

TENNESSEE EPI-NEWS

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COMMUNICABLE AND ENVIRONMENTAL DISEASE SERVICES

October, 2002

West Nile Virus in Tennessee

As this issue of EPI News goes to press, 20 human cases and four deaths attributed to the West Nile Virus have been reported in Tennessee. For the latest information, call the Communicable and Environmental Disease Services at 800-525-2437 or visit www2.state.tn.us/health/CEDS/wnvhome.htm. Laboratory testing of birds or human cases is available, free of charge, at the Tennessee Department of Health State Laboratory. To report a case, please call your local health department.

Tennessee's Appropriate Antibiotic Use Campaign

We are well into the 21st century and the reality of a "post antimicrobial" era looms in the future.¹ Will the treatments that were once coined "wonder drugs" lose their effectiveness before their time?

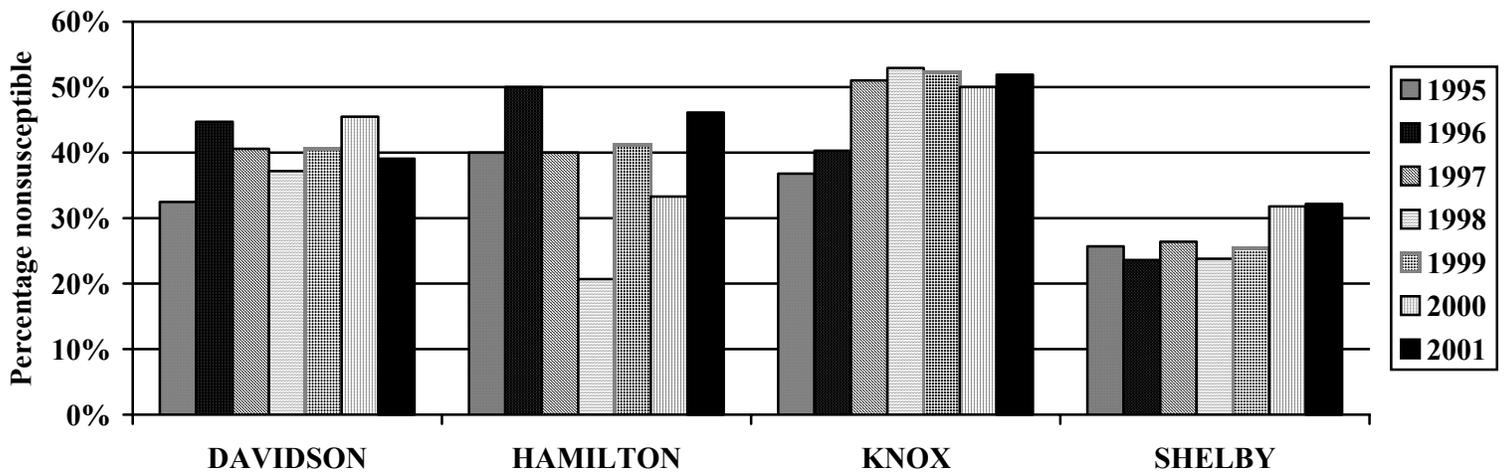
The National Foundation for Infectious Diseases has identified antibiotic resistance and emerging infections to be the most critical problems in infectious disease control.² Increased use of antibiotics has been linked to an increase in drug resistant organisms, and has led to the use of more toxic and expensive drugs.³ In the past decade, the prevalence of antibiotic-resistant pneumococci has increased considerably. In the 1980's, almost all *Streptococcus pneumoniae* infections were treated effectively with penicillin. However, today in some areas of the United States, one-quarter to one-third of invasive *Streptococcus pneumoniae* are nonsusceptible (resistant and intermediate) to penicillin.⁴ Many studies have demonstrated a link between infection with resistant *Streptococcus pneumoniae* and recent antibiotic use.⁵ Individuals whose

infections are caused by a resistant organism are at risk for antibiotic treatment failures, particularly for serious infections.

The relationship between antibiotic use and resistance is a particularly important issue in Tennessee. In 2000, Tennessee's utilization rates for penicillin, cephalosporins and trimethoprim-sulfamethoxazole were over 20% higher than the national average.⁶ Strains of *S. pneumoniae* isolated from invasive infections have demonstrated a high rate (35%) of penicillin nonsusceptibility in Tennessee compared to other states in the Centers for Disease Control and Prevention's Active Bacterial Core Surveillance program (Brenda Barnes, personal communication). The figure on the next page depicts the percentage of nonsusceptible invasive *S. pneumoniae* isolates by county in the four major metropolitan areas of Tennessee.

