

PARAPLEGIA NEWS FEBRUARY 2019

# PN

**Backyard Makeover**

Plan your accessible outdoor space

**Save Some Cash**

File these tips for tax season

A red wheelchair is the central focus, set against a vibrant green and blue background. The wheelchair is surrounded by numerous colorful, stylized illustrations of various bacteria and viruses, including red spiky spheres, blue spiky spheres, green rod-shaped bacteria, and orange star-shaped organisms. The overall theme is the presence of germs on the wheelchair.

# Battle The Bugs

Bacteria on your wheelchair could impact your health



ILLUSTRATION BY KERRY RANDOLPH © GETTY IMAGES/FINGERMEDIUM/TETIANA LAZUNOVA/ALEXEYPUSHKIN

by Brittany Martin

Even if you regularly clean your wheelchair, normal bacteria on it could impact your health in certain situations.

### The cold and flu season

has arrived, and staying healthy means taking extra precautions to avoid getting sick.

If you have a spinal-cord injury or disease, a weakened immune system can make you even more susceptible to viruses and bacteria both in the air and on surfaces — like your own wheelchair.

You may think you clean your wheelchair often enough to destroy harmful bacteria, but do you really know how clean your wheelchair is? And what can you do — short of bathing in hand sanitizer or quarantining yourself — to make sure those germs don't end up making you sick or causing an infection?

To find out, *PN* staff swabbed several areas of a power chair belonging to Paralyzed Veterans of America (PVA) Arizona Chapter Executive Director Peter Quinn and a manual chair belonging to PVA Publications Editor Tom Fjerstad and sent the samples to EMLab P&K in Phoenix for testing. The samples were incubated for a designated amount of time at a specified temperature range and analyzed for bacteria.

Quinn says he and his wife, Rusty Joanne, are diligent about cleaning his wheelchair seat cushion and its cover.

"I have a Roho cushion, so I change that out every Saturday," Quinn says. "It gets washed down and the



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cover gets cleaned off, unless I spill something on it during the week.”

Fjerstad also gives his manual chair a thorough scrubbing once every couple of weeks.

“I’ll transfer out and wipe the whole chair down with, usually, just Windex and paper towels,” he says. “I wipe off the tires and casters with a wet washcloth every time I enter the house. The pushrims and the edge of the rims of the wheels I actually go over once every couple of days also with Clorox wipes.”

## The Results

The lab analysis consisted of a surface culture to identify the top three most prevalent bacteria colony types, plus a general bacteria count and general descriptions of the bacteria groups.

“It’s very important to know there was almost certainly more [types of bacteria] when there was growth [on the culture],” says Aaron DeVries, MD, MPH, FIDSA, who’s worked as the hospital epidemiologist at the Minneapolis Department of Veterans Affairs (VA) Health Care System for over three years.

With washed and gloved hands, five areas of the manual chair were swabbed: the wheel lock, pushrim, tire, seat cushion and seat backrest. On the power chair, the five areas swabbed were the seat cushion, seat backrest, joystick, control pad and armrest. The areas were chosen because they would be the most likely places the wheelchair user’s hands or skin would contact.

For the manual chair, the wheel had the most bacteria, followed by the wheel lock and the seat cushion. There were no bacteria detected on the pushrim or the backrest.

On the power chair, the most bacterial colonies were found on the seat cushion, followed by the control pad and the backrest. There were no bacteria detected on the joystick or the armrest.

One group of bacteria found on both the manual and power chairs was bacillus.

“Bacillus is a word that describes a large family of bacteria,” DeVries says. “The overwhelming majority of organisms that would be



CHRISTOPHER DI VIRGILIO



Paralyzed Veterans of America Arizona Chapter Executive director Peter Quinn had several areas of his power wheelchair swabbed for testing.

described as bacillus are very common bugs that are found in soil in the environment.”

Other bacteria found on both chairs were described as gram positive cocci and gram positive rods. DeVries says the majority of those are also normal things in the environment, sometimes called diphtheroids or corynebacterium, but there are others that could cause human illness.

Bacteria described as gram negative rods were also found on the power chair’s control pad.



PVA Publications Editor Tom Fjerstad had his manual wheelchair swabbed and tested for bacteria.

“When they say gram negative rods, E. coli might be one of those,” DeVries says. “It would not be a surprise if they had found E. coli. You know, E. coli is found all over the place.”

The question of exactly what types and how many bacteria were present on the wheelchairs would be best left to scientists backed by research funding, DeVries says.

And while the types of bugs found on the wheelchairs are commonly found in the envi-

ronment, in the soil, on surfaces and on equipment, DeVries says they could still potentially be harmful.

“In general, bugs in the wrong place at the wrong time can cause infection or cause a problem,” he says. “And even things that may cause no problem when they’re found on a surface, if you have them in your bloodstream, that can be a very life-threatening problem.”

