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## Tensions in Antibiotic Prescribing

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## Tensions in Antibiotic Prescribing

### Abstract

Since 1999, the Agency for Healthcare Research and Quality has funded seven centers across the country to provide practical guidance to physicians and other health care professionals about the drugs they prescribe. These Centers for Education and Research on Therapeutics (CERTs) develop, translate and disseminate objective information on drugs to improve practice. The University of Pennsylvania's CERTs focuses on developing evidence for optimal treatment strategies for infectious diseases, and promoting the judicious use of antibiotics to combat the problem of antibiotic resistance. This Issue Brief explores one of the fundamental challenges physicians face in optimizing antibiotic use: the potential conflict between what is best for an individual patient, and what is best for society as a whole.

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## ***Tensions in Antibiotic Prescribing***

Editor's Note: Since 1999, the Agency for Healthcare Research and Quality has funded seven centers across the country to provide practical guidance to physicians and other health care professionals about the drugs they prescribe. These Centers for Education and Research on Therapeutics (CERTs) develop, translate and disseminate objective information on drugs to improve practice. The University of Pennsylvania's CERTs focuses on developing evidence for optimal treatment strategies for infectious diseases, and promoting the judicious use of antibiotics to combat the problem of antibiotic resistance. This Issue Brief explores one of the fundamental challenges physicians face in optimizing antibiotic use: the potential conflict between what is best for an individual patient, and what is best for society as a whole.

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## ***Overuse and misuse of antibiotics is a culprit in the rise of resistant organisms***

Growing evidence suggests that overuse and misuse of antibiotics is creating a new generation of bacteria resistant to existing medicines. If an organism is resistant to many drugs, treating the infections it causes can become difficult or impossible.

- Much of the initial attention to the problem of drug-resistant bacteria was focused on the hospital setting, particularly intensive care units, where the close proximity of critically ill patients and heavy use of antibiotics promoted the emergence of many difficult to treat drug-resistant infections.
  - Over the last decade there has been increasing recognition that drug-resistant bacteria are found in community settings and put otherwise healthy individuals at risk for resistant infections. Bacteria that cause childhood ear infections, sinus infections and pneumonia are increasingly resistant to multiple drugs and in some cases there are few, if any, oral antibiotics available to treat these infections.
  - Growing evidence indicates that patterns of antibiotic use in outpatient settings have a strong impact on patterns of emerging resistance.
  - To reduce the prevalence of antibiotic-resistant bacteria in the community, physicians must optimize their use of antibiotics. However, optimal use from the perspective of the community (reserving newer agents for future use) is not always consistent with optimal use from the perspective of the individual patient (prescribing newer, broader agents that are less likely to encounter current resistance).
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- A recommendation to limit use of newer drugs creates a tension for physicians caring for individual patients. Programs to reduce antibiotic use appeal to the community concerns of physicians, at the cost of withholding treatments of potential benefit (both real and perceived) for individual patients. Wouldn't a patient with an infection want the antibiotic most likely to treat that infection? Wouldn't the community want to balance that interest with the interest of preserving those antibiotics for the future?

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### ***New study examines physician attitudes and antibiotic prescribing patterns***

To explore the tension in antibiotic prescribing, Metlay and colleagues surveyed physicians about their attitudes and prescribing decisions when treating patients with community-acquired pneumonia (CAP). They used the example of CAP because recent guidelines endorse several antibiotic choices as equally appropriate treatments, although rates of resistance to each antibiotic vary widely. Moreover, some national experts have called on physicians to limit their use of newer antibiotics for patients with CAP to preserve the drugs' usefulness in the future.

- From April through June 2000, the investigators conducted a mailed survey of 1600 physicians, including general internists, family practitioners, and infectious diseases (ID) specialists. The goals were to identify physicians' drug choices for outpatients with CAP, to measure physicians' attitudes toward the balance between their public and individual patient health responsibilities, and to determine the relationships between prescribing patterns and attitudes.
- The survey presented physicians with the scenario of a 55-year-old man with uncomplicated CAP. It asked physicians to rank their antibiotic preferences in treating the hypothetical patient on an outpatient basis, and also asked them to rank the most important factors in their decision.
- The investigators were specifically interested in the rankings of a newer drug (levofloxacin), with limited current resistance, relative to an older agent (erythromycin) with increasing drug resistance. The former represents a drug with greater potential current benefit to a patient, and the latter represents a drug with greater potential societal benefit in the sense that its continued use delays emergence of resistance to these newer drugs and preserves their value for future use.

