Top Ten Pediatric Pathogens in North America

BY KERRY WACHTER
Senior Writer

WASHINGTON — *Staphylococcus aureus* was the most common pathogen isolated from pediatric patients in North America in 2004, according to data from the SENTRY Antimicrobial Surveillance Program presented as a poster at the annual Interscience Conference on Antimicrobial Agents and Chemotherapy.

The SENTRY program has monitored susceptibility rates and trends of pathogens worldwide since 1997. In 2004, 3,537 clinical isolates were collected from 47 medical centers as part of the program.

S. aureus also topped the list as the most common pathogen worldwide and in Europe but *Escherichia coli* snagged the top spot in Latin America (see table for regional rankings of the most common pathogens).

The 10 most frequently observed pathogens accounted for 84% of the organisms isolated in this study, wrote Kelley A. Fedler and her colleagues at JMI Laboratories in North Liberty, Iowa.

The researchers also noted a direct correlation between increasing patient population age and the frequency of occurrence among many pathogens, most notably *S. aureus* and *E. coli*.

S. aureus accounted for 19% of organisms in patients less than 1 year and 35% of organisms in patients aged 12-18 years. *E. coli* predominated in patients less than 1 year of age, at 20.6%. *Klebsiella* species, *Enterobacter* species, enterococci, and coagulase-negative staphylococci decrease in prevalence after age 1, according to the poster presented at the meeting sponsored by the American Society for Microbiology.

The researchers also looked at antimicrobial activity and resistance patterns among pediatric patients. Susceptibility tests were performed by reference broth microdilution methods of the Clinical Laboratory Standards Institute against more than 25 antimicrobial agents. Methicillin-resistant *S. aureus* accounted for 28% of *S. aureus* strains.

Both gatifloxacin and ciprofloxacin exhibited high levels of activity against the pathogens tested, "indicating the fluoroquinolone-naive nature of pediatric pathogens," the researchers wrote.

All of the *S. pneumoniae* strains from North America were susceptible to gatifloxacin and levofloxacin. Two fluoroquinolone-resistant strains were identified in Europe though. No strains of staphylococci tested had developed resistance to linezolid, quinupristin/dalfopristin, teicoplanin, or vancomycin.

Pneumococcal susceptibility was the greatest in North America. *Pseudomonas aeruginosa* was very susceptible to fluoroquinolones (5% resistance) in North American isolates. However, β-lactamase–mediated resistance was highest in North America (41%) and Latin America (46%) in contrast with Europe (18%). ■

Most Common Pediatric Pathogens

Organism	Rank: All Regions	North America	Latin America	Europe
Staphylococcus aureus	1	1	2	1
Escherichia coli	2	2	1	2
Pseudomonas aeruginosa	3	3	4	4
Klebsiella species	4	4	3	7
Coagulase-negative staphylococci	5	6	6	9
β-Hemolytic streptococci	6	8	12	3
Enterobacter species	7	5	5	10
Streptococcus pneumoniae	8	10	8/9	5
Enterococcus species	9	7	11	8
Haemophilus influenzae	10	11	15	6

Note: Based on 3,537 clinical isolates collected from 47 medical centers worldwide in 2004.
Source: Ms. Fedler

ELSEVIER GLOBAL MEDICAL NEWS

S. aureus Vaccine Project Is in Limbo

BY ALICIA AULT
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Although it was successful in one late-stage trial, StaphVax, a vaccine in development to combat *Staphylococcus aureus*, failed to meet the primary end point in a second pivotal trial.

The vaccine's development is now on hold, perhaps indefinitely, according to Thomas H. McLain, president and CEO of Rockville, Md.–based Nabi Biopharmaceuticals.

StaphVax targets *S. aureus* types 5 and 8, eliciting antibodies to the bacteria's polysaccharide capsule, Mr. McLain said in an interview. The initial market would be people having elective invasive procedures.

A vaccine is definitely needed, but the bar for vaccine acceptance will be high, given the success of other *S. aureus* elimination techniques.

In a randomized, double-blind, placebo-controlled study of 3,600 hemodialysis patients, there was no reduction in the incidence of infection with *S. aureus* types 5 and 8 compared with placebo.

The company issued only a press release in November; full data will likely be released after several months of analysis, Mr. McLain said. Meanwhile, the company withdrew its application for European Union approval and halted all development.

