In the patient care environment, quality of cleaning is measured by which and what percentage of high-touch surfaces (HTSs) are adequately cleaned and disinfected. Below, the four most common methods of monitoring are discussed, including their pros and cons.

# Observation1-3

* A supervisor or trained staff conducts visual inspection of HTSs and observes cleaning practices.

|  |  |
| --- | --- |
| **Advantages** | **Disadvantages** |
| * Quick and easy monitoring method.
* Simple to put into practice.
* Does not require special skills or training.
 | * Surfaces may appear clean and free of visible soiling but are still not adequately disinfected.
 |

# Culturing1-3

* Samples are swabbed from HTs and cultured in a microbiology lab to identify and quantify organisms.

|  |  |
| --- | --- |
| **Advantages** | **Disadvantages** |
| * Helpful in targeting one specific organism of concern.
* Can provide a high level of detail.
 | * Labor intensive and requires lab expertise.
* Delayed results; no immediate feedback.
* Not standard practice in hospitals; may be done for research or specific outbreak investigations.
 |

# Fluorescent Gel Monitoring1-4

* HTSs are marked with fluorescent gel, which is invisible to the eye, but glows under ultraviolet (UV) light.
	+ After a set interval (usually a day), the surfaces are rechecked with a UV flashlight.
	+ If the surface glows, then it has not been adequately cleaned.

Source: Ecolab USA Inc. Images used with permission.

|  |  |
| --- | --- |
| **Advantages** | **Disadvantages** |
| * Supported by evidence.4
* Easy to teach and to use.
* Results are intuitive and easy to interpret.
* Provides immediate visual feedback.
 | * Does not identify pathogens.
* Requires a subjective yes/no judgment from observer.
* More likely to induce Hawthorne effect—the observer’s effect on behavior being assessed.
* Cost depends on the product used.
 |

# ATP (Adenosine Triphosphate) Monitoring System1-3,5-6

* A device measures organic material on HTSs by detecting ATP, an energy molecule found in all organic cells.
	+ A specialized swab containing luciferase—a natural enzyme found in fireflies—is used to sample the surface.
		- Luciferase produces bioluminescent light on contact with ATP.
	+ The swab is inserted into an ATP meter, which analyzes the sample for light being emitted.
	+ By measuring bioluminescence, the meter can estimate the amount of organic matter on the surface.

|  |  |
| --- | --- |
| **Advantages** | **Disadvantages** |
| * Supported by evidence.6
* Provides quantitative data.
* Results may be more objective.
* Provides immediate feedback.
 | * Does not identify pathogens.
* ATP readings can’t differentiate live and inactivated pathogens.
* Results are less intuitive to interpret.
* Costly; requires specialized equipment and maintenance
 |

# References

1. Carling PC, Bartley JM. Evaluating hygienic cleaning in health care settings: what you do not know can harm your patients. Am J Infect Control. 2010 Jun 1;38(5):S41-50. PMID: 20569855.
2. Boyce JM. Modern technologies for improving cleaning and disinfection of environmental surfaces in hospitals. Antimicrob Resist Infect Control. 2016 Apr;5:10. PMID: 27069623.
3. Mitchell BG, Wilson F, Dancer SJ, et al. Methods to evaluate environmental cleanliness in healthcare facilities. Healthcare Infect. 2013 Feb;18(1):23-30.
4. Hung IC, Chang HY, Cheng A, et al. Application of a fluorescent marker with quantitative bioburden methods to assess cleanliness. Infect Control Hosp Epidemiol. 2018 Nov;39(11):1296-1300. PMID: 30221609.
5. Nante N, Ceriale E, Messina G, et al. Effectiveness of ATP bioluminescence to assess hospital cleaning: a review. J Prev Med Hyg. 2017 Jun;58(2):E177-83. PMID: 28900359.
6. Ziegler MJ, Babcock HH, Welbel SF, et al. Stopping Hospital Infections with Environmental Services (SHINE): a cluster-randomized trial of intensive monitoring methods for terminal room cleaning on rates of multidrug-resistant organisms in the intensive care unit. Clin Infect Dis. 2022 Feb 1:ciac070. PMID: 35100614.

AHRQ Pub. No. 25-0007

October 2024