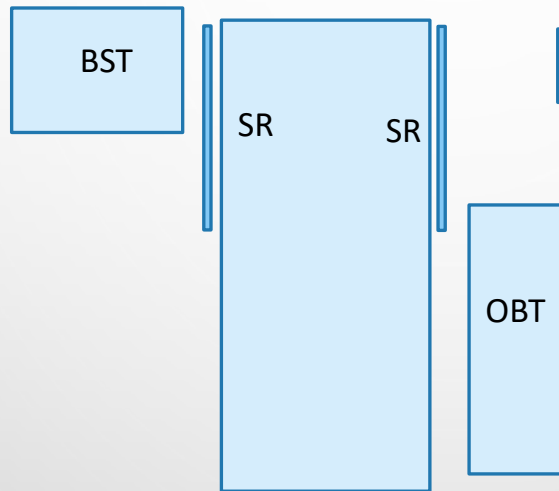
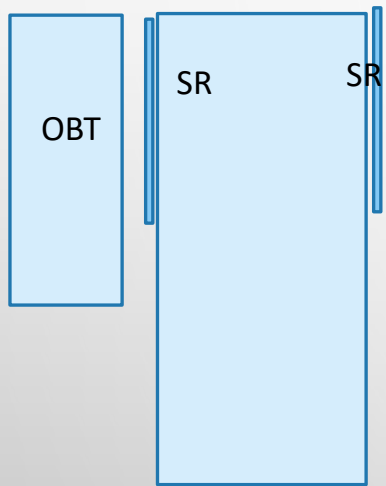
- measuring the residual bioburden (i.e., ATP or Adenosine triphosphate bioluminescence)
- taking a bacteriological culture of the surface itself using a swab or contact agar plate method


METHOD OF ASSESSING CLEANING PRACTICES


- Fluorescent marking method--Environmental Marking with Tide®
- Each room is marked using separate plastic bag with individual applicators saturated with liquid detergent



ROOM _____ DATE _____ TIME _____ MARKED BY _____ READ BY _____

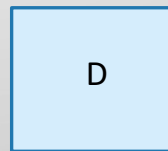
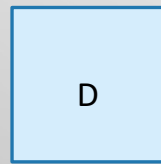


Missed 

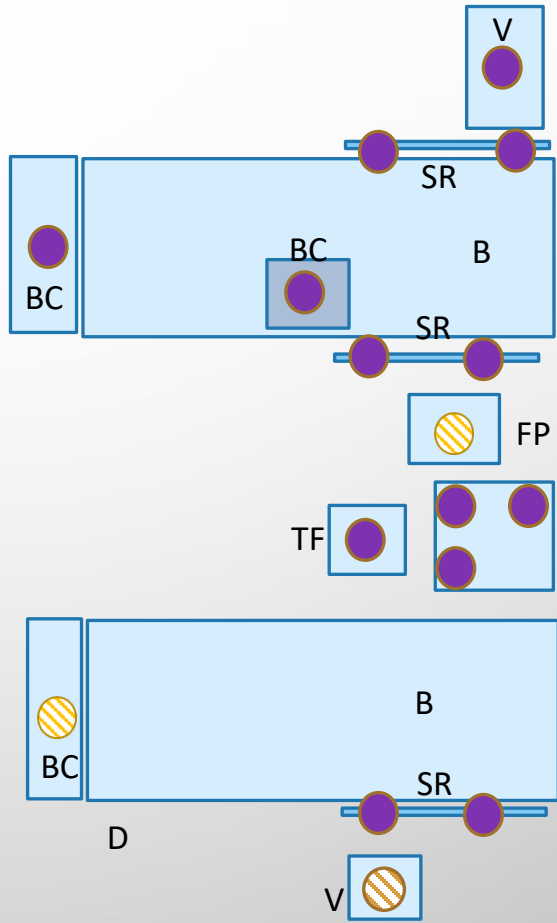
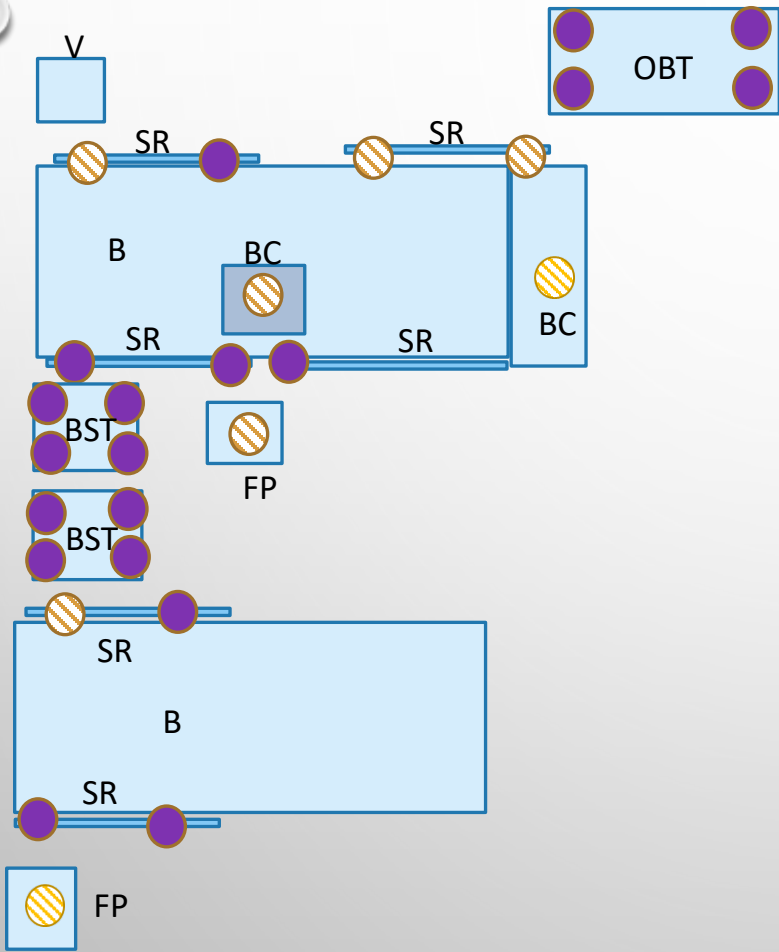
Wiped 



