

Bacteria-sniffing Dog Helps Identify Surfaces to Disinfect to Help Reduce *C. diff* Infections

By The Water Quality & Health Council

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In a nutshell...

This is the story of Harley, a working beagle who is trained to identify *Clostridioides difficile* (aka “*C. diff*”) bacteria on surfaces. Harley prompts staff in a North Carolina medical center to disinfect contaminated surfaces with chlorine bleach, helping to reduce the facility’s *C. diff* infection rate.

Our canine pals have *very* discerning sniffers. Their amazing sense of smell, up to 100,000 times stronger than humans’, can detect the equivalent of one-half of a teaspoon of sugar in an Olympic-sized swimming pool, [according to PetMD](#). “Detection dogs” are trained to sniff out explosives, illegal drugs, and even cancer. Recently we learned that they also can be trained to sniff out the potentially life-threatening bacteria known as *C. diff*.

A January 27, 2020, [media report](#) describes the work of Harley, a hard-working detection beagle who is taken to the Vidant Medical Center in Greenville, North Carolina, twice each week to help identify surfaces contaminated with *C. diff*. These surfaces are then disinfected using chlorine bleach wipes.

The Trouble with C. diff

C. diff is short for “*Clostridioides difficile*,” a bacterium that can cause severe and life-threatening diarrhea (known as “CDAD,” or “*C. diff*-associated diarrhea”). The U.S. [Centers for Disease Control and Prevention \(CDC\)](#) estimates there are nearly 500,000 cases of *C. diff* infection each year. CDC notes most *C. diff* infections occur in people who have been taking antibiotics. Other risk factors for *C. diff* are being 65 years old or older, having recently been hospitalized, having a weakened immune system, or having had a previous infection with or exposure to *C. diff*. [C. diff is highly contagious](#); in one laboratory [study](#) it took less than seven spores of the bacterium per cubic centimeter on a cage surface to produce a persistent infection in mice. The bacteria are passed through the fecal-to-oral route, so it is



Three cheers for sweet Harley, an infection prevention working dog in Greenville, North Carolina’s Vidant Medical Center

Photo credit: [East Carolina University News Services](#)

very important for those infected to wash their hands well after using the bathroom and to disinfect surfaces in the environments of *C. diff* patients.

Jumping through Hoops for Harley

Dr. Paul Cook of the East Carolina University Brody School of Medicine was instrumental in procuring Harley's help in fighting *C. diff* infections. Dr. Cook worked with dog trainer Keith Pittman to replicate the success of [dogs trained to detect *C. diff* in the Netherlands](#). Over the course of eight months, Mr. Pittman worked with Harley to help the pooch identify the bacteria on surfaces. He started with a very pungent culture of *C. diff* that even humans would have no difficulty smelling, and gradually reduced the amount for which Harley was rewarded for identifying. The wonderful advantage of working with dogs is that once they are familiar with an odor, they can detect it at *very* low levels, well beyond the limit of detection of the human nose.

*How Harley Ferrets Out *C. diff**

Harley is taken into hospital rooms that have been occupied by *C. diff*-infected patients. The pooch sniffs her surroundings and has been trained to sit down when she detects *C. diff* on a surface. That's the cue for disinfecting with chlorine bleach wipes. Previously, following a *C. diff* patient's discharge, hospital staff would clean and disinfect all environmental surfaces in that patient's room as thoroughly as they could, but there was always uncertainty, Dr. Cook noted, as to whether all *C. diff* bacteria had been removed. Harley helps provide that needed assurance. And the statistics are very encouraging: *C. diff* infection rates in the Vidant Medical Center are half the national average.

We congratulate Dr. Cook and Mr. Pittman on their extraordinary contribution to infection control, and recommend an extra-special treat for Harley!

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