

## Asymptomatic Bacteriuria: For How Long Will We Keep Swimming Against The Current?

“The chains of habit are too weak to be felt until they are too strong to be broken.”

—Samuel Johnson

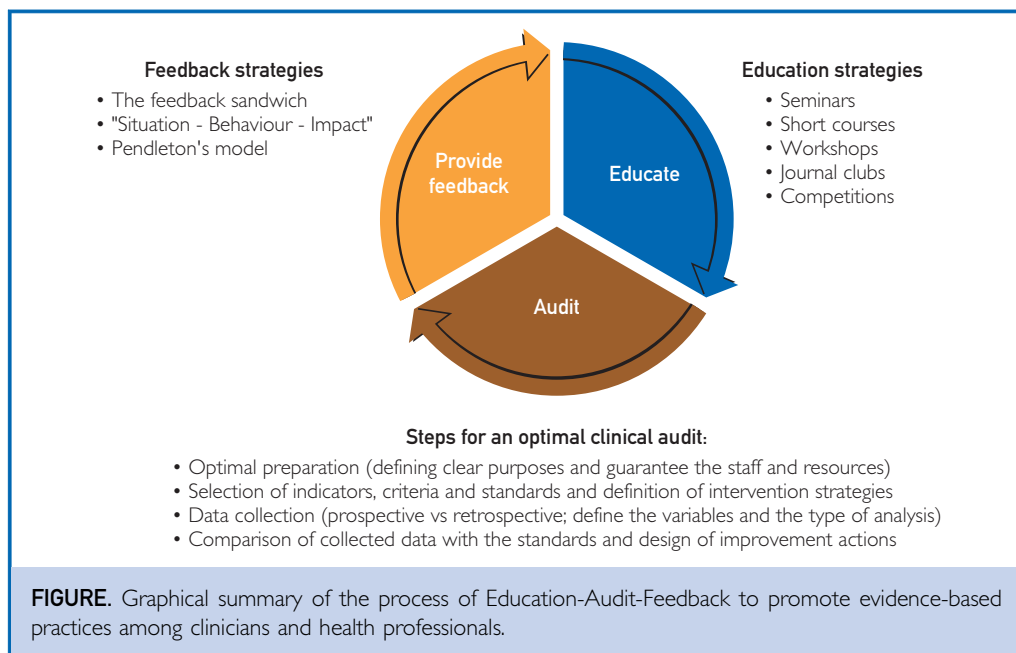
Understanding the dynamics of medical practice today is a complex issue. However, one thing is widely known: changing clinical conduct is not easy.<sup>1</sup> An example of this is the impressive 17-year time lag from an idea appearance to its application in the clinical setting.<sup>2</sup> Multiple behavioral models have addressed this problem, pointing out that there are barriers in the process of learning and in the implementation of new knowledge; however, this knowledge is not “written in a blank sheet,” but has to be overwritten in pre-existing concepts that may have been memorized for decades. This process is called de-innovation, de-adoption, or de-diffusion.<sup>3</sup> Recent research has pointed out that this process of unlearning old manners may be the most significant limitation for the new knowledge to thrive in current clinical practice. Becker et al<sup>4</sup> proposed one of the most accepted definitions of unlearning, defining it as “the process by which individuals and organizations acknowledge and release prior learning (including assumptions and mental frameworks) in order to incorporate new information and behaviors.” There are many examples of how the lack of unlearning represents a problem for innovation. For example, Eisenberg et al<sup>5</sup> 3 decades ago observed that even when having new techniques such as brain computed tomography (CT) and oral cholecystograms, old and outmoded diagnostic tests such as nuclear medicine brain scans and ultrasounds were still used as a supplement.

Nonetheless, this problem is not restricted to imaging techniques. In this issue of *Mayo Clinic Proceedings: Innovations, Quality & Outcomes*, a study by Hellinger et al<sup>6</sup> assessed the impact of cessation of screening urine cultures (UCs) on the surgical site infection (SSI)

incidence in clinical practice. The researchers analyzed all patients (a total of 2754) undergoing hip replacement, knee replacement, spinal fusion, and laminectomy 12 months before and after cessation of preoperative UC screening at their institution. They observed an 86.6% (988 of 1141) reduction in screening cultures over a 12-month period, a condition that was associated with a reduction of 988 unnecessary UCs and an 82.8% (29 of 35) decline in inappropriate antimicrobial treatment of asymptomatic bacteriuria (ASB) without an increase in SSI incidence. This study adds valuable information to the existing literature and is in accordance with the conclusions of most of the studies and guidelines published until now.<sup>7-11</sup>