Missed
Marked Areas
% Missed

Wiped
Marked Areas
% Wiped



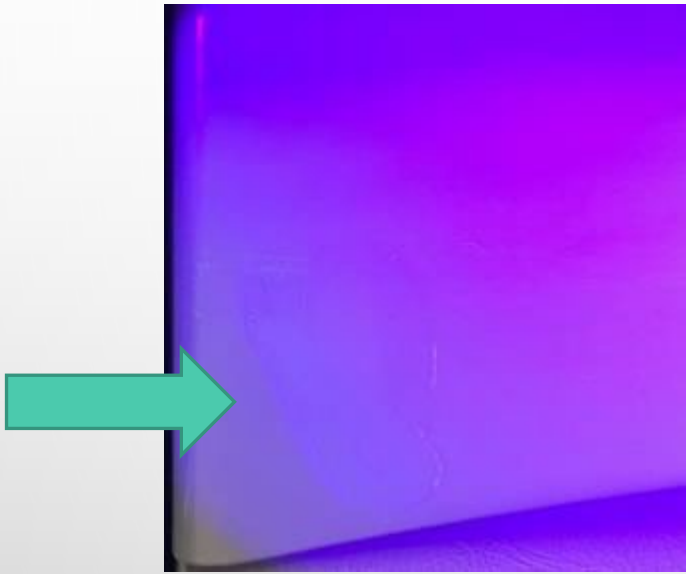
ROOM MAP EXAMPLE #1



Missed 
 Wiped 

11 Missed
 45 Marked Areas
 24% Missed

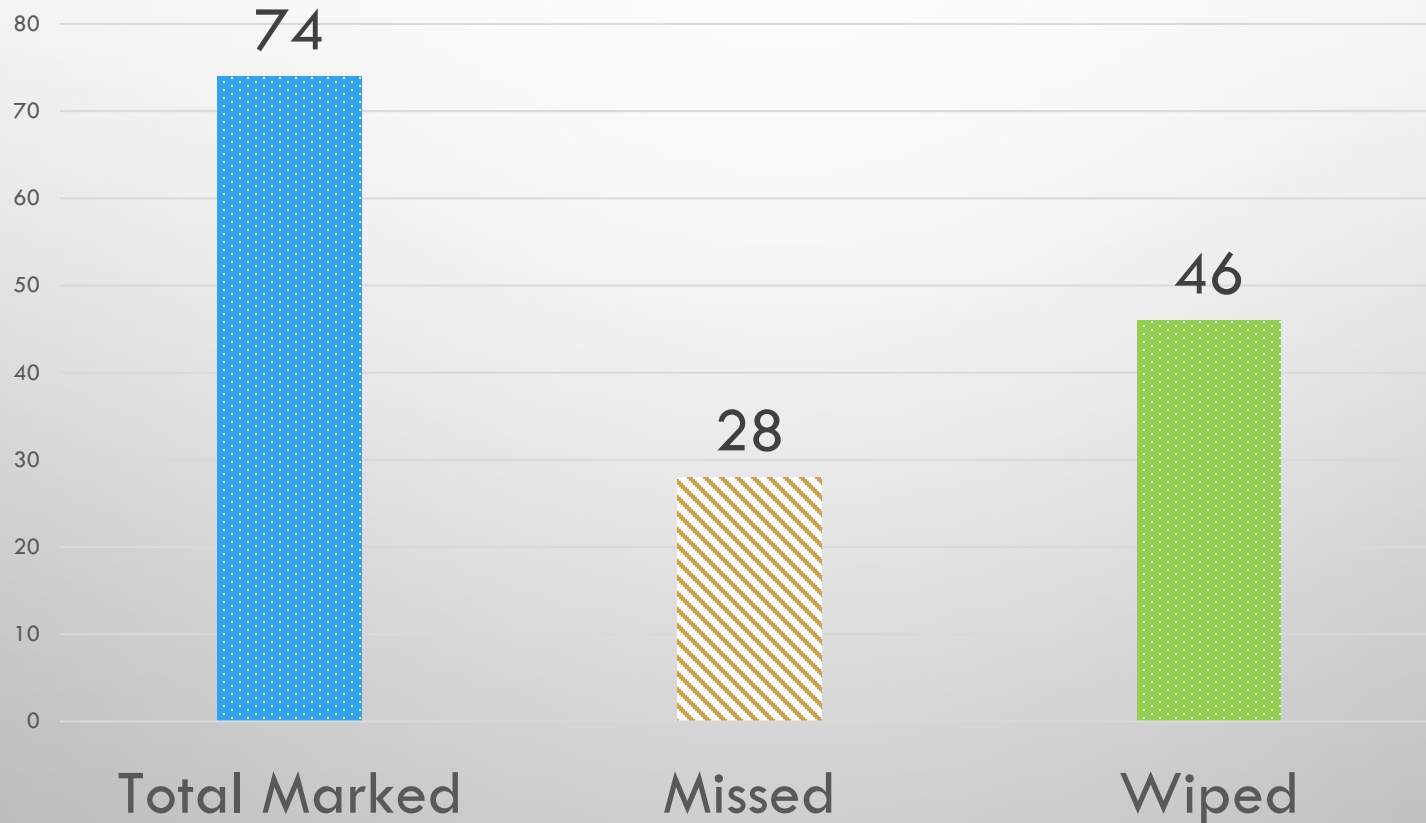
34 Wiped
 45 Marked Areas
 76% Wiped



EXAMPLE: WIPED AND MISSED

62% OF MARKED SURFACES CLEANED DURING DAILY CLEANING

Marked on 3rd Floor June 18-19, 2022



CONTRACTED PROGRAMS

Externally Contracted Programs

Environmental cleaning programs are increasingly implemented by external companies via a *contract or service level agreement*. Contracted staff, including cleaning staff and cleaning supervisors, should work closely with the environmental cleaning program focal point and IPC staff at the facility to ensure that environmental cleaning is performed according to best practices and facility policy.

It is essential that all the standard program elements be described explicitly in the service level agreement with the external company, to ensure accountability for the services provided.

In general, the components to be included in the service level agreement should mirror the facility cleaning policy, and at a minimum should include:

- an organizational chart for all contracted employees, including functional reporting lines and responsibilities
- the staffing plan for each patient care area, including contingency plans for additional staff
- the training content and frequency of training for contracted employees
- a summary of the cleaning schedules and methods for each patient care area, in line with the facility-specific policy
