

Antimicrobial Stewardship in the Emergency Department

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KEYWORDS

- Antibiotics • Antimicrobial stewardship • Emergency department
- Quality improvement • Infectious diseases

KEY POINTS

- The emergency department is a critical setting for antimicrobial stewardship efforts given the frequency of infectious disease encounters and its major role in hospital admissions and acute care outpatient encounters.
- Institutional support, especially for a physician champion, is critical for the success of any emergency department-based antimicrobial stewardship intervention.
- The biomarker procalcitonin and influenza assays are effective means to differentiate viral from bacterial causes of respiratory tract infections and thereby safely reduce unnecessary antibiotic prescribing.
- Emergency department stewardship efforts for urinary tract infections should focus on avoiding routine screening urinalyses for patients without urinary complaints and reducing treatment of asymptomatic bacteriuria.
- Clinical cure rates for uncomplicated abscesses are marginally improved with antibiotics following incision and drainage. The decision to prescribe antibiotics should involve shared decision making, which includes discussion of the risk/benefit ratio.

Disclosure Statement: M. Pulia: Ceptra (advisory board), Cepheid (grant funding, honoraria), Roche Diagnostics (grant funding), Thermo Fisher Scientific (advisory board, consulting). R. Redwood: No disclosures. L. May: Cepheid (grant funding, honoraria), Roche Diagnostics (grant funding, advisory board), BioFire (consulting).

Dr M. Pulia's effort on this article was supported in part by grant funding from the Agency for Healthcare Research and Quality (K08HS024342).

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Emerg Med Clin N Am ■ (2018) ■-■

<https://doi.org/10.1016/j.emc.2018.06.012>

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INTRODUCTION

Antimicrobials are unique among all classes of therapeutics in that they decrease in effectiveness over time and in direct relation to the frequency of use.¹ Pathogen resistance develops in response to selective pressure associated with all antibiotic prescribing but is accelerated by inappropriate use. Antimicrobials are critically important medications that affect not only the patient receiving them but also the surrounding community. A substantial increase in global rates of infections related to resistant pathogens, in combination with limited new antimicrobial agents in development, has raised concerns of an impending “postantibiotic era” with potential catastrophic consequences for human health.²

To address this public health crisis, tremendous efforts have begun to curb the widespread inappropriate use of antimicrobials in human health and agriculture.^{3–5} Antimicrobial stewardship refers to efforts aimed at optimizing the use of anti-infective medications. There is a substantial body of literature supporting the ability of hospital antimicrobial stewardship programs to reduce costs while also exerting a positive impact on clinical outcomes.⁶ The emergency department (ED) has traditionally been underrepresented as a focus for antimicrobial stewardship efforts. However, policy changes, such as the Joint Commission’s antibiotic stewardship accreditation standard (enacted January 1, 2017) and inclusion of stewardship quality metrics in the Centers for Medicare & Medicaid Services Physician Quality Reporting System,^{7,8} will increasingly require ED providers to engage in these efforts.⁹ This review serves as a primer on antimicrobial stewardship tailored for emergency care providers. To achieve this, we present antimicrobial stewardship from a public health and individual patient safety perspective, review the key domains of stewardship, identify the ED as a critical setting for stewardship efforts, summarize commonly implemented stewardship interventions, and provide stewardship strategies for the most common bacterial infections encountered in the ED.

Public Health Impact of Antimicrobial Misuse

Antimicrobial resistance is a phenomenon in which antimicrobials apply selective pressure on pathogens that, in turn, develop defense mechanisms against that antimicrobial agent’s mode of action.¹⁰ Antimicrobial resistance has been occurring since the advent of the first antimicrobial agents; however, the speed and severity of this naturally occurring phenomenon is accelerated by the misuse of antimicrobials.¹¹ One recent example of this was the increase in macrolide prescribing throughout the 1990s (+388% in ambulatory care).^{12,13} *Streptococcus pneumoniae* isolates resistance to macrolides rose dramatically during and after this time period, going from 10% in 1994 to 35% in 1995 and to 50% in 2009.¹⁴

From 2000 to 2010, antimicrobial use increased by 36% globally and the trend shows no signs of slowing.¹⁵ Moreover, the United States uses a disproportionate amount of antimicrobials per capita, ranking third in the world for total antimicrobial consumption.¹⁵ Antimicrobial resistance is widely regarded as a global epidemic and the conservative estimate for worldwide deaths directly attributable to antimicrobial resistance is 700,000 per year. That figure, however, is projected to swell to 10 million by the year 2050 if current trends continue.¹¹ Unchecked, the cumulative loss of economic output from antimicrobial resistance by 2050 would amount to 20 to 35 trillion US dollars or roughly double the current US gross domestic product.¹¹

Patient Safety Aspects of Antimicrobial Prescribing

Inappropriate and excessive use of antimicrobials remains a major public health threat; however, messaging to health care professionals and the public has frequently

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