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### ***Physicians act as if antibiotic resistance is not an important factor in CAP treatment decisions***

Although there are differences in the antibiotic treatment preferences of generalists and infectious diseases specialists, the study indicates that neither group acts as if the risk of contributing to antibiotic resistance is a major factor when treating uncomplicated CAP.

- About 53% of the physicians responded to the survey, including 400 generalists (family physicians and general internists) and 429 infectious diseases specialists.
  - Both generalists and infectious diseases specialists were more likely to prefer newer, broader drugs for the treatment of CAP compared to older agents still recommended by national guidelines. Infectious diseases specialists, however, were more likely to prefer levofloxacin over erythromycin than generalists.
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- The top three factors influencing the choice of drug were efficacy of the drug in treating CAP, severity of the patient's illness, and the physician's previous experience and knowledge about the drug. The risk of contributing to the problem of antibiotic resistance was ranked lowest of seven factors overall (including side effects, cost to patient, and ease of use).

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***Physicians acknowledge antibiotic resistance as a public health problem, but not in their own prescribing patterns***

The study also examined physician attitudes and beliefs toward antibiotic resistance in general, and the responsibility physicians have in addressing the problem.

- The vast majority of physicians (82% of generalists and 94% of infectious diseases specialists) believe that antibiotic resistance is a major public health problem. However, just over half of all respondents said that they weigh the potential benefit to the patient against the potential harm to society.
- More than 80% of all physicians agreed with statements that newer antibiotics should be reserved for patients with drug-resistant bacteria, and that they are more willing to use an older drug in milder infections.
- A substantial minority of physicians (21% of generalists and 14% of infectious diseases specialists) express confidence that the development of new and effective drugs will keep pace with the growing rate of antibiotic resistance.
- More than 80% of respondents agreed that patient demand was a major reason for antibiotic overprescribing. However, only a minority of respondents (36% of generalists and 22% of infectious diseases specialists) agreed that they personally prescribe antibiotics more than they should.
- These attitudes are associated with the physician's choice of antibiotic in treating CAP. Physicians who stressed the importance of societal interests had a weaker preference for levofloxacin (newer agent) over erythromycin (older agent) than their colleagues who stressed the importance of the individual patient.

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***POLICY IMPLICATIONS***

Neither generalists nor infectious diseases specialists emphasize the relative societal risks of antibiotic drug selection in their treatment decisions for patients with CAP. Instead, they emphasize providing the newest and best treatments for each individual patient, even though this approach may not be supported by current guidelines or public health policy.

- Since the completion of the survey, new guidelines from the Infectious Diseases Society of America, the American Thoracic Society and the Canadian Infectious Diseases Society were released and further emphasize the importance of weighing the current and future risks of antibiotic resistance in the selection of drugs for treatment of patients with pneumonia and other respiratory tract infections.
- Whenever antibiotic prescribing decisions create a tension between the interests of an individual patient and the broader community, physician decisions are likely to disfavor community interests. Thus, guideline recommendations and educational programs alone are unlikely to achieve ideal prescribing from a public health perspective, and future efforts to optimize antibiotic choices may need more force.

*Continued on back.*

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## **POLICY IMPLICATIONS**

*Continued*

- In the hospital setting, it is increasingly common for institutions to rely on order entry systems, formulary restrictions, and peer leaders to promote specific patterns of antibiotic use to combat rising antibiotic resistance. Such antibiotic regulation may be an increasingly necessary feature of outpatient care as well.
- Whether increased efforts to promote more judicious patterns of antibiotic prescribing will be successful is largely unknown. Ultimately, the success of such efforts will be judged based on their impact on the rate of emerging drug resistance.

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*Issue Brief*



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