

The 10 × '20 Initiative: Pursuing a Global Commitment to Develop 10 New Antibacterial Drugs by 2020

Infectious Diseases Society of America^a

Infectious Diseases Society of America, Arlington, Virginia

The time has come for a global commitment to develop new antibacterial drugs. Current data document the impending disaster due to the confluence of decreasing investment in antibacterial drug research and development concomitant with the documented rapid increase in the level of resistance to currently licensed drugs. Despite the good faith efforts of many individuals, professional societies, and governmental agencies, the looming crisis has only worsened over the past decade.

THE PROBLEM

Drug-resistant infections and related morbidity and mortality are on the rise in the United States and around the world. The World Health Organization has identified antimicrobial resistance as 1 of the 3 greatest threats to human health. Two recent reports—one by the Infectious Diseases Society of America (IDSA) [1] and another by the European Centre for Disease Prevention and Control and the European Medicines Agency [2]—demonstrate that there are few candidate drugs in the pipeline that offer benefits over existing drugs and few drugs moving forward that will treat infections due to the so-called “ESKAPE” pathogens (*Enterococcus faecium*, *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Acinetobacter baumannii*, *Pseudomonas aeruginosa*, and *Enterobacter* species), which currently cause the majority of US hospital infections and ef-

fectively “escape” the effects of approved antibacterial drugs [1, 3].

The antibiotic pipeline problem may change the practice of medicine as we know it. Advanced interventions currently taken for granted—for example, surgery, cancer treatment, transplantation, and care of premature babies—could become impossible as antibiotic options become fewer. Resistance to the current library of antibacterial drugs is a serious problem in all parts of the world including the Asia-Pacific region, Latin America, Europe, and North America. Accordingly, the regulatory, financial, and scientific challenges/impediments to antibacterial drug development are a global problem.

Bad Bugs Need Drugs



Ten new ANTIBIOTICS by 2020

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^a This statement was written by David N. Gilbert, Robert J. Guidos, Helen W. Boucher, George H. Talbot, Brad Spellberg, John E. Edwards Jr, W. Michael Scheld, John S. Bradley, and John G. Bartlett as members of the Infectious Diseases Society of America's Antimicrobial Availability Task Force. It was approved by the Infectious Diseases Society of America Board of Directors on 3 February 2010.

Reprints or correspondence: Mr Robert J Guidos, Public Policy & Government Relations, Infectious Diseases Society of America, 1300 Wilson Blvd, Suite 300, Arlington, VA 22209 (RGuidos@idsociety.org).

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Table 1. Key Global Leaders Needed to Solve the Antibacterial Pipeline Problem

Individual stakeholders cannot, and have not, been able to solve the problem of development of new, effective antibiotics for ever more-resistant bacteria. Diverse voices are essential to drive action. The first step is the global commitment of the leadership of

- The executive branch of the government (both US and global counterparts), including the US Department of Health and Human Service's Food and Drug Administration, Biomedical Advanced Research and Development Authority, National Institutes of Health, Centers for Disease Control and Prevention, and Department of Commerce
- The US Congress and global counterparts
- The pharmaceutical and diagnostics industries
- Health care providers (including those engaged in cancer care and treatment, surgery, pediatrics, transplantation, and infectious diseases) and their professional societies
- Policy and legal communities (including experts in pharmacoconomics, intellectual property, and reimbursement policy)
- Medical universities and independent research institutes
- Medical and public health philanthropic organizations
- Affected patient advocacy groups

THE SOLUTION

It is IDSA's conviction that the antibiotic pipeline problem can be solved by bringing together global political, scientific, industry, economic, intellectual property, policy, medical and philanthropic leaders to develop creative incentives that will stimulate new antibacterial research and development (R&D). Our audacious but noble aim is the creation of a sustainable global antibacterial drug R&D enterprise with the power in the short-term to develop 10 new, safe, and effective antibiotics by 2020. To achieve this goal, IDSA has launched a new collaboration titled the "10×'20" initiative, which the American Academy of Pediatrics, American Gastroenterological Association, Trust for America's Health, Society for Healthcare Epidemiology of America, Pediatric Infectious Disease Society, Michigan Antibiotic Resistance Reduction Coalition, National Foundation for Infectious Diseases, and European Society of Clinical Microbiology and Infectious Diseases have endorsed.