Since 2005, several studies have shown the lack of benefit of systematic screening and antimicrobial treatment of ASB in populations different from pregnant women.<sup>9,10,12,13</sup> Moreover, multiple scientific entities, such as the Infectious Diseases Society of America (IDSA) and the US Preventive Services Task Force (USPSTF), have published clinical guidelines addressing the issue of ASB management, all concluding that treatment could be justified only in gravid women.<sup>8,11</sup> Then, it is reasonable to ask ourselves: after more than ten years of existing literature that discourages systematic screening and treatment for ASB, why do we keep seeing studies evaluating ASB screening and treatment published in medical journals and with this high relevance?

The answer is simple: we keep doing the same, as it was evidenced in a recent systematic review and meta-analysis that evaluated the rate of inappropriate ASB treatment based on the IDSA guideline recommendations. The result was worrisome; 45% (95% CI, 39–50;  $\tau^2$ , 0.08) of the total cases that did not require treatment by guidelines were prescribed with antimicrobials, identifying gram-negative pathogens, nitrite positivity, and female sex as risk factors for this inappropriate prescription.<sup>14</sup> However, these results are definitely not



due to rebel physicians that prescribe antibiotics just to oppose clinical guidelines; instead, most of the clinicians are still concerned of the possibility of complications potentially derived from withholding antibiotic prescription, arguing that their patients have had so far good results with their systematic antibiotic prescription strategy or that their patients are more ill or just different from those covered by the IDSA and the USPSTF statements.<sup>15</sup> This *status quo* remained even after the publication of the 2005 IDSA guideline and the 2008 USPSTF statement (both clearly against systematic ASB screening and treatment in most clinical scenarios) due to the lack of multi-level implementation programs, and it will remain in the future even after the 2019 guidelines unless an implementation plan closes the gap between guidelines and clinical practice.

The solution to this issue relies on a clinician behavioral change, which can be achieved through a process of education, audit, and feedback (Figure).<sup>16,17</sup> This education process must start by demystifying ASB as an exclusively pathological condition, as today we know it represents a condition of stable bacterial colonization of the urinary tract with some characteristics of commensalism as in other mucosal sites.<sup>18</sup> Furthermore, some studies

have even suggested that ASB may be beneficial, as it may prevent superinfection with other strains by a phenomenon called bacterial interference, a condition that derives from the interactions between microorganisms that result in competition for nutrients and the production of toxic molecules, leading finally to a microbial balance on colonized surfaces.<sup>19</sup> Secondly, there is an urgent need for discouraging systematic UC screenings in asymptomatic patients, which was the focus of the successful Kicking CAUTI campaign.<sup>20</sup> Finally, a de-implementation initiative is crucial to reduce incorrect antibiotic use for ASB. One of the most successful examples of this is the ABCs of ASB, a campaign that taught physicians alternative strategies for the management of ASB instead of antimicrobial therapy while discouraging systematic screening for this condition. This initiative achieved a 50% reduction in unnecessary antimicrobial use in preoperative settings and nursing home facilities.<sup>21</sup> Similar to the mentioned ones, multiple strategies have been proposed and carried out worldwide to prevent unnecessary antibiotic treatment for ASB (multifaceted education, antimicrobial stewardship education, phone call requirement for results, case-based audit and feedback, among others), all of them

showing a positive impact in the chosen outcome.<sup>14</sup>

The crucial point is to create a strategy that fits into the local and regional context of our clinical practice, capable of delivering the guidelines recommendations in a flexible, structured, and user-friendly manner, allowing the audit process to identify “weak points” and finally providing complete feedback. By doing this, we may have a chance to prevent the history of the failed implementation of the 2005 and 2008 guidelines from repeating itself and finally promote this long-needed change in current clinical practice, which consists of shifting the culture of systematic culturing and treatment of ASB to more individualized and precise interventions for the benefit of this population.

