

# Improving Antimicrobial Stewardship in Pediatric Emergency Care: A Pathway Forward

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In 2015, White House administrators released the National Action Plan for Combating Antibiotic-Resistant Bacteria with a 5-year goal to reduce unnecessary and inappropriate antibiotic prescribing in ambulatory settings by 50%.<sup>1</sup> Among ambulatory sites, emergency departments (EDs) receive ~30 million pediatric visits annually with ~7 million associated antibiotic prescriptions.<sup>2</sup> It is estimated that approximately one-half of these ED prescriptions for antibiotics are unnecessary or inappropriate.<sup>3</sup> Therefore, the ED represents an important site of care in which inappropriate antibiotic prescribing and the consequent impact posed by antibiotic-resistant bacteria can be reduced.

However, antimicrobial stewardship in the ED is challenging because of logistical and provider-level barriers as well as obstacles native to the ED environment.<sup>4</sup> In this issue of *Pediatrics*, Poole et al<sup>5</sup> describe the high proportion of unnecessary antibiotic prescribing for children who are evaluated in the ED and highlight the following important challenge of regulating antibiotic use in children: pediatric emergency care that occurs in nonpediatric hospitals. In their study, EDs that were not in children's hospitals had relatively higher rates of unnecessary antibiotic prescribing for acute respiratory tract infections, greater usage rates of broad-spectrum antibiotics, and higher rates of guideline-discordant therapy

for common infections (such as otitis media and pharyngitis).

More than 80% of pediatric emergency care occurs in general and community EDs.<sup>6</sup> As opposed to children's hospital EDs (which are typically academic, tertiary-care centers staffed by pediatric emergency specialists), general and community EDs are characterized by a diversity of providers. Setting and provider variation is associated with inappropriate prescribing, which is a result of limited pediatrics-specific training, limited education regarding evidence-based antibiotic prescribing, and fewer opportunities to treat common pediatric infections.<sup>7-9</sup> Therefore, the findings by Poole et al<sup>5</sup> are used to emphasize the need for generalizable solutions for implementing antibiotic stewardship programs (ASPs) in EDs.

Antibiotic stewardship interventions in ED settings are clearly necessary.<sup>3,10,11</sup> Despite the critical importance of antibiotic stewardship in patient care and public health, the reduction of inappropriate antibiotic use in EDs is not an easy task because of unique operational, provider-level, and system-level barriers native to pediatric, general, and community ED environments.<sup>4</sup> We propose the following strategies to enhance the implementation of generalizable, ED-based ASPs and optimize their design:

1. Collaboration and engagement. Generalizable ASP implementation requires input and effort from



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key stakeholders in pediatric, general, and community EDs. To be successful, the engagement of frontline providers is crucial for success.<sup>11</sup> However, even among children's hospitals, these collaborations have been lacking; <10% of pediatric hospitals with active ASPs have ED providers participating in ASP committees.<sup>12</sup> Within individual institutions, the participation of ED champions is important to help design interventions that are sensitive to operational concerns and facilitate ASP adoptions. On a broader level, ASPs represent an excellent outreach opportunity for administrators in pediatric hospital EDs to partner with those in local general and community EDs who are trying to implement pediatrics-focused ASPs;

2. Dissemination of best practices. Lectures and other traditional educational activities are often inadequate in improving clinical practice; knowledge retention from didactics is poor, especially when infections are low-frequency events. As stated by Poole et al,<sup>5</sup> exposure to pediatrics-focused guidelines is an important strategy for improving antibiotic prescribing in nonpediatric EDs. Although evidence-based clinical care pathways for common

childhood infections exist, the simple provision of these documents is insufficient.<sup>13</sup> The optimization and customization of clinical pathways for general and community EDs are necessary for effective implementation. Adapted clinical pathways that include a rigorous framework with locally tailored recommendations for antibiotic prescribing will likely increase guideline uptake. Additionally, the integration of guidelines into electronic health records (EHRs) can increase access and evidence delivery to ED providers<sup>14</sup>; and

3. Use of effort-independent mechanisms. Regardless of the type of ED, uniform barriers to ASP implementation include high volumes of patients, rapid patient turnover, and large numbers of providers with varying training and experience backgrounds.<sup>4,10</sup> Methods that are used to obviate the need for active provider solicitation, such as behavioral nudges and automated provider feedback, have been proven effective at curbing inappropriate prescribing in outpatient settings.<sup>15–17</sup> With the rapid increase of ED providers who use EHRs in their workflows, embedded and automated clinical-decision support has the potential to be used to

assist with antibiotic prescribing at the point of care, and it is often preferred by ED providers.<sup>18</sup> Importantly, behavioral-economic and EHR-based methods are truly generalizable beyond pediatric EDs and can be applied in all ED settings.

The data presented by Poole et al<sup>5</sup> are used to support the fact that there is a critical need for pediatric-focused antibiotic stewardship in general and community ED settings. However, interventions must be targeted at all ED providers who treat children. Efforts to develop generalizable, ED-based ASPs are underway. Recent multidisciplinary teams have used novel methods rooted in behavioral economics and dissemination and implementation science to successfully engage with and intervene in urgent care, pediatric, and general-ED antibiotic prescribing.<sup>15,18,19</sup> ASP and ED experts must continue to collaborate and formulate thoughtful solutions to this important patient-safety and public-health issue.

#### ABBREVIATIONS

ASP: antibiotic stewardship program  
ED: emergency department  
EHR: electronic health record

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