C. diff rates falling but still a concern

Ten years after an outbreak of *Clostridium difficile* killed as many as 2000 people in Quebec, the diarrhea-causing bacterium is infecting fewer people in Canadian hospitals, though it remains a major public health concern.

Mandatory reporting and stricter guidelines on antibiotic use and hygiene have helped reduce infection rates, and while reports of infections are still seen in the media, large-scale outbreaks are rare. But there is still plenty of room for improvement, says Dr. Allison McGeer, director of infection control at Mount Sinai Hospital in Toronto, Ontario. "We're doing better, but doing well? How is it acceptable that *C. diff* is still one of the top 10 most common infectious causes of death?"

C. difficile is primarily acquired in hospitals. Spread by spores, it can colonize a patient's gut after helpful gut bacteria are killed by antibiotics. Its toxins can cause severe diarrhea and colitis, and it can be fatal.

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Improved hygiene, in addition to mandatory reporting and stricter guidelines on antibiotic use, has helped reduce *C. difficile* infection rates in Canadian hospitals.

At the beginning of the 2000s, a more virulent strain, NAP1, sometimes referred to as the "Quebec strain," began circulating in Canadian hospitals, causing a dramatic rise in infections and deaths. NAP1 produces 20 times more toxins than other strains, is more easily transmitted and is more resistant to antibiotics. It is also more deadly. In the late 1990s, the mortality rate from *C. difficile* was 1.5%. By 2004, it had quadrupled, to nearly 6%.

In an effort to get the bug under control, provinces began requiring hospitals to report infections, starting with Quebec in 2004, followed by Manitoba in 2005 and Ontario in 2008. Today, all hospitals in Canada are required to report *C. difficile* infections to the Public Health Agency of Canada, though not every province makes the data public.

Mandatory public reporting had repeatedly been held up as an important part of infection control in hospitals, but according to Dr. Nick Daneman, an infectious disease specialist at Sunnybrook Health Sciences Centre in Toronto, there was little evidence that it actually improved patient outcomes. So he decided to find out if Ontario's reporting rules had changed things for the better.

In the six years before reporting of *C. difficile* became mandatory in Ontario, infection rates had been rising steadily, from 7 cases per 10 000 patient-days in 2002 to 10.8 per 10 000 patient-days in 2007. In the first year after reporting, the rate dropped to 8.9 per 10 000 patient-days, Daneman and colleagues reported in a research paper last year (*PLoS Med* 9(7): e1001268. doi:10.1371). Daneman estimates that the drop led to around 100 fewer deaths in the province.

The study could not definitively prove that public reporting was behind the drop, but Daneman says they did take measures to rule out other factors. The rates for other community-acquired gastrointestinal infections didn't change, for example, and they checked their data against other factors that predict *C. difficile* infection. Quebec and the United Kingdom also saw comparable falls in infection rates after they introduced public reporting.

It remains difficult to say why public reporting might have been effective in reducing infections, but Daneman thinks the sense of competition the reports encouraged between hospitals probably helped stimulate quality-improvement programs. The effect was short-lived, however. In the year since his study was published, infection rates have crept up, says Daneman, though they're still below the predicted rates under a do-nothing scenario in the paper. "The impact of public reporting might not be as big as we would like."

McGeer cautions that there is no "magic bullet" that will solve the problem. Controlling hospital-acquired infections involves making big changes in three different areas: the structure of hospitals (reducing the number of shared bathrooms, patient rooms and equipment), improved hygiene and more responsible antibiotic use.

"These are long, slow, painful changes," she says. "We're not going to change our hospital infrastructure for 20 to 25 years."

Improving hygiene, as well, is a difficult nut to crack. Though there has been good progress on hand hygiene, it is very difficult to clean for the hardy *C. difficile* spores. And when budgets are tight, housekeeping is an easy target for cuts.

To help move things along, Daneman is turning his attention to discovering which hospital-level interventions are most effective. "There are lots of guidelines out there, on hygiene and antibiotic use; we want to find the best ones." — Brian Owens, St. Stephen, NB.

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