POLICY UPDATE
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As part of our [series](#) on current policy issues regarding antimicrobial stewardship and the threat of antimicrobial resistance (AMR), this update provides a broad overview of policy initiatives and key resources pertaining to antimicrobial stewardship that have been completed or published during the past year. We welcome your feedback on any of the issues addressed in this series. If you have comments or suggestions, please share your thoughts with CIDRAP's ASP project team via Twitter at [@CIDRAP_ASP](#) or email at [asp-cid@umn.edu](#).
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Overview of Recent Policy Initiatives and New Resources for Antimicrobial Stewardship

The meaning of the term "antimicrobial stewardship" has evolved over the past decade. It was recently defined as a "coherent set of actions" that promote the responsible use of antimicrobials. Antimicrobial stewardship programs (ASPs) or strategies can apply to individual or population health, humans or animals, and the environment ([Dyar 2017](#)). The meaning of "responsible use" of antimicrobials is more difficult to define but generally refers to the goals of preventing or reducing antimicrobial resistance (AMR) and preserving the effectiveness of therapies for bacterial, viral, and fungal infections.

Policy initiatives aimed at enhancing antimicrobial stewardship extend to various domains, including healthcare, research, public health, animal agriculture, and government. This ASP policy update offers a brief overview of current or recently completed policy initiatives and recently published reports or other publications that focus on antimicrobial stewardship. It highlights examples of policy initiatives in four areas listed below: ASP practice guidelines, coordination of programs, research and development, and animal agriculture.

Practice Guidelines

[ASP practice] *Antimicrobial Stewardship: From Principles to Practice,* an e-book released in March 2018, was published by the British Society for Antimicrobial Chemotherapy (BSAC), the European Society of Clinical Microbiology and Infectious Diseases (ESCMID) and the ESCMID Study Group for Antimicrobial Stewardship. This new ASP resource is available (with free registration) from the [BSAC website](#). Its 27 chapters offer guidance on a wide range of topics regarding the goals and process of applying antimicrobial stewardship principles to various healthcare settings and patient populations, illustrated using case studies, narratives, journal articles, slide sets, and videos ([BSAC 2018](#)).

[Antibiotic use] In its latest biennial review and update of the Model List of Essential Medicines (EML), the World Health Organization (WHO) Expert Committee on Selection and Use of Essential Medicines has adopted a new categorization for antibacterials used to treat common infectious diseases; the new categorization scheme uses three categories: "access," "watch," and "reserve." Specific antibacterial agents identified in the "access" group should be available at all times to treat common infections; those

in the "watch" group are recommended as first- or second-choice treatments for a small number of infections; and those in the "reserve" group should be considered last-resort options, used only in the most severe circumstances when all other alternatives have failed. The new categorization aligns with the goals of strengthening antimicrobial stewardship and ensuring access to necessary antibiotics, as highlighted in the [WHO Global Action Plan on Antimicrobial Resistance](#) ([WHO 2017a](#)).

[Outpatient care] A recent report by the Pew Charitable Trusts Antibiotic Resistance Project focuses on factors contributing to the overuse of antibiotics in outpatient healthcare settings. Based on findings from a previous study conducted in collaboration with the US Centers for Disease Control and Prevention (CDC), the report notes that nearly a third of the antibiotics prescribed in outpatient facilities (including physicians' offices, emergency departments, and outpatient clinics) are unnecessary. The new report identifies several key factors that influence physician decision-making, including patient satisfaction and pressure, time constraints, diagnostic uncertainty, and externalized responsibility. While the report indicates that conventional intervention strategies (eg, educational initiatives, communication training, audit and feedback strategies, clinical decision support systems, delayed prescribing) are important, it also advocates for the role of behavioral science to improve stewardship interventions. For example, recent research supports interventions such as public commitment to appropriate prescribing, increased provider accountability, and peer comparisons as ways to influence prescribing behavior ([Pew 2017a](#)).

[Hospitals] An international team of antimicrobial stewardship experts has defined a set of seven core elements for hospital ASPs—leadership commitment, accountability, drug expertise, action, tracking, reporting, and education—based on principles of effectiveness and affordability. These core elements, including a corresponding checklist of 29 items, apply to hospitals in both resource-rich and resource-limited contexts and provide international guidance and standards for the implementation and evaluation of ASPs in hospitals worldwide ([Pulcini 2018](#)).

