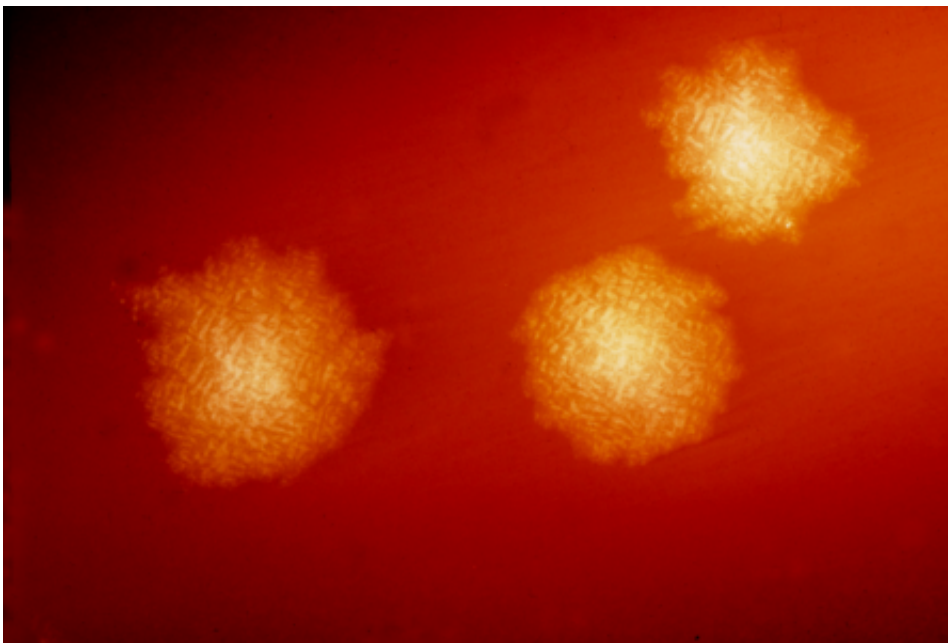


## Study: Sepsis care initiatives may lead to higher *C. difficile* infection rates, antibiotic resistance

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This photograph depicts *Clostridium difficile* colonies after 48hrs growth on a blood agar plate; Magnified 4.8X. *C. difficile*, an anaerobic gram-positive rod, is the most frequently identified cause of antibiotic-associated diarrhea (AAD). It accounts for approximately 15–25% of all episodes of AAD. Credit: CDC

Healthcare experts have long known the benefits of integrated sepsis care programs, yet less information has been published on potential unintended consequences of these programs. That's changed with a new

study that suggests that electronic sepsis screenings and treatment protocols could, in fact, lead to increased use of certain broad-spectrum antibiotics and healthcare facility-onset (HCFO) *C. difficile* infection (CDI) rates, according to findings published in the October issue of the *American Journal of Infection Control (AJIC)*, the journal of the Association for Professionals in Infection Control and Epidemiology (APIC).

The research is the first to address the inadvertent impact of [sepsis](#) care programs on broad-spectrum antibiotic use among hospitals and nursing unit-levels—and follows previous reports demonstrating the effectiveness of sepsis care programs, now a part of most hospitals.

Lead researcher Jashvant Poeran, MD, PhD, Assistant Professor of Population Health Science and Policy, Orthopaedics, and Medicine at the Icahn School of Medicine at Mount Sinai, alongside colleagues from The Mount Sinai Hospital, analyzed adult inpatients at a 1,171-bed tertiary care teaching hospital who were admitted to nursing units with both sepsis care bundle programs in place and the highest incidences of sepsis, antibiotic use, and HCFO CDI. Researchers collected data on the administration of [broad-spectrum antibiotics](#) per 1,000 patient days and HCFO CDI data per 10,000 patient days from June 2011 through July 2014.

Poeran and his team defined sepsis care bundle programs as sepsis screenings integrated into a hospital's electronic health record and EHR-triggered antibiotic administration. This protocol aims to standardize initial evaluation and subsequent sepsis management orders, including monitoring, laboratory tests, and fluid and antibiotic administration. The order set recommends broad-spectrum antibiotics available for use without preauthorization from a hospital's antibiotic stewardship team. These broad-spectrum antibiotics can increase the risk of CDI.

Among the findings:

- Over 127,346 total patient days, researchers recorded increased antibiotic use and HCFO CDI during sepsis care bundle implementation, with the period directly following the implementation phase accounting for the highest rate of antibiotic use (50.4 days of therapy [DOT] per 1,000 patient days).
- Specifically, while HCFO CDI rates were decreasing before sepsis care bundle implementation (-1.4 events per 10,000 patient days/month) they began to increase during (1.6 events per 10,000 patient days/month) and following (10.8 events per 10,000 patient days/month) implementation.
- Over the three-year timeframe, the data recorded an HCFO CDI rate of 14.4 per 10,000 patient days/month.
- While overall, cefepime was the most commonly used antibiotic, the main driver of increased antibiotic use was levofloxacin which, interestingly, was not part of the sepsis care order set. In the period directly following sepsis care bundle implementation phase (compared to the period before implementation) levofloxacin increased by 32.7 DOT per 1,000 patient days.
- Researchers proposed several explanations for the study's findings. For one, the increase in antibiotic administration could mirror the general increase in sepsis cases. But, as the study's authors write, the uptick could also be due to changes in documentation and diagnosis patterns. Integrated sepsis care programs may identify septic [patients](#) earlier in their disease course. This would lead to increased doses of antibiotics, particularly if antibiotics can be prescribed without preauthorization.

"Integrated sepsis care streamlines how treatment is delivered. Yet as our research indicates, providers face the tough task of addressing how to

deliver timely sepsis care, while mitigating potential unintended consequences such as an increase in healthcare facility-onset *Clostridium difficile* infection that may be linked to increased use of broad-spectrum [antibiotics](#)," said Dr. Poeran. "Hospitals' antibiotic stewardship teams can use these observations to align protocol with processes that ensure appropriate antibiotic administration."

"Routine integrated sepsis treatment remains an integral part of how providers deliver rapid care to counter a sepsis diagnosis," said Linda Greene, RN, MPS, CIC, FAPIC, 2017 APIC president. "But this is a double-edged sword: How do we prevent and treat sepsis while minimizing antibiotic resistance? We cannot diminish the importance of implementing swift treatment, but so, too, do we need more research to uncover solutions to the unintended consequences that ensue."

**More information:** Robert Hiensch et al, Impact of an electronic sepsis initiative on antibiotic use and health care facility-onset *Clostridium difficile* infection rates, *American Journal of Infection Control* (2017). [DOI: 10.1016/j.ajic.2017.04.005](https://doi.org/10.1016/j.ajic.2017.04.005)

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