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Bacterial infection's spread occurs beyond health care settings, study finds

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Review of *C. difficile* suggests most transmission takes place outside of hospitals, nursing homes.

(HealthDay)—A new British study raises questions about the transmission of *Clostridium difficile*, a bacteria that causes life-threatening diarrhea in people who have recently been on antibiotics.

Physicians have assumed that *C. difficile* mainly spreads from patient to patient in hospital settings.

However, a genetic analysis of *C. difficile* infections at the four Oxford University Hospitals during a three-year period found that only 35 percent of cases occurred because the bacteria passed from one person to another in the hospital, according the study in the Sept. 26 *New England Journal of Medicine*.

"Unexpectedly few cases—13 percent—appear to be acquired from direct ward-based contact with other symptomatic cases," said study co-author David Eyre, a research microbiologist at Oxford University's experimental medicine division. "These have previously been thought to be the main source of infections, and the focus of prevention efforts."

Another 19 percent of cases seemed to represent some sort of hospital contact outside the ward, the authors wrote, while the remaining 3 percent might have been contracted through at least one intermediate host at the hospital.

The new findings should prompt epidemiologists and public health experts to begin searching for other potential sources of *C. difficile* infection, both inside and outside the hospital, said a U.S. expert who wrote an journal editorial accompanying the study.

"This study clearly shows we're missing a lot of potential transmissions, a lot of potential sources of *C. difficile*, but we still don't know where the *C. diff.* is coming from," said Dr. Curtis Donskey, an associate professor of medicine at Case Western Reserve University and a staff physician in the infectious diseases section at Louis Stokes Cleveland VA Medical Center.

The U.S. Centers for Disease Control and Prevention recently named *C. difficile* one of the top three health threats caused by overuse of antibiotics.

The bacteria is opportunistic and invades a person's gut after antibiotics have wiped out the intestinal flora that normally would fend off such an infection, according to the CDC.

There are about 250,000 *C. difficile* infections a year in the United States that either require hospitalization or involve already hospitalized

patients. The bacteria kills 14,000 Americans a year, the CDC says.

In the new study, the Oxford researchers tested nearly 41,000 stool samples from patients for *C. difficile*. They cultured the bacteria and then genetically analyzed every strain to see which ones shared genetics and, therefore, were likely to have been transmitted from one patient to the other.

"The sources of *Clostridium difficile* infections were highly genetically diverse, with 45 percent of cases having a genetically distinct origin, suggesting a diverse reservoir of disease not previously appreciated," Eyre said.

That reservoir might be located inside or outside the hospital, editorial author Donskey said. People might be contracting the bacteria at the hospital from carriers who show no symptoms, or they could be contracting it from sources in the community such as water, food, animals, infants or other health care facilities such as nursing homes.

"I think the molecular typing they are doing will be one key way we can figure out where it's coming from," Donskey said. "We can combine our basic "shoe leather" epidemiology with molecular typing to get an answer."

Interestingly, the overall rate of *C. difficile* in Oxfordshire fell during the three-year study, Eyre noted, and suggested that more limited use of antibiotics might be a reason.

"This suggests that the decline in *Clostridium difficile* was due to factors that prevent the transition from simple exposure and asymptomatic carriage to overt disease," he said. "The main factor known to determine this is antibiotic exposure, particularly quinolones and cephalosporins. The use of these antibiotics fell significantly in the U.K. during the three

years of the study. Hence, it is likely that the fall in incidence in *Clostridium difficile* was likely to be due to restriction of use of antibiotics rather than an improvement in infection control."

More information: For more about *C. difficile*, visit the U.S. Centers for Disease Control and Prevention.