### What You Can Do

To ward off those germs that could be “in the wrong place at the wrong time,” proper cleaning and basic hygiene come into play.

Washing your hands before and after cleaning a wheelchair is key, especially in minimizing the risk of transporting bugs that could cause an infection into your environment.

DeVries says to be practical when it comes to washing your hands, but avoid

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– Aaron DeVries, MD, MPH, FIDSA





Testing swabs analyzed in a lab found bacterial colonies that are common in the environment and soil.

touching mucus membranes such as the mouth, eyes or other openings, such as a drain, without first washing with soap and water or an alcohol-based hand sanitizer. Also remember to wash after touching an area you're cleaning, such as a colostomy stoma, to avoid transferring potential organisms from around that site.

"There are organisms on wheelchairs and in our environments, and individuals who might have spinal-cord injuries or are in a wheelchair for other reasons ... have a greater risk of having whatever's on the ground come on their hands," he says. "And so the most important thing they can do is regular hand hygiene, either using alcohol hand sanitizers or soap and water before they do any kind of personal cares, like changing bandages or touching their mucus membranes in some fashion."

DeVries says alcohol-based hand sanitizers are very effective at cleaning the hands in most situations.

"There's many benefits to that. You don't have to have a sink with running water," he says. "By rubbing your hands together thoroughly, usually it takes about five to 10 seconds to work in an adequate amount. For the most part, your hands are quite clean."

No matter which way you choose to clean your hands, DeVries says the most crucial step is the physical rubbing of the hands.

"So, it's the rubbing of your hands, your fingers between each other," he says. "When you're doing soap and water, part of it is doing

that with the water going. When you're doing it with alcohol hand sanitizer, you're physically rubbing the surface of your skin and making it a less habitable environment for bacteria."

In addition to disinfecting surfaces you touch regularly, frequent wheelchair cleaning and maintenance can help people prevent the transfer of bacteria to parts of their body.

"I think another important message is just like your hands, people being mindful of their equipment, for instance, their wheelchairs, and making sure they're cleaned regularly according to the specifications of the chair," he says. "They're often made from different kinds of materials, so it's hard to say, 'Oh, you must clean them this way using this product this frequently.'"

Cleaning your chair properly is even more critical in snowy climates during the winter.

"If there's something on the ground, be it something very obvious like dirt or mud, as the wheel turns, that mud is brought up much higher and it's much easier to get that mud, or in other circumstances certain kinds of bacteria, onto your hands or your clothes," he says. "So, it kind of reinforces the point of making sure that you're cleaning your hands regularly and then cleaning your chair properly if it's dirty after a use, cleaning it appropriately so that you're not dragging in, be it mud or whatever, from one environment into another environment."

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This manual wheelchair prototype could have several potential health benefits, including less hand contact with the drive wheels and tires.

## Keep It Clean

To that end, researchers are working on a way for wheelchair users to make basic hygiene even more effective.

Gary Goldish, MD, medical director of the Minneapolis Adaptive Design and Engineering Program at the Minneapolis VA Health Care System, and his team have built and are testing a manual wheelchair prototype that uses a geared chain drive system between the pushrims and the drive wheel. The “ergonomic wheelchair” design may have many health benefits for manual wheelchair users, but one potential advantage may be less contact with the drive wheels.

Goldish’s team presented some pilot testing of their device at the 2014 Rehabilitation Engineering and Assistive Technology Society of North America conference, and they hypothesized that “separating the pushrims from the drive wheels may improve wheelchair users’ hand hygiene because the users’ hands do not inadvertently touch the wheels, which have been in contact with the ground.”

The team recently concluded gathering data to test this hypothesis by comparing contaminants found on a regular

The ergonomic wheelchair prototype has pushrims that are separate from the drive wheels.



manual chair versus the ergonomic chair and plans to publish the results later this year.

As for the results of *PN*'s lab tests, Quinn says he was surprised that the results showed more bacteria on his seat than his armrests because he often uses his armrests to carry boxes and other items.

“I have two cushions. I keep two around in case something happens to one of them,” Quinn says. “I think I would start to rotate them during the week. I should probably rotate them and let them get totally dried out, cleaned, the whole nine yards.”

Fjerstad says he’s quite meticulous about cleaning his chair, especially after he’s rolled through unsanitary environments. While he must sometimes use the tire for stability during transfers, he mostly touches it with gloved hands.

“I’m driving a van [and] when I transfer, I’m going across my tire, my hands are touching everything, and I just rolled up the ramp and off of the street through who know’s what,” Fjerstad says. “The chances of inviting unwanted bacteria when you intermittent cath and things like that, there’s an opportunity to get bacteria into your system in a very harmful way. Just trying to keep things as clean as you can all the time is important.” ■