What are the factors that lead to inappropriate antibiotic use? The main issues discussed throughout the literature are parents' lack of knowledge of appropriate antibiotic use, parental demand for antibiotics and the physicians' concerns regarding time and patient satisfaction.⁷ Many parents do not fully understand that antibiotics are only effective against bacterial infections. A study conducted by Trepka and colleagues reported that approximately 50% of parents felt that an antibiotic was needed when their child was diagnosed with influenza or a common cold.⁸ Interviews with physicians suggest that they often feel pressured by their patients (or parents of their patients) to provide antibiotics.⁹

Invasive Pneumococcal Disease, Percentage Nonsusceptible Isolates, Tennessee, 1995-2001



However, two recent studies suggest that patient satisfaction is not predicted by receipt of antibiotics.^{10,11} Since many parents do not understand appropriate antibiotic use and since physicians have a high perception of parents expecting antibiotics, it is important that community-based interventions seek to educate both parents and physicians about the importance of appropriate antibiotic use.

In October 2001, the Tennessee Public Health Association (TPHA) passed a resolution in support of efforts to combat antimicrobial resistance in Tennessee. TPHA recognized the problem of antibiotic resistance in Tennessee and committed to uphold activities focused on decreasing inappropriate antibiotic use. One section of the TPHA's mission states: "To promote, articulate, and advocate for the vision of healthy people in healthy communities throughout Tennessee." With this mission in mind, TPHA resolved to support the prudent use of antibiotics and measures that include appropriate use of vaccines and infection control in an effort to keep people and communities in Tennessee healthy.

The TPHA endorsed the Tennessee Department of Health's Appropriate Antibiotic Use Campaign, which is committed to further educate parents of young children, physicians and the public about appropriate antibiotic use.

The campaign's goal is to decrease inappropriate antibiotic prescriptions and ultimately antibiotic resistance rates in Tennessee. A partnership with Abbott Laboratories and several managed care organizations across the state has been established to provide continuing medical education sessions for physicians on antibiotic resistance in Tennessee. Other planned campaign projects include providing appropriate antibiotic use literature to patients and physicians in 95 county health departments, airing public service announcements, conducting presentations about appropriate antibiotic use to daycare center staff and parent groups, and forming appropriate antibiotic use coalitions around the state.

The Tennessee Department of Health continues to encourage the use of pneumococcal polysaccharide vaccine (PPV) in the elderly (\geq age 65 years) and persons with chronic medical conditions. The new pneumococcal conjugate vaccine (PCV-7) is recommended for all children under two years of age and for children age 2-5 with high risk medical conditions. Unfortunately supplies of PCV-7 are limited. Until the PCV-7 supply improves, priority should be given to children under age 1 year and to children age 1-5 years with chronic medical conditions. Since pneumococcal vaccines prevent invasive

disease caused by both susceptible and nonsusceptible strains, it is critical that their utilization be increased. It is imperative that the public, especially parents, and clinicians are fully educated about the risks of inappropriate antibiotic use. Increasing antimicrobial resistance rates threaten commonly used treatment regimens. Since antibiotic use drives resistance, it is critical that antibiotics be used only when necessary. Physicians need to provide leadership in their local communities if this effort is to be a success. Likewise, it is important that the public understands the risks of taking antibiotics inappropriately and communicates with their healthcare providers about this issue. The goal is to decrease antibiotic resistance rates in Tennessee by working together to decrease antibiotic use. If you are interested in learning more about the Tennessee Appropriate Antibiotic Use Campaign, contact Katie Garman at 615-741-7247 or katie.garman@state.tn.us.

¹ Cohen, ML. Epidemiology of drug resistance: Implications for a post-antimicrobial era. *Science* 1992;257:1050-1055.

² The National Foundation for Infectious Diseases. Biological terrorist attacks, antimicrobial resistance are growing global threats. *Double Helix* 1998;23:4.

³ McCraig LF, Hughes JM. Trends in antimicrobial drug prescribing among office-based physicians in the United States. *JAMA* 1995;273:214-219.

⁴ Whitney CG, Farley MM, Hadler J, et.al. Increasing prevalence of multidrug-resistant *Streptococcus Pneumoniae* in the United States. *N Engl J Med* 2000;343:1917-1924.

⁵ Belongia EA, Sullivan BJ, Chyou PH, Madagame E, Reed KD, Schwartz B. A community intervention trial to promote judicious antibiotic use and reduce penicillin-resistant *Streptococcus pneumoniae* carriage in children. *Pediatrics* 2001;108:575-583.

