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If Not Now, When? Seizing the Moment for Antibiotic Stewardship

Lori A. Pollack, MD, MPH[1], **Carolyn V. Gould, MD, MSc**[1], and **Arjun Srinivasan, MD**[1]

[1]Division of Healthcare Quality Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia.

Efforts to improve antibiotic use in hospitals are consistently hampered by the complexity of medical decision making surrounding antibiotic administration. In addition to the myriad factors that influence a decision to start ntibiotics in the first place, there are a variety of issues that might change frequently during a course of therapy that can impact the decision to continue, change, or stop antibiotics.

There is certainly a great need to improve the way clinicians make decisions to start antibiotics. Better education and availability of information at the point of care on optimal diagnosis and treatment of infectious syndromes and on antibiotic spectra and dosing will lead to more effective decisions on the initiation of antibiotics. Interventions at the time of antibiotic prescribing using decision support or prior approval programs have proven highly effective in improving the way we start antibiotics.[1,2]

Just as important as the decision to start antibiotics is the decision to continue them. Antibiotics are often started in settings where their utility is unclear. Hence, the need for continued antibiotic therapy needs to be regularly reassessed in light of ever-changing clinical information. At least it should. Too often, antibiotics are started and simply continued without critical reappraisal.

One excellent strategy for improving reexamination of antibiotic treatments is to define specific moments when changes in therapy are especially likely to be important. This is a lesson learned from the World Health Organization hand hygiene campaign. Rather than simply telling people to clean their hands, the Clean Hands Campaign developed the My 5 Moments for Hand Hygiene approach, which lays out specific times during patient care when hand hygiene is especially critical.[3] Essential to applying this approach to antibiotics is, of course, the definition of these key moments in antibiotic therapy.

Given that microbiologic results are perhaps the single most important determinant of optimal antibiotics, a critical reassessment of therapy after 2 or 3 days, when culture results are likely to be available, seems warranted whenever antibiotics are used in hospitals. This

Address correspondence to Arjun Srinivasan, MD, 1600 Clifton Road, Mailstop A-07, Atlanta, GA 30333 (beu8@cdc.gov).

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has led to the concept of an “antibiotic time-out,” much like the procedure time-outs that have become standard practice before surgery. The idea is to pause and review a patient’s antibiotics after 2 or 3 days in light of not just the culture results but also the clinical response and other information that was not available when the antibiotics were started.

In addition to an antibiotic time-out after 2 or 3 days of treatment, there are other key moments when an antibiotic time-out is warranted, as demonstrated in the article by Shaughnessy et al[4] in this issue of *Infection Control and Healthcare Epidemiology.* In this excellent study, investigators from the Minneapolis Veterans Affairs Medical Center examined antibiotic therapy in patients with a new diagnosis of *Clostridium difficile* infection (CDI). Treatment guidelines for C. *difficile* emphasize the importance of evaluating and stopping all unnecessary antibiotics as a key part of treatment.[5] Indeed, as the authors of this study point out, non-CDI antibiotics not only lower cure rates for CDI but also can increase the risk of disease recurrence.[6,7] Shaughnessy and colleagues reviewed charts of patients who had a new diagnosis of CDI to see how often these patients were receiving unnecessary antibiotics. Each chart was reviewed by 2 infectious disease specialists, and necessity of therapy was based on whether the patient had an infection that required an antibiotic. In cases where an antibiotic was deemed necessary, the duration of therapy was also reviewed. The primary outcome was the total number of unnecessary antibiotic days.

Their findings, while discouraging, do point out a critical opportunity for improvement. More than half (57%) of all patients with a new diagnosis of CDI received a non-CDI antibiotic at some point in the month following the CDI diagnosis. Of these 141 patients, only 23% (33) received fully optimal non-CDI antibiotic treatment, meaning they received no unnecessary doses of antibiotics. The vast majority of patients, 76%, received at least 1 unnecessary dose of an antibiotic. But most importantly, 36 of the 141 patients—or 26%—received only unnecessary antibiotics following a new diagnosis of CDI. Of the 2,147 antimicrobial days that occurred during a CDI and the 30 days following CDI treatment, 964 (45%) included at least 1 unnecessary antimicrobial, and 763 (36%) included only unnecessary antimicrobials. The authors examined several potential predictors of unnecessary antibiotic therapy but did not find any particular patient or clinician factors that predicted unnecessary use. One encouraging finding was that patients who were immune suppressed were less likely to receive unnecessary antibiotics.