[Small and critical access hospitals] The CDC has developed guidance on practical strategies to implement the 2014 [CDC core elements of hospital ASPs](#) in small and critical access hospitals, which may face challenges owing to limitations in staffing, infrastructure, and resources. The new guidance, which is based on discussions with hospital staff, is tailored to the needs of small and critical access hospitals. It provides additional targeted background information and identifies specific examples of successful strategies used by small hospitals to implement the core elements for ASPs ([CDC 2017a](#)).

[Infection control] The Association for Professionals in Infection Control and Epidemiology (APIC), the Society for Healthcare Epidemiology of America (SHEA), and the Society of Infectious Diseases Pharmacists (SIDP) recently published a joint position paper that highlights the importance of strategic, coordinated efforts to address the threat of AMR and prevent and control the spread of healthcare-associated infections, particularly those due to multidrug-resistant organisms. The paper focuses on the need for close collaboration between infection preventionists and ASP leadership and the need for well-functioning infection prevention programs to ensure the effectiveness of ASPs. The paper also highlights

the importance of integrating microbiology staff and clinical microbiologists into ASP efforts. ([Manning 2018](#)).

[Leadership] Two recent reports examine the roles of healthcare specialists in ASP leadership. A white paper published by the Infectious Diseases Society of America (IDSA), SHEA, and the Pediatric Infectious Diseases Society (PIDS) illustrates the business case for infectious disease (ID) physicians' leadership in ASPs and uses clinical vignettes to illustrate the importance of their role in ASPs across all healthcare settings ([Ostrowsky 2018](#)). The report outlines the unique value that ID physicians have in promoting stewardship. Key attributes of ID physicians include established leadership; ability to improve prescriber decision-making; clinical, microbiologic, and diagnostic expertise; and alignment with public health priorities. A position statement issued by the SIDP emphasizes the importance of pharmacists' expertise in ASP leadership, particularly regarding interpretation of diagnostic testing results and management of antibiotic prescribing ([Hill 2018](#)).

[Multidrug-resistant disease] A multidisciplinary team of experts in the UK have developed detailed evidence-based guidance on the treatment of infections due to multidrug-resistant (MDR) gram-negative bacteria. The new guidelines, devised by BSAC, the Healthcare Infection Society (HIS), and the British Infection Association (BIA), includes recommendations and best practices for antimicrobial prescribing, taking into account the challenges in optimizing antimicrobial therapy for MDR infections while also ensuring effective antimicrobial stewardship, particularly of the critical broad-spectrum agents ([Hawkey 2018](#)).

[*Clostridium difficile* infection] ESCMID has published updated guidelines, including 18 strong recommendations, on preventing *C difficile* infection among adults in acute-care settings through targeted infection prevention and control measures and ASPs. The recommendations for outbreak and endemic settings focus on diagnostic testing, surveillance, infection prevention and control methods, antibiotic prescribing, and education ([Tschudin-Sutter 2018](#)).

[Diagnostic technology] The US Government Accountability Office (GAO) has conducted a technology assessment of commercially available multiplex point-of-care diagnostic technologies for rapid detection of infectious disease pathogens. The GAO's report examines the range of performance characteristics, costs, technical challenges, and implementation issues associated with these technologies and assesses potential challenges and benefits, including improvements in patient outcomes, antimicrobial stewardship, and infection control, as well as issues regarding regulatory approval or clearance to market ([GAO 2017](#)).

[Antimicrobial susceptibility testing] Authorized by the US [21st Century Cures Act](#), the US Food and Drug Administration (FDA) has created the Antibacterial Susceptibility Test Interpretive Criteria [website](#) to enable healthcare providers to access information that will help guide the selection of effective antimicrobial therapies. The website provides updated information regarding antimicrobial breakpoints,

indicating in vitro susceptibility of bacteria and fungi to certain antibacterial/antifungal agents ([FDA 2018](#)).

Coordination of Programs

[Diagnostics] The Foundation for Innovative New Diagnostics (FIND), a nonprofit global health product development partnership, has recently issued a report outlining its overall strategy to combat AMR and preserve the effectiveness of new antimicrobials through enhanced diagnostics, focusing on three primary goals: (1) optimize the use of antimicrobial drugs through simple and rapid diagnostic tests that enable appropriate use of antimicrobials and reduce unnecessary prescribing of antibiotics for nonbacterial infections, (2) support the development and use of companion diagnostics for new antimicrobials, and (3) strengthen AMR surveillance and mapping through interconnected diagnostic networks ([FIND 2018](#)).