⁶ Novartis Pharmacy Benefit Report: 2001 Facts and Figures. Emigh RC, editor. East Hanover, NJ; Novartis Pharmaceuticals Corp. , 2001.

⁷ Bauchner H, Osganian S, Smith K, Triant R. Improving parent knowledge about antibiotics: A video intervention. *Pediatrics* 2001;108:845-850.

⁸ Trepka MJ, Belongia EA, Chyou PH, Davis JP, Schwartz B. The effect of a community intervention trial on parental knowledge and awareness of antibiotic resistance and appropriate antibiotic use in children. *Pediatrics* 2001;107:1-7.

⁹ Dowell SF, Marcy SM, Phillips WR, Gerber MA, Schwartz B. Principles of judicious use of antibiotics for pediatric upper respiratory tract infections. *Pediatrics* 1998;101:163-165.

¹⁰ Mangione-Smith R, McGlynn EA, Elliott MN, Krogstad P, Brook RH. The relationship between perceived parental expectations and pediatrician antimicrobial prescribing behaviors. *Pediatrics* 1999;103:711-718.

¹¹ Hamm RM, Hicks RJ, Bemben DA. Antibiotics and respiratory infections: are patients more satisfied when expectations are met? *J Fam Pract* 1996;43:56-62.

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A Hepatitis Outbreak at a Hazardous Waste Recycling Plant

In January 2001, physicians from an emergency room at a hospital in Memphis reported treating several patients with elevated liver enzymes, nausea, and vomiting, possibly caused by chemically induced hepatitis. All of the patients were workers who had responded to a fire at their place of work, a plant that stores, treats, and disposes of solid and liquid waste under the Resource Conservation Recovery Act. The apparent outbreak was reported to the Memphis-Shelby County Health Department, Bureau of Environmental Services. The Tennessee Department of Health assisted with portions of the outbreak investigation.

Early on January 16, 2001, a fire occurred in a building at the plant. Vapors escaped from a shredding machine and were ignited by a nearby propane forklift which was not equipped with the proper safety device. The fire quickly spread to adjacent areas that contained an accumulation of volatile organic liquid. The local fire department was called but by the time firefighters arrived the fire had been extinguished by employees.

A liver specialist at the university medical center interviewed and tested most of the employees one week after the fire. Of 110 employees, alanine aminotransaminase (ALT) levels were obtained on 91 (81.7%) within three weeks. Of these 91 employees, 85 (93.4%) were interviewed.

Cases of hepatitis were defined as an ALT level greater than 1.5 times the upper limit of normal, 50 International Units (IU). Forty-four (44%) of the 91 employees were identified as cases from January 17, 2001, through February 7, 2001. Eight employees had ALT levels higher than 1000 IU. At the last testing in April 2001, ALT levels had returned to normal in 24 of the 40 cases. ALT levels were decreasing, but not normal in 13 cases.

Preliminary results showed that of the 85 employees interviewed, 28 (33%) were ill. The most common symptoms were nausea (82%), vomiting (57%), eye irritation (46%), abdominal cramps (43%), headache (43%), dizziness (32%), and diarrhea (25%). Onset of symptoms

occurred within one week of the fire and resolved within five days. The odds ratio of having an abnormal ALT level and working in the building where the fire occurred was 29.73, a statistically significant figure. Of the 36 employees in the building where the fire occurred, 33 (92%) were among the cases with high ALT levels. Of the 20 administrative, transportation, laboratory, dock, and hazardous material dump workers, only two working at the receiving dock were cases.

It appears that hepatotoxic substances in the building injured these workers in mid-January 2001. The immediate cause of the injury was the fire in the building on January 16, 2001, which appeared to facilitate the exposure of the workers to solvents. No one solvent could be implicated. The combination of a fire involving solvents and the increased temperature in the building may have facilitated the inhalation of the solvent. It also appears that inconsistent use of personal protective equipment, especially respirators, may have contributed to the exposures. The Tennessee Occupational Safety and Health Agency assisted with the investigation and wrote recommendations to prevent future incidents.

The Tennessee Epi-News is published quarterly by the Communicable and Environmental Disease Services (CEDS), Tennessee Department of Health, 425 5th Avenue North, Nashville N 37247.
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Department of Health. Authorization No. 343227, 9,000 copies. This public document was promulgated at a cost of \$0.16 per copy. 06/02



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¹ The National Foundation for Infectious Diseases. Biological;23:4.