



5 Things Medical Professionals Should Question for Infection Prevention and Antimicrobial Stewardship

1 Do not start antibiotics without evaluating the patient for bacterial infection and determining that antibiotics are needed to treat the infection.

Antibiotics increase the risk for *C. difficile* infection and other patient harms. Antibiotics also can affect the body's microbiome and contribute to antibiotic resistance.

Many patients are given antibiotics unnecessarily, primarily for misdiagnosed urinary tract infections or pneumonia. Antibiotics should never be given to a patient who does not need them. Antibiotics can cause adverse drug reactions, disrupt the body's microbiome, increase antibiotic resistance, and increase the risk for a patient to get *Clostridioides* (formerly *Clostridium*) *difficile* (*C. difficile*) infection. *C. difficile* infection is a life-threatening illness that can occur when antibiotics kill normal bacteria in the intestine. Patients recovering from *C. difficile* infections are three times more likely to have a recurrence of *C. difficile* infection if they take an antibiotic within a month.

Antibiotic resistant bacteria are a rising cause of death of hospitalized patients. Some studies have linked exposure to antibiotics to other medical problems even beyond the period when a person has an infection, such as asthma in childhood.

Sources

- 1 CDC Core Elements of Hospital Antibiotic Stewardship Programs <https://www.cdc.gov/antibiotic-use/hcp/core-elements/hospital.html>
- 2 CDC. Antibiotic Resistance Threats in the United States, 2019. Atlanta, GA: U.S. Department of Health and Human Services, CDC; 2019. www.cdc.gov/antimicrobial-resistance/media/pdfs/2019-ar-threats-report-508.pdf
- 3 Elligsen M, Walker SA, Pinto R, Simor A, Mubareka S, Rachlis A, Allen V, Daneman N. Audit and feedback to reduce broad-spectrum antibiotic use among intensive care unit patients: a controlled interrupted time series analysis. *Infect Control Hosp Epidemiol.* 2012 Apr;33: 354-61.
- 4 Antimicrobial Resistance Collaborators. Global burden of bacterial antimicrobial resistance in 2019: a systematic analysis. *Lancet.* 2022 Feb 12;399:629-655. Erratum in: *Lancet.* 2022 Oct 1;400:1102.

2

Stop antibiotics in patients whose diagnostic culture(s) are negative unless there is clear evidence of bacterial infection.

Patients often receive antibiotic treatment when bacterial infection is suspected but not yet confirmed. Usually, laboratory and radiology information are available after 3 days.

Based on test and culture results, antibiotics should be deescalated to a narrow-spectrum antibiotic or discontinued if there is no further evidence of infection.

Reducing antibiotic exposure decreases the risk of infections with *C. difficile* and antibiotic-resistant bacteria. Medical professionals should use their local antibiogram to develop guidance for narrow empiric choices to limit patient exposures to unnecessary antibiotics.

Sources

- 1 Kociolek LK, Gerding DN, Carrico R, Carling P, Donskey CJ, Dumyati G, Kuhar DT, Loo VG, Maragakis LL, Pogorzelska-Maziarz M, Sandora TJ, Weber DJ, Yokoe D, Dubberke ER. Strategies to prevent *Clostridioides difficile* infections in acute-care hospitals: 2022 Update. *Infect Control Hosp Epidemiol*. 2023 Apr;44:527-549.
- 2 Biondi EA, Mischler M, Jerardi KE, Statile AM, French J, Evans R, Lee V, Chen C, Asche C, Ren J, Shah SS; Pediatric Research in Inpatient Settings (PRIS) Network. Blood culture time to positivity in febrile infants with bacteremia. *JAMA Pediatr*. 2014 Sep;168:844-9.
- 3 Shaughnessy MK, Amundson WH, Kuskowski MA, DeCarolis DD, Johnson JR, Drekonja DM. Unnecessary antimicrobial use in patients with current or recent *Clostridium difficile* infection. *Infect Control Hosp Epidemiol*. 2013 Feb;34:109-16.
- 4 Drekonja DM, Amundson WH, Decarolis DD, Kuskowski MA, Lederle FA, Johnson JR. Antimicrobial use and risk for recurrent *Clostridium difficile* infection. *Am J Med*. 2011 Nov;124:1081.e1-7.

