# What Healthcare Professionals Need to Know about Disinfection, Sanitizing and Cleaning

Medical facilities are full of high-touch areas and objects where microorganisms thrive and can then be transferred person-to-person. To complicate matters, many infectious disease agents are tenacious and can survive for hours or for longer periods (up to 30 days or more) on hard surfaces.[1] In some instances, as few as 10 viral particles can cause infection.[2]

The possibilities are endless, so when an infectious disease sweeps through a facility, immediate action and ongoing disinfection diligence can help break the cycle.

**From High Touch Areas to Hands**

Research has demonstrated that 65 percent of viruses can be transferred to uncontaminated hands from hard surfaces and objects.

So, focusing on personal hygiene practices, such as washing hands frequently with soap and water and using hand sanitizers, is important. Disinfecting high-touch items is needed using effective disinfectants properly. It's often a hard-fought battle because pathogens are typically spread widely well before symptoms appear.

**Which Products Do What? Knowing the Difference Can Make ALL the Difference**

The terms "cleaner," "sanitizer," and "disinfectant" are defined by federal regulations for each of these types of products. And, for disease control, it's important to understand the difference when selecting the correct products to use.

**Cleaning physically removes germs, dirt, and other impurities from surfaces or objects.** This does not necessarily kill pathogens, but by removing them, lowers their numbers and helps to reduce the risk of spreading infection.

**Sanitizing chemically lowers the number of bacteria on surfaces or objects to a safe level.** Sanitizers (on non-food contact surfaces) reduce 99.9 percent of bacteria (but not necessarily other pathogens like many viruses) listed on the product label. The actual "kill" often occurs on the cloth used in the sanitizing process as well as on the surfaces being sanitized.[3]

> Encouraging frequent hand washing is a good first step. But that's not enough. High-touch areas must be properly cleaned and disinfected.

**Disinfecting kills all microbes listed on the product label.** Killing pathogens on a surface (especially on high-touch areas) after cleaning further reduces the risk of spreading infection. Many quat-based disinfectants are "one-step" products – they clean and disinfect in one operation. Be sure to select disinfectants labeled with directions for use in medical settings. This helps to assure that the product will help to control a broader spectrum of pathogens.

**Pathogens Are Everywhere**

Disinfectants kill 100 percent of the disease-causing agents indicated on the product labels when used according to directions. They must be properly applied and then must be allowed to remain as visible liquids on the surface for a specific period of time specified on the label. All high-touch hard surface areas – door knobs and push panels, bed rails, bathroom fixtures, telephones, nurse call devices and paper towel dispensers—should be on the "hit list" for disinfection. For vertical surfaces, foam products will be the most practical to use to achieve the needed "contact time" during which the disinfectant is in contact with the surface.

**Viruses**

Viruses are divided into three categories (A, B, C), based on the presence/absence of lipids on the virus and on the virus's size. The lipid outer envelope and the virus's size are the two primary characteristics that most influence the impact of disinfectants on the organism.

**Influenza**
Influenza viruses belong to Category A, which includes all enveloped viruses of intermediate-to-large size. The presence of lipids is associated with a high susceptibility to all disinfectants including quats. So, even if there is no information on the efficacy of quats against a specific emerging influenza virus, such as a new avian flu, if it is an enveloped virus, quats are likely to eradicate it.[4] Thorough cleaning/disinfecting practices by the janitorial staff and frequent hand washing by everyone is needed.

**Norovirus**
Norovirus is the most common foodborne illness in the United States.[5] It is a non-enveloped virus, which makes it more difficult to eradicate. Infections occur in a variety of settings such as food service, leisure (hotel, cruise ships), and institutional (schools, day-care centers, healthcare facilities).[6] Controlling norovirus begins with proper cleaning and disinfecting all hard surfaces and objects, along with frequent hand washing. But, using the correct disinfectant for norovirus is critical. Note that alcohol-based hand sanitizers and other products that do not manage norovirus can sometimes enhance the spread of the virus.[7] There are more than 1,100 different EPA-registered quat-based commercial products that kill norovirus.[8]

### "Green" Products

Everyone loves "going green"—but most "green" advocates don't realize that the vast majority of "green" products may not disinfect. Typically they are cleaners. This gives a false sense of security when it comes to helping to prevent and control disease outbreaks.

