KEEP ANTIBIOTICS WORKING

The Campaign to End Antibiotic Overus

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Antibiotic Resistance and its Impact on Children

For more than half a century, antibiotic drugs have ensured that potentially life-threatening bacterial infections are treatable. Today, however, more and more bacterial infections fail to respond to antibiotic treatment. A federal task force recently warned that antibiotic resistance is "a growing menace to all people" and concluded that if nothing is done, treatments for common infections will become "increasingly limited and expensive-*and, in some cases, nonexistent*."

Antibiotic resistance poses a threat to everyone, but children are at particular risk. Children are more vulnerable to bacterial illness than are adults, and this vulnerability is reflected in their higher disease rates. Infants under the age of one, for example, are 10 times more likely than adults to contract a *Salmonella* infection. The availability of effective antibiotics has helped decrease infant mortality in the United States from about 20 percent in the late 19th century to under 1 percent in 1998. Despite this triumph, children continue to develop many non-fatal bacterial infections that require treatment with antibiotics.

The risk of bacterial infection is higher for infants and children, and treatment options are more limited, for several reasons. First, their immune systems are not fully developed and they have not yet acquired the full range of antibodies required to ward off infection. Second, children tend to be exposed to more disease-causing bacteria through day-to-day activities such as childcare and mouthing behaviors. Finally, many therapeutic medications have not been approved for use in children, in part because metabolic differences between children and adults can make use of certain drugs impractical or unsafe for children. For example, because tetracycline binds to immature calcium structures, it permanently disfigures enamel in teeth. Similarly, animal studies have shown that fluoroquinolones, a powerful class of Cipro-related drugs used to treat serious infections, can damage immature cartilage in bones and joints. If antibiotic resistance further depletes the number of effective drugs available, sick infants and children will have even fewer treatment options.

Although careful use of antibiotics can result in the emergence of antibiotic-resistant bacteria, inappropriate use greatly accelerates this process. The more often bacteria are exposed to antibiotics, the more resistant they become. Because bacteria reproduce rapidly, these antibiotic-resistant bacteria can spread efficiently. Unlike higher organisms, bacteria can transfer DNA to other bacteria that are not their offspring, and even to members of completely unrelated bacterial species. In effect, bacteria can teach one another how to outwit antibiotics.

Antibiotic resistance carries a significant economic toll as well as a medical one. The congressional Office of Technology Assessment calculated that resistance in just six types of bacteria increased hospital treatment costs by $1.3 billion as of 1995. Few new drugs are now in the pipeline, and any new antibiotics will be considerably more expensive than existing ones; the research and development costs for a new drug may top $800 million, by some estimates, while prescription costs are likely to far exceed those for older, generic medicines.

Although the misuse of antibiotics in human medicine has been well publicized, less attention has been paid to the serious overuse of antibiotics in agriculture. By one estimate, 80 percent of all antibiotics and related drugs (antimicrobials) sold in the United States are used in livestock production. The lion's share-roughly 70 percent of the total-are fed to healthy farm animals to promote growth and prevent diseases that would otherwise result from the unsanitary conditions found in overcrowded agricultural facilities. About half of those drugs are identical or closely related to medicines used in treating humans.

Because of the growing health crisis of antibiotic resistance, which could render these "wonder drugs" useless in treating infections, the American Medical Association now opposes the routine feeding of antibiotics to healthy farm animals. The American College of Preventive Medicine, the American Public Health Association, and the World Health Organization have taken similar positions. A National Academy of Sciences report estimates that eliminating all such uses in poultry, cow, and swine production would cost U.S. consumers only about $5 to $10 per person annually.

The Centers for Disease Control and Prevention has observed that "decreasing inappropriate antibiotic use is the best way to control resistance." Key steps in doing so include adoption of policies aimed at ending the inappropriate use of antibiotics in agriculture, as well as continued implementation of programs to educate patients, parents and physicians about the need to use antibiotics more sparingly.

In particular:

- Congress should phase out the routine feeding of medically important antibiotics to healthy livestock and poultry and other inappropriate uses of vital antibiotics in agriculture. S. 2508, introduced by Sen. Edward M. Kennedy, and H.R. 3804, introduced by Rep. Sherrod Brown, would accomplish these objectives.

- Producers and marketers of meat and poultry should voluntarily agree to stop selling or buying meat produced with routine feeding of antibiotics to healthy animals, and pharmaceutical companies should stop producing antibiotics for such use in animals.

- Finally, those who decide which meat products to purchase - whether an individual shopper buying a few pounds of meat during a weekly trip to the grocery store, or a food-service corporation that purchases millions of pounds in a single transaction - should select meat produced without the inappropriate use of antibiotics.

Unless we act now, we face a future of untreatable bacterial infections. Children will be among the first to pay the price.

For a full report on antibiotic resistance and vulnerable groups, see www.keepantibioticsworking.com/vulnerable.