

Cleaning Up: Battling Germs in School Facilities



By Charles P. Gerba, Ph.D.

It's inevitable. Every school year, parents, teachers, and administrators must deal with an overwhelming number of sick children. In fact, according to the Centers for Disease Control and Prevention, the average child catches at least eight colds a year, and kids in the United States miss as many as 189 million school days annually due to colds.

Typically, precautions have focused on flu shots and other preventative care. Although these measures are important, school administrators should also focus on the way their school is being cleaned. Often, the custodians responsible for cleaning schools are not properly trained in the latest techniques to combat germs and are using outdated cleaning methods that don't completely eradicate bacteria.

Good hygiene practices, such as hand washing and using hand sani-

tizers, along with proper cleaning of school environments, can significantly reduce the number of infections each year and keep teachers and students in the classrooms.

The Challenge

Germs are capable of changing rapidly and developing resistance to antibiotics used to treat infections. As a result, these new variations are more likely to cause illness and result in more serious infections. Two examples that continue to challenge

education institutions are the norovirus and MRSA (methicillin-resistant *Staphylococcus aureus*), often referred to as a “superbug.”

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Norovirus is the most common cause of viral diarrhea in young children and adults. New variations became evident a few years ago, causing more serious illnesses than in previous years. The illness usually lasts only one or two days and spreads easily by feces and vomit.

Because 70% to 80% of those infected with norovirus vomit, the illness is difficult to control in institutions and public places. When people vomit, norovirus can spread through the air to contaminate surfaces that people may later touch. The virus is easily spread from hand to mouth.

Norovirus can lurk on surfaces for weeks or even months. Outbreaks have been traced to the use of public restrooms and other shared facilities. It quickly became the curse of the cruise ship industry as it spread rapidly through the passengers, requiring some ships to cancel their cruises and return to port. Norovirus has also caused the closing of schools, child-care facilities, universities, dormitories, summer camps, and even hospital emergency rooms.

MRSA is a bacterium that has spread rapidly across the United States to become the most common cause of skin infections among individuals seeking medical attention. It is estimated that more than 17,000 people may die from MRSA infections each year in the United States, which is more than those reported for AIDS. Although most of these deaths result from infections acquired in hospitals or other types of health care institutions, serious infections also occur in the general population. One study showed that 85% of MRSA infections were acquired in the community (Klevens and others 2007).

Once MRSA enters the body—often through a lesion—it can invade other tissues and cause life-threatening infections. Most are skin infections that are easily treated; however, it is a virulent organism and can spread easily to other organs.

One of the problems with combating the spread of MRSA is that people who are not ill can carry the germ in their nose. During a normal day, they can effectively spread it by skin-to-skin contact or by touching hard surfaces throughout the day. A fairly hardy organism,

MRSA can survive in the environment for long periods. For example, it has been found to survive on tabletops for 12 days.

The Centers for Disease Control lists five factors that contribute to the spread of MRSA in schools:

- Crowding
- Frequent skin-to-skin contact
- Compromised skin (cut and abrasions)
- Contaminated items and surfaces
- Improper cleaning

MRSA has been recognized as an increasing problem among high school athletes. A recent survey of 186 high school athletic departments in Texas found that 60 had reported MRSA infections among their athletes (Barr, Felkner, and Diamond 2006).

Germy Classrooms

So just how germy are our schools?

Although only a few types of bacteria cause illness, knowing where the greatest numbers of these bacteria occur in a school reveals where the greatest risk of exposure to potential disease-causing microbes lies. Researchers at the University of Arizona have conducted a number of studies that examined where germs were most concentrated in schools and demonstrated the importance of effective cleaning in controlling the spread of infections among schoolchildren.

Interestingly, schoolteachers have 20 times more bacteria on their desks and work areas than any other profession we studied (doctors, lawyers, accountants, news reporters, bankers)! This is probably because they work with children who experience more infections than adults and because a large amount of material crosses their desks every day.

In one study, bacteria were found in the greatest numbers on the following surfaces, in order from highest to lowest:

- Water fountain toggles. Children with respiratory infections and diarrhea spend more time here.
- Pencil sharpeners. A hard grip leaves a lot of germs.
- Computer keyboards. Does anybody ever clean them?
- Faucet handles. Washing your hands is a good idea, but you have to turn the water on first.
- Student desktops. They need cleaning.
- Classroom doorknobs. It is not a good idea to be the last person entering the classroom.

In these same classrooms, we most commonly found influenza virus and norovirus on students' desktops, followed by faucet handles and classroom doorknobs. Influenza virus was detected on up to 50% and norovirus up to 22% of the surfaces throughout the day during the winter when these viruses are common.

Battling Bacteria

Can good hygiene and effective cleaning practices reduce illness in schoolchildren? This question is not easy to

answer. Children may pick up germs and infections at home, on the playground, or during other activities outside school. Therefore, it's difficult to prove the effect of proper cleaning and disinfection in school facilities. In general, however, hand washing and the use of hand sanitizers have been shown to reduce illness and absenteeism rates among children and adults by 30% to 50%.

It is essential to emphasize the importance of “proper cleaning.”

To demonstrate the effect of proper cleaning and disinfecting, we cleaned and disinfected classroom desks of first, fourth, and fifth graders at the end of each school day for 12 weeks and found that we could reduce absenteeism by 50% compared with classrooms where this was not done.

In another study, researchers found that providing an alcohol-based sanitizer and disinfecting key surfaces in the classroom reduced the occurrence of noroviruses on surfaces by more than 50%. Not surprisingly, student absenteeism due to diarrhea declined (Sandora, Shih, and Goldmann 2008).

It is essential to emphasize the importance of “proper cleaning.” Improper use of cleaning tools (mops, clothes) can actually increase contamination. We discovered that after an outbreak of norovirus at a major university, the cleaning crews actually increased the number of surfaces in dorm rooms contaminated with norovirus! Thus, proper use of cleaning tools and disinfectants is essential in reducing the spread of disease-causing microbes.

Districts should ensure that facilities are cleaned with hospital-grade disinfectants, color-coded microfiber cleaning cloths, and flat mops that reduce cross-contamination. In addition, facilities managers and custodians should be knowledgeable about the proper ways to clean. For a list of products registered by the Environmental Protection Agency as effective against norovirus, MRSA, and other pathogens, visit <http://epa.gov/oppad001/chemregindex.htm>.

A Way Forward

The benefits of good hygiene and proper cleaning can be a hard sell because they are not clearly visible in the short term. However, the benefits for our students are huge in reduced absenteeism and reduced health care costs.

Germs continually reinvent themselves to outwit the use of antibiotics and resist the development of vaccines for common infections. Two lines of attack that have never let us down are good hygiene and proper cleaning of our environment. No disease-causing organism transmitted through the environment has developed an iron-clad defense against them yet.



References

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