Is it that quat-based and other disinfectants are not "green"? No, the problem lies in the regulatory world which, by definition, classifies disinfectants as "antimicrobial pesticides"—the disease organisms being the "pests." By law, no pesticide can be labeled as "green." Hopefully, this problem will be rectified in the future. In the meantime, purchasing decision-makers and disinfection policy makers need to remain vigilant. The answer is to use products for disinfection that carry references to use in medical, daycare, nursing home and other healthcare-based settings. This helps to ensure efficacy in disinfecting—to help everyone stay healthy.

The CDC and EPA have recommended using products that control norovirus to eradicate Ebola. For a list, see http://tiny.cc/norovirusproducts

## Disinfection Requires Specific Procedures

It's crucial to understand the difference between clean/sanitize/disinfect and where to use products designed for each category of pathogen control. Single-action disinfectants (those that just disinfect but don't clean) often must be applied to pre-cleaned surfaces for maximum efficacy, especially when trying to control viruses.[4]

- Don't apply a disinfectant and then immediately wipe it off—follow label directions. Apply the product to the surface, then allow the liquid to remain on the surface for the recommended amount of time ("contact" or "dwell" time).[10] Contact time is dependent on the type and position of the surface (horizontal or vertical) and on the amount of airflow in the room. Some disinfectants must remain on the surface for up to 10 minutes…and then dry on their own. Rinsing is not typically necessary and some products are "no-rinse" formulations. **Read the labels to be certain.**
- Disinfectants are the most efficacious at higher temperatures, most of them reaching optimum efficacy above 20°C (68°F).[4] If the area being disinfected is colder, contact times may have to be increased.
- Change out cleaning cloths, mops, and wipes frequently, especially if they show visible dirt.
- Commercial quat-based disinfectants are sometimes purchased by the custodial team in concentrated form and then diluted before use. Custodial staffers may need assistance in understanding the importance of proper dilution and thoroughness of application. Thorough, consistent cleaning of all high touch surfaces is the best defense against transmittable pathogens. Training is critical--cleaning staffs must understand how and when to clean. They must also recognize the importance of their work and how it contributes to patient and staff health and wellbeing.
- Quat-based sanitizers are used routinely in foodservice environments on non-food contact surfaces to maintain cleanliness that achieves public health standards. These kill 99.9 percent of bacteria. Tables, chairs, railings, and other high-touch areas should be disinfected, not just sanitized, when illnesses – especially those caused by viruses – are an issue.

> The type and frequency of wiping action on a surface being disinfected, as well as the pressure exerted during wiping, can profoundly influence the outcome of the decontamination. Improper wiping can be counterproductive by spreading localized contamination over a wider area.
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> Source: Sattar, Syed A.; Maillard, Jean-Yves. The crucial role of wiping in decontamination of high-touch environmental surfaces: Review of current status and directions for the future. American Journal of Infection Control. Vol 41, No. 5 Supplement, May 2013.

### Why Use Quat-based Products?

Quat-based disinfectants have been on the front line of disease control for more than 30 years. They are used with confidence where we live, work, learn, and play as well as in medical facilities. The U.S. Environmental Protection Agency (EPA) reviews all formulations for safety and efficacy. The EPA registration number appears on the product label.


> Experts note that, regardless of the method of application of the disinfectant, the most important factor is following label directions.

Hospitals and other healthcare facilities routinely use quat-based products as part of their day-to-day disinfection efforts. In fact, a recent survey of 125 hospitals in the U.S. showed that quat-based products were used in up to 84 percent of hospital disinfection activities.[9] Hospitals rely on quat-based products because they work, are compatible for use on metals and other hard non-porous surfaces, do not create air quality issues, and are suitable for use in patient rooms and in public areas.

It is important to use broad-spectrum products labeled for use in medical settings, to assure the product will disinfect properly. And, of course, make sure the janitorial purchasing decision-maker is aware of the difference in cleaning/sanitizing/disinfecting products and how they are best used to control disease spread.


**Broad-spectrum Disinfectants for Traditional and Emerging Diseases**

Many EPA-registered quat-based disinfectant products work on emerging/communicable diseases as well as on flu, norovirus, and others. There is particular concern among infection-control professionals and others about controlling well-known pathogens such as *Escherichia coli, HIV, Hepatitis C virus, rotavirus, norovirus*, and newer ones causing threats, such as severe acute respiratory syndrome *coronavirus*.[11] The CDC has stated that these pathogens have been studied and found to be susceptible to "currently available chemical disinfectants."[12]

Those who purchase commercial products for disinfection should always specify quat-based broad-spectrum products with healthcare setting-use instructions on the label. Labels list the pathogens that special formulations of quat-based product can control when used according to label directions.