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Avoid giving patients unnecessary invasive medical devices.

All invasive medical devices pose a major risk for infection. Invasive medical devices, including central venous catheters, endotracheal tubes, indwelling urinary catheters, and peripheral IVs, may be necessary for patient support, but they also increase the patient's risk for healthcare-associated infection (HAI).

Often, invasive devices can be avoided. If they are used, they can be removed quickly with the help of clinical reminders and protocols. Invasive devices should never be used for convenience. Medical professionals should consider using alternatives to invasive medical devices when they are appropriate for the patient, such as external urinary catheters, and implement protocols that facilitate prompt removal.

Sources

- 1** Klompas M, Anderson D, Trick W, Babcock H, Kerlin MP, Li L, Sinkowitz-Cochran R, Ely EW, Jernigan J, Magill S, Lyles R, O'Neil C, Kitch BT, Arrington E, Balas MC, Kleinman K, Bruce C, Lankiewicz J, Murphy MV, E Cox C, Lautenbach E, Sexton D, Fraser V, Weinstein RA, Platt R; CDC Prevention Epicenters. The preventability of ventilator-associated events. The CDC Prevention Epicenters Wake Up and Breathe Collaborative. *Am J Respir Crit Care Med*. 2015 Feb 1;191:292-301.
- 2** Buetti N, Marschall J, Drees M, Fakih MG, Hadaway L, Maragakis LL, Monsees E, Novosad S, O'Grady NP, Rupp ME, Wolf J, Yokoe D, Mermel LA. Strategies to prevent central line-associated bloodstream infections in acute-care hospitals: 2022 Update. *Infect Control Hosp Epidemiol*. 2022 May;43:553-569.
- 3** Patel PK, Advani SD, Kofman AD, Lo E, Maragakis LL, Pegues DA, Pettis AM, Saint S, Trautner B, Yokoe DS, Meddings J. Strategies to prevent catheter-associated urinary tract infections in acute-care hospitals: 2022 Update. *Infect Control Hosp Epidemiol*. 2023 Aug;44:1209-1231.
- 4** Klompas M, Branson R, Cawcutt K, Crist M, Eichenwald EC, Greene LR, Lee G, Maragakis LL, Powell K, Priebe GP, Speck K, Yokoe DS, Berenholtz SM. Strategies to prevent ventilator-associated pneumonia, ventilator-associated events, and nonventilator hospital-acquired pneumonia in acute-care hospitals: 2022 Update. *Infect Control Hosp Epidemiol*. 2022 Jun;43:687-713.
- 5** Muller M, Bryant KA, Espinosa C, Jones JA, Quach C, Rindels JR, Stewart DL, Zangwill KM, Sánchez PJ. SHEA Neonatal Intensive Care Unit (NICU) White Paper Series: Practical approaches for the prevention of central-line-associated bloodstream infections. *Infect Control Hosp Epidemiol*. 2023 Apr;44:550-564.
- 6** Mermel LA. Short-term Peripheral Venous Catheter-Related Bloodstream Infections: A Systematic Review. *Clin Infect Dis*. 2017 Oct 30;65:1757-1762.
- 7** Blauw M, Foxman B, Wu J, Rey J, Kothari N, Malani AN. Risk Factors and Outcomes Associated with Hospital-Onset Peripheral Intravenous Catheter-Associated Staphylococcus aureus Bacteremia. *Open Forum Infect Dis*. 2019 Feb 27;6:ofz111.

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Do not perform diagnostic tests unless the patient has signs or symptoms of infection.