[Action plan] The European Commission has adopted a new action plan against AMR that takes a One Health approach to address the threat of AMR in humans, animals, and the environment. The plan focuses on three areas:

1. Establishing the European Union as a best-practice region to improve the effectiveness of national AMR policies across all EU member states through improving surveillance, improving coordination and implementation of EU rules, strengthening infection prevention and control measures, addressing the role of the environment, and building stronger partnerships across a range of key stakeholders
2. Supporting research, development and innovation on surveillance, new antimicrobials, diagnostics, and other approaches to reduce AMR
3. Promoting initiatives that support global AMR strategies, such as building a stronger EU global presence, strengthening bilateral partnerships, cooperating with developing countries, and creating a global research agenda ([European Commission 2017](#))

[Progress reporting] A number of organizations have recently issued updates or provided mechanisms to monitor progress in implementing global AMR initiatives. Recent reports include the following:

- The WHO, the Food and Agriculture Organization of the United Nations (FAO), and the World Organisation for Animal Health (OIE) organized an online global [database](#) to help track countries' development and implementation of national action plans and other efforts to address AMR, based on data from annual self-assessment questionnaires ([WHO/FAO/OIE 2018](#)).
- The United Nations secretary-general (UNGA) established an ad hoc Interagency Coordination Group (IACG) to provide practical guidance on efforts to ensure sustained effective global action to address AMR, aligned with the WHO Global Action Plan on AMR ([UNGA 2017](#))
- The Wellcome Trust and the United Nations Foundation issued a report on the progress of efforts to sustain global action against AMR, including the IACG's strategy, AMR surveillance programs, development of national action plans among WHO member states, industry

initiatives, research investments, and One Health initiatives ([Wellcome Trust/United Nations Foundation 2017](#)).

- The CDC published a report that summarizes data on the status of antibiotic use in US healthcare settings, including outpatient facilities, nursing homes, and hospitals, and highlights available resources to enhance antibiotic stewardship in human medicine ([CDC 2017b](#)).

- The US Task Force for Combatting Antibiotic-Resistant Bacteria issued a progress report on the first 2 years of implementing the US National Action Plan for Combating Antibiotic-Resistant Bacteria, detailing progress on its five goals: (1) slowing the emergence of drug-resistant bacteria, (2) strengthening surveillance systems, (3) developing rapid diagnostic tests, (4) accelerating the development of new antimicrobials, and (5) improving international collaboration on efforts to combat AMR ([HHS 2017](#)).

- The WHO issued a report on the early development and implementation of its Global Antimicrobial Resistance Surveillance System (GLASS), which was launched in 2015 to standardize and strengthen the collection, analysis, and sharing of AMR surveillance data worldwide, one of the strategic goals of the WHO Global Action Plan on AMR. The report documents participation, challenges, and outcomes across 42 enrolled countries (including many low- and middle-income countries), and reports national AMR data for key pathogens in 40 countries using standardized surveillance methodology ([WHO 2018](#)).

[Epidemiology] The Wellcome Trust has launched a new multidisciplinary international consortium, the Surveillance and Epidemiology of Drug-resistant Infections Consortium (SEDRIC), to address the gaps in drug-resistant infection surveillance and epidemiology. Steps include providing technical expertise on tracking, sharing, and analyzing AMR data and strengthening public health interventions aimed at reducing the burden of the drug-resistant infections ([Wellcome Trust 2018](#)). In addition, a new 4-year project, funded by the Wellcome Trust, the UK government, and the Bill and Melinda Gates Foundation, was launched to gather global data on select bacteria-antibacterial drug combinations in 195 countries and territories and produce publicly accessible maps to enable policymakers and researchers to facilitate future studies and target interventions at the local level ([Wellcome Trust 2017](#)).

Research and Development

[Incentives] DRIVE-AB, a public-private research consortium that was funded by the European Innovative Medicines Initiatives, issued its final report summarizing its research-based policy recommendations to incentivize antibiotic research and development (R&D) in response to scientific and economic challenges limiting the current R&D pipeline for innovative antibiotics. A key principle guiding the consortium's work was that new incentives to stimulate antibiotic innovation must be coupled with provisions for sustainable use and equitable availability. Through 12 specific recommendations, the report proposes the development of a complementary set of R&D incentives, combining "push" incentives (such as grants to support antibiotic R&D and pipeline coordinators to manage financial and technical gaps) and "pull" incentives (such as market-entry rewards to developers for achieving regulatory approval for new antibiotics that meet public health needs and ensure sustainable use and

access). The report also emphasizes the need for a de-linked payment system to ensure the availability of potentially low-volume but critical generic antibiotics (DRIVE-AB 2018).