- the methods for routine monitoring and feedback
- the supplies and equipment to be used, including environmental cleaning products



THAT'S NICE, DEAR

REGULATORY REQUIREMENTS

§483.80 Infection Control

The facility must establish and maintain an infection prevention and control program designed ***to provide a safe, sanitary, and comfortable environment and to help prevent the development and transmission of communicable diseases and infections.***

State Operations Manual-Appendix PP



**OTHER ENVIRONMENTAL CONSIDERATIONS
NOT DISCUSSED TODAY**

Air and Water



AIR

- Construction and renovation adds to contamination of the environment
- Facilities need to complete an infection control risk assessment or ICRA prior to the work beginning to determine what barriers are necessary to protect the patients/residents from dust, and other airborne particles which can cause disease




WATER

- Wet environments pose a particular hazard of infection, promoting microbial growth and serving as a source for antibiotic resistant pathogens, and health care associated infections.
- Facilities should develop a water management plan.



HOW TO CLEAN & DISINFECT A ROOM IN LONG-TERM CARE FACILITY



Cleaning and Disinfecting a Resident Room in Long-Term Care (English)

This training video demonstrates how to set up a housekeeping

www.youtube.com

- [HTTPS://WWW.YOUTUBE.COM/WATCH?V=YHPJOVSHVCG](https://www.youtube.com/watch?v=YHPJOVSHVCG)



**CLEANING & DISINFECTION IS
EVERYONE'S RESPONSIBILITY!!**

QUESTIONS??

Karen Trimberger RN, MPH, CIC
Infection Prevention Consultant
Hektoen Institute/IDPH Grantee