A positive diagnostic test result without a correlating clinical picture may represent colonization rather than infection, leading to overdiagnosis and overtreatment.

Although diagnostic tests such as urine, blood, sputum cultures, and PCR and/or NAAT tests are important for diagnosing disease when used in patients with appropriate signs or symptoms, if the patient does not have signs or symptoms test results can return positive when infection is not present. A positive blood culture may be due to contamination, a positive urine culture may represent asymptomatic bacteriuria, and a positive test for *C. difficile* may be from colonization. Treating patients who do not have infections exposes them to the risks of antibiotics without the benefit of treatment.

Medical professionals should consider implementing a tiered approach to diagnostic testing (for example, urinalysis with reflex urine culture) for infections that are difficult to diagnose.

Sources

- 1 Fabre V, Davis A, Diekema DJ, Granwehr B, Hayden MK, Lowe CF, Pfeiffer CD, Sick-Samuels AC, Sullivan KV, Van Schooneveld TC, Morgan DJ. Principles of diagnostic stewardship: A practical guide from the SHEA Diagnostic Stewardship Task Force. *Infect Control Hosp Epidemiol*. 2023 Feb;44:178-185.
- 2 Peterson LR, Robicsek A. Does my patient have *Clostridium difficile* infection? *Ann Intern Med*. 2009 Aug 4;151:176-9.
- 3 Dubberke ER, Carling P, Carrico R, Donskey CJ, Loo VG, McDonald LC, Maragakis LL, Sandora TJ, Weber DJ, Yokoe DS, Gerding DN. Strategies to prevent *Clostridium difficile* infections in acute care hospitals: 2014 update. *Infect Control Hosp Epidemiol*. 2014 Sep;35 Suppl 2:S48-65.
- 4 Patel PK, Advani SD, Kofman AD, Lo E, Maragakis LL, Pegues DA, Pettis AM, Saint S, Trautner B, Yokoe DS, Meddings J. Strategies to prevent catheter-associated urinary tract infections in acute-care hospitals: 2022 Update. *Infect Control Hosp Epidemiol*. 2023 Aug;44:1209-1231.
- 5 Schinkel M, Boerman A, Carroll K, Cosgrove SE, Hsu YJ, Klein E, Nanayakkara P, Schade R, Wiersinga WJ, Fabre V. Impact of Blood Culture Contamination on Antibiotic Use, Resource Utilization, and Clinical Outcomes: A Retrospective Cohort Study in Dutch and US Hospitals. *Open Forum Infect Dis*. 2023 Dec 22;11:ofad644.
- 6 Doern GV, Carroll KC, Diekema DJ, Garey KW, Rupp ME, Weinstein MP, Sexton DJ. Practical Guidance for Clinical Microbiology Laboratories: A Comprehensive Update on the Problem of Blood Culture Contamination and a Discussion of Methods for Addressing the Problem. *Clin Microbiol Rev*. 2019 Oct 30;33:e00009-19.
- 7 Nicolle LE, Gupta K, Bradley SF, Colgan R, DeMuri GP, Drekonja D, Eckert LO, Geerlings SE, Köves B, Hooton TM, Juthani-Mehta M, Knight SL, Saint S, Schaeffer AJ, Trautner B, Wullt B, Siemieniuk R. Clinical Practice Guideline for the Management of Asymptomatic Bacteriuria: 2019 Update by the Infectious Diseases Society of America. *Clin Infect Dis*. 2019 May 2;68:e83-e110.
- 8 Curran J, Lo J, Leung V, Brown K, Schwartz KL, Daneman N, Garber G, Wu JHC, Langford BJ. Estimating daily antibiotic harms: an umbrella review with individual study meta-analysis. *Clin Microbiol Infect*. 2022 Apr;28:479-490.

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After wound closure, do not continue antibiotics that were used for routine surgical prophylaxis.