**Emerging pathogens related to the ones on the labels are typically controlled.** As an example, respiratory illnesses attributable to Pandemic 2009 H1N1 flu, formerly called swine flu, are caused by influenza A virus. Broad-spectrum hard surface disinfectants that contain quats and other active ingredients that are effective against Influenza A Virus I Hong Kong are ALSO expected to inactivate all influenza A viruses, including swine flu.[13]

**Using Commercial Quat-Based Products In Facilities**

Quat-based commercial disinfectants are sold as ready-to-use liquids, wipes, sprays and aerosols. These are typically "one step" cleaners *and* disinfectants. Many facilities also purchase concentrates, because they are more economical. These solutions are applied to nonporous surfaces such as walls, floors, and solid high-touch areas and objects using a mop, a cloth or a spray application. The proper dilution rate and application procedures are critical for efficacy.

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"All influenza and coronaviruses should be susceptible to quats, because they are just genetic variants of the same virus. The structure of these viruses is the same, so the quats work against them all. Influenza viruses such as bird flu and swine flu are all sensitive to quats, and the same can be said for all coronaviruses. All of these viruses have a lipid layer which the quat attacks." *Charles P. Gerba, Ph.D., Professor of Environmental Microbiology, College of Agriculture and Life Sciences, University of Arizona*

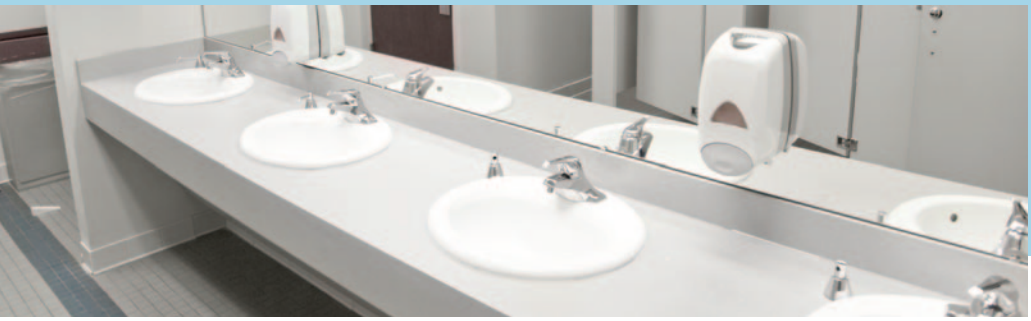
When janitorial staffers use spray bottles to apply quats to specific surfaces and objects, the droplets are of relatively large size (a "coarse spray") and settle quickly to the surface being disinfected. Because these compounds are stable in liquid form, they do not give off harmful/hazardous vapors.[14] They must remain in place as liquids for the required "contact" time specified on the label. Surfaces, once allowed to dry, or when re-wetted by other liquids, do not represent a risk to anyone who touches them.

Experts suggest using:

- Disinfectants labeled for use in medical settings
- Color-coded microfiber cleaning cloths for different types of tasks to avoid moving pathogens from one location to another
- Flat mops for better contact between the floor and the disinfectant.[14]


Facility managers and custodians must also know the right ways to clean.[15] Proper preparation, cleaning and disinfecting techniques are crucial. Using clean mops and cloths is important for complete infection control procedures to help kill rather than spread the microorganisms.[11] Mops should be changed and laundered when they become visibly soiled and at end of each shift.[16] Mops that are not thoroughly cleaned and dried between uses/shifts can become contaminated-- even though they are always used with a disinfectant. This contamination and use of dirty cleaning cloths or sponges contribute to unintentional disease spread.[17]

For optimal disinfecting efficacy, pre-clean heavily soiled areas. Discard the disinfecting solution in the bucket if it gets "soiled" during the application process, as mops or cloths pick up visible dirt and debris from floors and other areas.[17] Organic material in the bucket, on the mop, or on the wipe or cloth can affect efficacy.[17] Proper dilution is critical. Read the label carefully.




Ready-to-use quat-based one-step disinfectants are available in a wide array of consumer products.

- Some formulations kill norovirus and other infectious disease agents. It is important to read the labels before using to see which types of pathogens are controlled.
- Ready-to-use quat-based wipes also must be used as directed to achieve maximum efficacy. Change wipes often, and make sure the surface stays wet long enough to be effective. Do not wipe surfaces dry—let them air dry.

**Need More Information?**

The information in this document is available at www.quats.org. The Quats Education Program is also available to answer questions any time. Many may already be answered in the website FAQs. We welcome your inquiries. Call us toll-free at the number below.

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