## Method of Participation

Read this newsletter, complete the CME posttest and evaluation, and fax or mail the form to the Veritas Institute for Medical Education at the address listed. You will receive a certificate within 2 weeks. There is no certificate processing fee.

## Intended Audience

Physician assistants and nurse practitioners who provide care to patients with respiratory tract infections.

## Effective Dates

December, 2002 through December, 2003.

## Accreditation/Designation Statements

*Physician Assistants*--This program has been reviewed and is approved for a maximum of 1 hour of clinical Category I (Preapproved) CME credit by the American Academy of Physician Assistants (AAPA). Approval is valid for one year from the issue date of December, 2002. Participants may submit the self-assessment at any time during that period.

This program was planned in accordance with the AAPA's CME Standards for Enduring Material Programs and for Commercial Support of Enduring Materials Programs.

*Nurse Practitioners*--This program has been granted 1.0 contact hours of continuing education (which includes 1.0 hours of pharmacology) by the American Academy of Nurse Practitioners. Approval is valid through December, 2003.

## Disclosure Statements

All editorial board members have received honoraria from the Veritas Institute for Medical Education, Inc. for their involvement in this program.

Dr File is the recipient of research grants from Abbott Laboratories, Bayer, Bristol-Myers Squibb Company, McNeil Consumer & Specialty Pharmaceuticals, and GlaxoSmithKline. He is a consultant for McNeil, Aventis Corporation, GlaxoSmithKline, Pfizer Inc, Bristol-Myers Squibb, Bayer, and Wyeth Pharmaceuticals. He is a member of the speakers bureaus of Abbott, McNeil, Merck, GlaxoSmithKline, Wyeth, and Pfizer. Dr Lipsky is a consultant and speakers bureau participant for Aventis Corporation and Bayer. Dr Taylor and Mr Deziel have nothing to disclose.

Information presented in this program does not include the unlabeled use(s) of drugs/products.

## Provider

This program is provided by the Veritas Institute for Medical Education, Inc., Hasbrouck Heights, NJ.

## Acknowledgment of Support


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## The Increase in Antibiotic Resistance

Recent studies indicate that about 25% to 35% of *S pneumoniae* strains now show decreased susceptibility to penicillin, with about 2/3 of those strains showing full resistance (minimum inhibitory concentration [MIC] ≥ 2.0 µg/mL) (Bartlett 2000). Penicillin resistance among *H influenzae* and *M catarrhalis* is also common. In 1997 studies, ampicillin resistance in some areas of the US was seen in 50% of *H influenzae* isolates and over 90% of *M catarrhalis* isolates (File and Hadley 2002).

The majority of *S pneumoniae* strains with reduced susceptibility to penicillin are still vulnerable to certain third-generation cephalosporins, such as cefotaxime or ceftriaxone. However, a significant number of strains now show reduced susceptibility to both penicillin and first- and second-generation cephalosporins (Bartlett et al 2000).

*S pneumoniae's* resistance to macrolides is also increasing: in recent US studies, 31% of isolates showed resistance to azithromycin and clarithromycin (White et al 2002), and 61% showed erythromycin resistance (Whitney et al 2000). And the problem of cross resistance is emerging. One investigation found that 16% of *S pneumoniae* isolates with intermediate resistance to penicillin and 57% of strains that were fully penicillin-resistant showed macrolide resistance as well (White 2002). In fact, recent data from the Tracking Resistance in the US Today (TRUST) Surveillance Program show that as much as 80% of penicillin-resistant bacteria may also have macrolide resistance (Kelly et al 2001).

The new fluoroquinolone antibiotics with enhanced activity against *S pneumoniae*, such as levofloxacin, were designed to offer an alternative therapy for drug-resistant CAP. However, clinical failures due to strains of *S pneumoniae* with decreased susceptibility to these newer fluoroquinolones have recently been reported in the US, raising concern that their prevalence will grow with increased use of these antibiotics (White 2002, Davidson 2002).

The growing resistance to penicillin and macrolides has led to the development of a new class of antibiotics called ketolides. The first of these agents to be developed for clinical use, telithromycin, has been shown to remain active against strains of *S pneumoniae* that were resistant to penicillin and macrolides (Stratton 2001, Fogarty et al 2002). Telithromycin is currently under FDA review and is not yet available in the United States.

## Local Patterns of Resistance

In view of the seriousness of the problem, resistance patterns of old and new antibiotics must be monitored. One effort to do that is the PROTEKT US (Prospective Resistant Organism Tracking and Epidemiology for the Ketolide Telithromycin) Surveillance Study, which collects data from more than 200 medical centers in 42 states. This study documented the emergence of antimicrobial resistance in common respiratory tract infections in the US (Stratton 2001).

Resistance patterns differ from one region to another, and from state to state as well. In one study, Maryland showed the lowest incidence (15.3%) of penicillin-resistant *S pneumoniae*, while Tennessee had the highest incidence (38.3%). Even within one state, resistance may vary substantially (MMWR 1999). For example, in the Pittsburgh, Pennsylvania area, there has been such a rapid emergence