Prophylactic antibiotics can significantly decrease the risk of surgical site infections, but they are beneficial only when used intraoperatively. No evidence exists that they provide additional benefit after the surgical incision has been closed.

Unnecessary antibiotic use can cause harms, including antibiotic-resistant bacteria colonization and infection, *C. difficile* infection, and acute kidney injury.

Sources

- 1 Calderwood MS, Anderson DJ, Bratzler DW, Dellinger EP, Garcia-Houchins S, Maragakis LL, Nyquist AC, Perkins KM, Preas MA, Saiman L, Schaffzin JK, Schweizer M, Yokoe DS, Kaye KS. Strategies to prevent surgical site infections in acute-care hospitals: 2022 Update. *Infect Control Hosp Epidemiol.* 2023 May;44:695-720.
- 2 Bratzler DW, Dellinger EP, Olsen KM, Perl TM, Auwaerter PG, Bolon MK, Fish DN, Napolitano LM, Sawyer RG, Slain D, Steinberg JP, Weinstein RA; American Society of Health-System Pharmacists; Infectious Disease Society of America; Surgical Infection Society; Society for Healthcare Epidemiology of America. Clinical practice guidelines for antimicrobial prophylaxis in surgery. *Am J Health Syst Pharm.* 2013 Feb 1;70:195-283.
- 3 Ban KA, Minei JP, Laronga C, Harbrecht BG, Jensen EH, Fry DE, Itani KM, Dellinger EP, Ko CY, Duane TM. American College of Surgeons and Surgical Infection Society: Surgical Site Infection Guidelines, 2016 Update. *J Am Coll Surg.* 2017 Jan;224:59-74.
- 4 WHO SSI Global Guidelines for the Prevention of Surgical Site Infection Geneva: World Health Organization; 2018. ISBN-13: 978-92-4-155047-5.
- 5 Berríos-Torres SI, Umscheid CA, Bratzler DW, Leas B, Stone EC, Kelz RR, Reinke CE, Morgan S, Solomkin JS, Mazuski JE, Dellinger EP, Itani KMF, Berbari EF, Segreti J, Parvizi J, Blanchard J, Allen G, Kluytmans JAJW, Donlan R, Schechter WP; Healthcare Infection Control Practices Advisory Committee. Centers for Disease Control and Prevention Guideline for the Prevention of Surgical Site Infection, 2017. *JAMA Surg.* 2017 Aug 1;152:784-791. Erratum in: *JAMA Surg.* 2017 Aug 1;152:803.
- 6 Branch-Elliman W, O'Brien W, Strymish J, Itani K, Wyatt C, Gupta K. Association of Duration and Type of Surgical Prophylaxis with Antimicrobial-Associated Adverse Events. *JAMA Surg.* 2019 Jul 1;154:590-598.



Disclaimer

These items are provided solely for informational purposes and are not intended as a substitute for consultation with qualified medical professionals.

How this list was created

This list is managed by the SHEA Guidelines Committee. It originally was developed for the ABIM Choosing Wisely campaign.

Since it was first published in 2016, the Guidelines Committee has reviewed and updated it biennially, with the most recent revision in March 2024, published in July 2024.

In 2015, a SHEA task force compiled a list of approximately 40 recommendations of medical tests or treatments to avoid, collected from members of the SHEA Guidelines, Public Policy and Government Affairs, Antibiotic Stewardship, Education, and Publications Committees. From those suggestions, the group reviewed removed duplicates and electronically ranked them. The top 15 recommendations were sent to the SHEA Research Network for a separate ranking. The Guidelines Committee reviewed the top 8 recommendations for their appropriateness for the Choosing Wisely campaign, and five final recommendations were formally approved by the SHEA Guidelines Committee and the SHEA Board of Trustees. The method for the development of the first SHEA Choosing Wisely list is published in *Infection Control and Hospital Epidemiology*: <https://doi.org/10.1017%2Fice.2016.61>.

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