Even more important, the authors examined the diagnoses for which unnecessary antibiotics were given. These results were particularly eye-opening. More often than not, antibiotics for empiric therapy for fever and leukocytosis, urinary tract infection, and pneumonia were unwarranted. Indeed, unnecessary antibiotic days accounted for 81% of all antibiotic days given for urinary tract infection. Taken together, these 3 indications accounted for 60% of all unnecessary antibiotic days following a new diagnosis of CDI, with urinary tract infection and pneumonia combined accounting for nearly 50%. This finding fits well with the results of other studies showing significant inappropriate antibiotic treatment for these 2 commonly diagnosed infections.[8,9]

It is impossible to say exactly how much of an impact reducing these unnecessary antibiotic days would have on CDI, although there is no doubt that it would have some impact. Several studies have shown that reducing antibiotic days will avert CDI.[10,11] It is interesting to note that in this study CDI recurred in 47% of patients who received only unnecessary antibiotics, nearly double the usually reported recurrence rate for CDI. This certainly suggests an important opportunity for prevention.

We should applaud Shaughnessy and colleagues for performing a study that provides concrete data for action. The authors have shown us another critical moment for an antibiotic time-out—anytime a new diagnosis of CDI is made. A major benefit to promoting a time-out with a new CDI diagnosis is that the antibiotic reassessment has immediate and direct benefits to the individual patient: higher cure rates and lower risk of recurrent disease. This should make the time-out that much more acceptable—and even desirable—to providers. Moreover, the authors have shown us that if we can prompt critical reappraisal of antibiotics being given for just 2 infections—urinary tract infections and pneumonia—we could potentially reduce unnecessary antibiotic use in hospitals by half. Highlighting key moments for antibiotic time-outs is one way we can make antibiotic stewardship a core part of every clinician's practice. Shaughnessy and colleagues have shown us the opportunity; our next challenge will be to seize it.

REFERENCES

1. Hermsen ED, VanSchooneveld TC, Sayles H, Rupp ME. Implementation of a clinical decision support system for antimicrobial stewardship. Infect Control Hosp Epidemiol 2012;33(4): 412–415. [PubMed: 22418640]
2. Lautenbach E, LaRosa LA, Marr AM, Nachamkin I, Bilker WB, Fishman NO. Changes in the prevalence of vancomycin-resistant enterococci in response to antimicrobial formulary interventions: impact of progressive restrictions on use of vancomycin and third-generation cephalosporins. Clin Infect Dis 2003;36: 440–446. [PubMed: 12567301]
3. Sax H, Allegranzi B, Uçkay I, Larson E, Boyce J, Pittet D. "My five moments for hand hygiene": a user-centred design approach to understand, train, monitor and report hand hygiene. J Hosp Infect 2007;67(l):9–21. [PubMed: 17719685]
4. Shaughnessy MK, Amundsen WH, Kuskowski MA, DeCarolis DD, Johnson JR, Drekonja DM. Unnecessary antimicroibial use in patients with current or recent Clostridium difficile infection. Infect Control Hosp Epidemiol 2013;34(2):109–116 (in this issue). [PubMed: 23295554]
5. Cohen SH, Gerding DN, Johnson S, et al. Clinical practice guidelines for Clostridium difficile infection in adults: 2010 update by the Society for Healthcare Epidemiology of America (SHEA) and the Infectious Diseases Society of America (IDSA). Infect Control Hosp Epidemiol 2010;31(5): 431–455. [PubMed: 20307191]
6. Johnson S Meeting the challenge of recurrent Clostridium difficile infection. J Hosp Med 2012;7(suppl 3):S11–S13.
7. 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;124(11): 1081el–1081.e7.
8. Cope M, Cevallos ME, Cadle RM, Darouiche RO, Musher DM, Trautner BW. Inappropriate treatment of catheter-associated asymptomatic bacteriuria in a tertiary care hospital. Clin Infect Dis 2009;48:1182–1188. [PubMed: 19292664]
9. Frei CR, Restrepo MI, Mortensen EM, Burgess DS. Impact of guideline-concordant empiric antibiotic therapy in communityacquired pneumonia. Am J Med 2006;119(10):865–871. [PubMed: 17000218]

10. Aldeyab MA, Kearney MP, Scott MG, et al. An evaluation of the impact of antibiotic stewardship on reducing the use of highrisk antibiotics and its effect on the incidence of Clostridium difficile infection in hospital settings. J Antimicrob Chemother 2012;67(12):2988–2996. [PubMed: 22899806]
11. Stevens V, Dumyati G, Fine LS, Fisher SG, van Wijngaarden E. Cumulative antibiotic exposures over time and the risk of Clostridium difficile infection. Clin Infect Dis 2011;53(1):42–48. [PubMed: 21653301]