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#### REFERENCES

1. Ubel PA, Asch DA. Creating value in health by understanding and overcoming resistance to de-innovation. *Health Aff (Millwood)*. 2015;34(2):239-244.
2. Morris ZS, Wooding S, Grant J. The answer is 17 years, what is the question: understanding time lags in translational research. *J R Soc Med*. 2011;104(12):510-520.
3. Gnjidic D, Elshaug AG. De-adoption and its 43 related terms: harmonizing low-value care terminology. *BMC Med*. 2015;13:273.
4. Becker KL. Individual and organisational unlearning: directions for future research. *Int J Organ Behav*. 2005;9(7):659-670.
5. Eisenberg JM, Schwartz JS, McCaslin FC, Kaufman R, Glick H, Kroch E. Substituting diagnostic services. New tests only partly replace older ones. *JAMA*. 1989;262(9):1196-1200.
6. Hellinger W, Haehn D, Heckman M, et al. Improving value of care: cessation of screening urine culture prior to orthopedic and spinal surgery. *Mayo Clin Proc Inn Qual Out*. 2020;4(2):126-131.
7. Goldman JD, Julian K. Urinary tract infections in solid organ transplant recipients: guidelines from the American Society of Transplantation Infectious Diseases Community of Practice. *Clin Transplant*. 2019;9:e13507.
8. Nicolle LE, Gupta K, Bradley SF, Colgan R, DeMuri GP, Drekonja D, et al. Clinical practice guideline for the management of asymptomatic bacteriuria: 2019 update by the Infectious Diseases Society of America. *Clin Infect Dis*. 2019;68(10):e83-e110.
9. Gómez-Ochoa SA, Espín-Chico BB, García-Rueda NA, Vega-Vera A, Osma-Rueda JL. Risk of surgical site infection in patients with asymptomatic bacteriuria or abnormal urinalysis before joint arthroplasty: systematic review and meta-analysis. *Surg Infect*. 2019;20(3):159-166.
10. Gómez-Ochoa SA, Vega-Vera A. Systematic review and meta-analysis of asymptomatic bacteriuria after renal transplantation: incidence, risk of complications and treatment outcomes. *Transpl Infect Dis Off J Transplant Soc*. 2020;22(1):e13221.
11. Henderson JT, Webber EM, Bean SI. Screening for asymptomatic bacteriuria in adults: updated evidence report and systematic review for the US preventive services task force. *JAMA*. 2019;322(12):1195.
12. Wang C, Yin D, Shi W, Huang W, Zuo D, Lu Q. Current evidence does not support systematic antibiotherapy prior to joint arthroplasty in patients with asymptomatic bacteriuria—a meta analysis. *Int Orthop*. 2018;42(3):479-485.
13. Angelescu K, Nussbaumer-Streit B, Sieben W, Scheibler F, Gartlehner G. Benefits and harms of screening for and treatment of asymptomatic bacteriuria in pregnancy: a systematic review. *BMC Pregnancy Childbirth*. 2016;16(1):336.
14. Flokas ME, Andreatos N, Alevizakos M, Kalbasi A, Onur P, Mylonakis E. Inappropriate management of asymptomatic patients with positive urine cultures: a systematic review and meta-analysis. *Open Forum Infect Dis*. 2017;4(4):ofx207.
15. Trautner BW, Petersen NJ, Hysong SJ, Horwitz D, Kelly PA, Naik AD. Overtreatment of asymptomatic bacteriuria: identifying provider barriers to evidence-based care. *Am J Infect Control*. 2014;42(6):653-658.
16. Patelarou AE, Kyriakoulis KG, Stamou AA, Laliotis A, Sifaki-Pistolla D, Matalliotakis M, et al. Approaches to teach evidence-based practice among health professionals: an overview of the existing evidence. *Adv Med Educ Pract*. 2017;8:455-464.
17. Esposito P, Dal Canton A. Clinical audit, a valuable tool to improve quality of care: General methodology and applications in nephrology. *World J Nephrol*. 2014;3(4):249-255.
18. Salvador E, Wagenlehner F, Köhler C-D, Mellmann A, Hacker J, Svanborg C, et al. Comparison of asymptomatic bacteriuria Escherichia coli isolates from healthy individuals versus those from hospital patients shows that long-term bladder colonization selects for attenuated virulence phenotypes. *Infect Immun*. 2012;80(2):668-678.
19. Sundén F, Håkansson L, Ljunggren E, Wullt B. Escherichia coli 83972 bacteriuria protects against recurrent lower urinary tract infections in patients with incomplete bladder emptying. *J Urol*. 2010;184(1):179-185.
20. Trautner BW, Grigoryan L, Petersen NJ, Hysong S, Cadena J, Patterson JE, et al. Effectiveness of an antimicrobial stewardship approach for urinary catheter-associated asymptomatic bacteriuria. *JAMA Intern Med*. 2015;175(7):1120.
21. Gupta K, Trautner BW. The 2019 USPSTF report on screening for asymptomatic bacteriuria—lessons from history. *JAMA Netw Open*. 2019;2(9):e1912522.