[Prioritization] In response to a request from its member states, the WHO established an expert working group to create a priority list of antibiotic-resistant bacteria to help direct funding and coordinate R&D strategies to develop new antibiotics against drug-resistant bacteria that cause acute infections and MDR tuberculosis. The ranking methodology combined scientific evidence in 10 criteria and expert opinion from six WHO regions to ensure the inclusion of diverse global public health perspectives, resulting in the designation of three priority tiers of bacteria (critical, high, and medium). While R&D of new antibiotics against MDR tuberculosis remained a global priority, other high-priority targets include extensively drug-resistant gram-negative bacteria that cause acute infections in hospital and community settings (such as carbapenem-resistant *Acinetobacter baumannii* and *Pseudomonas aeruginosa*, and carbapenem-resistant and third-generation cephalosporin-resistant Enterobacteriaceae), as well as antibiotic-resistant bacteria responsible for community-acquired infections (eg, *Salmonella* spp, *Campylobacter* spp, *Neisseria gonorrhoeae*, and *Helicobacter pylori)*. (Tacconelli 2018; WHO 2017b)

[Pipeline Analysis] Two organizations, the WHO and the Pew Charitable Trusts, have released reports analyzing the current R&D pipeline of antimicrobials. The WHO's report concludes that the clinical development pipeline is insufficient to address rising rates of AMR; potential treatment options are lacking for the most critical drug-resistant pathogens, especially MDR and extensively drug-resistant gram-negative pathogens, and that most of the agents in the pipeline are modifications of existing antibiotic classes (and therefore cannot overcome existing resistance mechanisms). In addition, few oral formulations of antibiotics needed to treat community-acquired gram-negative infections are in the pipeline (WHO 2017c). The Pew Charitable Trusts has updated and expanded the scope of its 2014 antibiotics pipeline analysis and data visualization to include antibiotics currently in global clinical development and nontraditional products such as peptide immunomodulators, vaccines, lysins, virulence inhibitors, antibodies, and probiotics. The Pew report also suggests policy actions to strengthen the antibiotic pipeline (Pew Charitable Trusts 2017b).

Animal Agriculture

[Guidelines] The WHO has developed evidence-based recommendations and best practice statements on the use of medically important antimicrobials in food-producing animals, using its fifth revision (2017) of the WHO List of Critically Important Antimicrobials for Human Medicine. Despite low-quality evidence, given the potentially large benefits to human health, the WHO strongly recommends an overall reduction in the use of all classes of medically important antimicrobials in food animals, including complete restriction of medically important antimicrobials for growth promotion and prevention of infectious diseases that have not yet been clinically diagnosed (WHO 2017d).

[Best practices] A veterinary antimicrobial stewardship network funded by the Joint Programming Initiative on Antimicrobial Resistance (JPIAMR) has developed guidelines for monitoring farm-level

antimicrobial use, detailing best practices for establishing systems for data collection, analysis, benchmarking, and reporting. The guidelines are intended to provide farm-level monitoring and feedback on prescribing practices and support antimicrobial stewardship (AACTING 2018).

[Roadmap] An interdisciplinary group has released a One Health policy roadmap addressing the use of medically important antibiotics in livestock as a driver of AMR in humans and the need for enhanced antibiotic stewardship in food animal production. Its recommendations focus on monitoring and reducing the on-farm use of medically important antibiotics and enhancing surveillance and reporting to inform antibiotic stewardship policies. Additional guidance is provided on appropriate metrics for reporting antibiotic use in food animals and the development of government policies to prevent overuse of antibiotics in the livestock sector (Expert Commission on Addressing the Contribution of Livestock to the Antibiotic Resistance Crisis 2017).

[Policy analysis] A report by the Pew Charitable Trusts provides an overview of the status of potential alternatives to antibiotics, such as vaccines and probiotics, for use in animal agriculture that could be used for growth promotion, infection prevention in livestock, and other purposes. The report examines data on the efficacy and cost-effectiveness of alternative products and potential ways to integrate their use in farm management (Pew Charitable Trusts 2017c).

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