



## **Principles and Strategies Intended to Limit the Impact of Antimicrobial Resistance**

The development of antimicrobial agents (antibacterials, antivirals, antifungals and antiparasitics) to treat infections has been one of the most notable medical achievements of the past century. These advances in medical care are now threatened by increasing resistance among all microorganism classes, but particularly resistance among bacteria to antibiotic agents. The seriousness of antimicrobial resistance is reflected in the:

- steadily increasing frequency of resistance over time among individual pathogens
- increased presence of resistance among critical bacterial species causing common infections
- global extent of the resistance problem

The rate of resistance has become so high that there are no longer effective agents to treat some pathogens.

The manageable causes of antimicrobial resistance are diverse and include:

- overuse and misuse of antimicrobial agents in humans, food animals, agriculture and consumer products
- increased pressure to prescribe antimicrobial agents as a result of advances made in the use of invasive medical technology and indwelling prosthetic devices
- transmission of antimicrobial-resistant organisms because of inadequate infection control practices
- insufficient development and application of immunization as a preventive strategy
- government policies that permit direct over-the-counter purchase of antimicrobial agents by consumers

The relative contribution of each of these factors to the overall problem of antimicrobial resistance is not known. Some antimicrobial resistance is expected to develop over time as a consequence of any antimicrobial use (even appropriate use) as microorganisms mutate and adapt in response to exposure to the drug. It is not realistic to expect that antimicrobial agents can be used indefinitely without eliciting any resistance. However, appropriate use will slow the development of resistance. As a result, it is imperative that antimicrobial agents be used responsibly in the treatment of individual patients to preserve their utility and value as agents for treating others in the future, recognizing that use of antimicrobial agents incurs societal as well as individual effects. The Infectious Diseases Society of America is committed to defining and promoting those strategies most likely to prevent and reverse antimicrobial resistance in order to better manage the problem.

The Society delineates two major principles to limit the impact of antimicrobial resistance:

**Good Antimicrobial Stewardship:** Good antimicrobial stewardship is the optimal selection of antimicrobial agents for the appropriate indication, dosage and duration of therapy that results in the maximum benefit and minimum of adverse events for the patient and minimizes the development of antimicrobial resistance.

**Control and Prevention:** This includes the consistent development and application of infection control and immunization policies and practices to prevent transmission and infection caused by resistant organisms.

The Society also gives high priority to the following strategies in the belief that support for these efforts will most rapidly achieve control of the problem of antibiotic resistance and/or provide the scientific basis to manage it in a rational manner:

- Rigorous measurement and mandatory industry reporting to the Department of Health and Human Services of antimicrobial agent usage in human, animal, plant and inanimate applications. Routine surveillance for antimicrobial resistance rates in key microorganisms found in humans, animals, plants, food products, and the environment.
- Continued availability of high quality diagnostic microbiology laboratories in human and animal health care facilities
- Improved diagnostic testing in humans and in animals to aid practitioners in better identifying those subjects with infections who will and who will not benefit from antimicrobial treatment
- Steadfast and unflinching support for infection control programs in all health care settings
- Education of the public and of professionals to change expectations and to increase awareness of the risks of antimicrobial resistance when these agents are used
- Development of decision support tools for clinicians including computer and Internet technology to deliver best practice information at the time the clinical antimicrobial treatment decision is made
- Development and application of vaccines to prevent infections caused by a broader array of organisms, thus reducing the need for the use of antimicrobial agents
- Development of new antimicrobial agents for the treatment of antimicrobial-resistant microorganisms
- Responsible marketing and promotion of antimicrobial agents that incorporate concern about the potential for development of antimicrobial resistance

- Support for good antimicrobial stewardship and improved hygiene in food animal production that promotes animal health
- Support for legislation to phase out nontherapeutic use of certain antimicrobial drugs in food animals, including all antimicrobial drugs classified as 'critically important' or 'highly important' for human therapeutic use by the Food and Drug Administration.
- Support for adequate resources to apply the Food and Drug Administration's (FDA) Guidance for Industry document #152: *Evaluating the Safety of Antimicrobial New Animal Drugs with Regard to Their Microbiological Effects on Bacteria on Human Health Concern* to all antimicrobial agents used in food animals including those previously approved by FDA.

Increased public and private funding to encourage the following is greatly needed:

- Research to better understand the effects of antimicrobial and antiseptic agents in consumer products, including the potential for antimicrobial resistance and adverse human health effects.
- Research to better understand the basic mechanisms of antimicrobial resistance
- New antimicrobial research & development
- Vaccine research & development
- Biotherapy and biointerference strategies to replace antimicrobial use
- Improved infection control methods
- Better diagnostic methods for detection of infectious organisms
- More rapid, sensitive and specific tests for antimicrobial resistance
- Effective educational methods to reach the public and professionals
- Antimicrobial use strategies to minimize resistance development
- Use of technology for antimicrobial decision support
- Alternatives to antimicrobial agents for growth promotion in food animals

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