In the first phase III study, StaphVax induced partial immunity for 40 weeks in an end-stage renal disease population (N. Engl. J. Med. 2002;346:491-6).

Results also seemed to be promising in a recently completed substudy, according to its principal investigator, Dr. Todd K. Rosengart head of cardiothoracic surgery at Stony Brook University Hospital, N.Y. In that study, conducted when Dr. Rosengart was at Evanston Northwestern Healthcare, Ill., 120 patients undergoing elective, open cardiac surgery were given either the vaccine or a sham injection 7-40 days before the procedure. "We found dramatic increases in antibodies to types 5 and 8 *S. aureus* in 90% of our patients," Dr. Rosengart said in an interview.

A vaccine is definitely needed, he noted, adding that although infections occur in only 1% of cases, the mortality rate with an infection is 5-10 times greater than for open heart surgery alone. "Infection is probably one of the greatest concerns for our patients," he said.

Antibiotics, as well as screening and prevention programs, are starting to make a dent against *S. aureus*, but the bacteria—particularly the methicillin-resistant *S. aureus* (MRSA) strains that are on the rise—are still anathema to hospitals, surgeons, and patients. MRSA is one of the top 10 causes of death in the United States. About 126,000 people a year are infected with the resistant strain.

The bar for vaccine acceptance will be high, given the success of other *S. aureus* elimination techniques, said Dr. Lance Peterson, a colleague of Dr. Rosengart's at Evanston Northwestern. Patients at Evanston are tested for MRSA on admission and treated with a nasal antibiotic ointment for 5 days before a procedure in an effort to reduce postsurgical infections. The effort seems to be paying off so far, although there are data only from a pilot study in knee surgery.

The vaccine would need to be at least 75% effective, said Dr. Peterson, director of microbiology and infectious disease research at the Chicago-area health system. To be safe, the vaccine should not permanently destroy nasal carriage of *S. aureus*, he added.

Even if Nabi does not proceed with StaphVax's development, it is going forward with what Mr. McLain calls its next-generation approach—a vaccine that attacks the bacteria's cell walls. That investigation is in a phase I study. ■

Cephalosporins Superior For Treating Group A Strep

WASHINGTON — Oral cephalosporins, whether given for 5 or 10 days, are more effective than penicillin in the treatment of Group A streptococcal tonsillopharyngitis, Dr. Janet R. Casey and Dr. Michael E. Pichichero reported in a poster at the annual Interscience Conference on Antimicrobial Agents and Chemotherapy.

Data were derived from a metaanalysis involving a total of 11,426 patients from 47 trials in the United States and Europe, said Dr. Casey and Dr. Pichichero, both of the Elmwood Pediatric Group and the University of Rochester, N.Y.

Among 10 European studies comparing 10 days of penicillin versus 10 days of cephalosporins in the bacterial eradication of GAS in a total of 1,656 pediatric patients with tonsillopharyngitis, the odds ratio was 4.27 in favor of cephalosporins. In 25 such U.S. trials, involving 5,469 patients, cephalosporins didn't fare quite as well, although they were still superior to penicillin, with an odds ratio of 2.70.

Clinical cures for 10-day regimens were similar for the two continents, with odds ratios of 2.38 in Europe (7 trials/1,488 children) and 2.46 in the United States (22 trials/4,990 children).

Studies of 4-5 days of cephalosporins versus 10 days of penicillin were analyzed in a total of 6 European and U.S. trials involving 1,149 adults and in 6 trials from both continents involving 3,152 children.

Odds ratios for bacterial eradication favored the shorter cephalosporin regimen for the 9 combined European trials (1.30) and even more so in the 3 U.S. trials (2.41). On both continents, the superiority of cephalosporins in bacterial eradication was more pronounced in children than in adults (odds ratios 1.34 vs. 1.09 in Europe and 2.94 vs. 1.65 in the United States).

Bacterial cure rates with cephalosporins were strongly superior to penicillin in trials from the United Kingdom, Germany, France, and Sweden, with odds ratios ranging from 3.35 to 4.77. While cephalosporin cure rates remained consistent in the different countries, penicillin bacterial cure rates varied widely, with a low of 66% in Sweden. That's probably because 2 of the 3 trials conducted there were among patients with recurrent GAS tonsillopharyngitis, in whom penicillin would be expected to be even less effective, Dr. Casey and Dr. Pichichero said at the meeting, sponsored by the American Society for Microbiology.

—Miriam E. Tucker