Specifically, IDSA supports the development of 10 new systemic antibacterial drugs through the discovery of new drug classes as well as exploring possible new drugs from existing classes of antibiotics. Key to advancing antibacterial drug development is the concurrent need to advance the development of improved diagnostic tests specific to multidrug-resistant infections.

Global stakeholders can capitalize on each other's strengths to create a long-term, sustainable R&D infrastructure model that provides incentives for both antibacterial drugs and related diagnostic research enterprises. Success would be of immense benefit to the health of the citizens of the world. Furthermore, the sustained infrastructure created to achieve this goal would help to recreate the highly skilled scientific workforce that was lost over the past two decades as many companies abandoned antibacterial drug development. Microbial evolution causing antibiotic resistance is constant; our collective efforts at antibiotic discovery must be constant.

The European Union already has committed to the devel-

opment of innovative solutions to spur antibacterial development and is generating policy ideas [4, 5]. With the IDSA's support, in November 2009, the United States also agreed to make the issue a higher priority, as US President Barack Obama joined with Swedish Prime Minister Fredrik Reinfeldt (acting on behalf of the European Union) to establish a transatlantic task force to focus on solutions to the antibacterial drug pipeline problem as well as ways to strengthen infection control interventions and antimicrobial stewardship practices in human and veterinary settings. IDSA applauds the creation of the task force and already has articulated the Society's vision for moving forward to solve the pipeline problem and toward achieving the goal of the 10×'20 initiative [6]. For example, we support the creation of a specialized, high-level antibacterial drug pipeline work group comprised of key global leaders (Table 1). Of course, we also will work closely with task force members on ways to attenuate the serious problem of antimicrobial resistance through enhanced public health and clinical efforts and interventions.

The discovery of antibacterial drugs in the 1930s and 1940s represents a transformative moment in human history. One of the leading physicians of the 20th century, who bore witness to the preantibiotic and antibiotic eras, described the discovery and development of antibacterial drugs as an "awesome acquisition of power" for physicians and their patients [7]. Now, 70 years later, in the United States, European Union, and around the world, the challenges posed by infections caused by the multidrug-resistant pathogens continue to escalate, causing patient morbidity and mortality and increasing health care costs. As a global society, we have a moral obligation to ensure, in perpetuity, that the treasure of antibiotics is never lost and that no infant, child, or adult dies unnecessarily of a bacterial infection caused by the lack of effective and safe antibiotic therapies.

Only after a global commitment has been made can multifaceted global solutions be instituted. In 1961, John F. Ken-

nedy declared that it was possible for humans to walk on the moon. Many thought the statement was only political and impossible to achieve. History proved Kennedy's dream was possible in 1969—*less than 10 years after he first committed to act*. Likewise, naysayers will discount our $10 \times '20$ initiative as too radical, politically impossible, and unacceptable to industry, academe, government, international colleagues, and others. Objections are inevitable but easily nullified by recognition of the magnitude of the problem and the moral and ethical commitment of the leadership of all stakeholders to make it happen. Without a moral commitment to create and maintain the necessary infrastructure, the inventory of safe and effective antibiotics will inevitably shrink as bacteria become ever more resistant to the current inventory of antibacterial drugs. It need not happen if we all work together to make the $10 \times '20$ commitment a priority. As President Kennedy forecasted, we can walk on the moon within 10 years if we collectively commit to the goal.

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and holds shares in NovaDigm Therapeutics. D.N.G. serves an advisory/consultant role to Achaogen, Pacific Bioscience, Pfizer, Schering-Plough (Merck), and Advanced Life Sciences. B.S. has received consulting fees from Pfizer, Merck, Basilea, Arpida, Theravance, Advanced Life Sciences, and The Medicines Company; research support from Astellas, Gilead, Enzon, Novartis, Merck, and Pfizer; and speaker's honoraria from Merck, Pfizer, and Astellas; B.S. also owns shares in Neutropenia Immunotherapy Solutions and NovaDigm Therapeutics. G.W.T. provides or has recently provided, through Talbot Advisors, consultative services to the following pharmaceutical companies: Actelion, Advanced Life Sciences, Avera, Bausch & Lomb, Calixa, Cempra, Cerexa, Cubist, Durata, Ipsat, Middlebrook, Nabriva, PTC, Rib-X, Shire, Targanta, Tetrphase, Theravance, ViroPharma, and Wyeth; G.W.T. also owns shares in Calixa and Mpex. R.J.G. and W.M.S.: no conflicts.

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