

## Drug-resistant Nontyphoidal *Salmonella* Bacteremia, Thailand<sup>1</sup>

**To the Editor:** Despite improved public health, serious infections with nontyphoidal *Salmonella enterica* remain a major clinical and public health concern in Thailand and worldwide (1,2). Life-threatening *Salmonella* infections resistant to fluoroquinolones, extended-spectrum cephalosporins, or both, have been increasingly reported (3). Use of antimicrobial drugs for disease prevention and growth promotion in food animals has been implicated in this increase in drug resistance (4). Because of extensive global travel, such increases affect the medical community domestically and internationally (5). We report a pilot survey of drug resistance in *Salmonella* spp. in Thailand.

We studied archival nontyphoidal *Salmonella* isolates from bacteremic patients at King Chulalongkorn Memorial Hospital from January 2003 to October 2005 and from bacteremic patients in Thailand sent to the World Health Organization National *Salmonella* and *Shigella* Center in Bangkok during the first half of 2005. The isolates from these archives were nonoverlapping and were kept frozen at  $-80^{\circ}\text{C}$ . Isolates were divided into *Salmonella* serovar Choleraesuis and other nontyphoidal *Salmonella* (non-Choleraesuis) because we observed that Choleraesuis isolates show a higher frequency of resistance to fluoroquinolones and extended-spectrum cephalosporins than non-Choleraesuis isolates. A standard Etest method (AB Biodisk, Solna, Sweden) was used to

evaluate MICs for nalidixic acid, ciprofloxacin, and ceftriaxone. Susceptibility was defined according to the 2005 criteria for *Salmonella* of the Clinical Laboratory Standards Institute (CLSI, formerly NCCLS) (6).

Isolates showed high frequencies of antimicrobial drug resistance (Figure). All *S. Choleraesuis* isolates with ceftriaxone resistance also showed high levels of resistance to nalidixic acid (MIC  $\geq 256$   $\mu\text{g}/\text{mL}$ ); most of these also had reduced susceptibility to ciprofloxacin (MIC  $\geq 0.125$   $\mu\text{g}/\text{mL}$ ). Of 73 nalidixic acid-resistant *Salmonella* isolates, 55 (75%) required a ciprofloxacin MIC  $\geq 0.125$   $\mu\text{g}/\text{mL}$ , 14 (19%) required an MIC of 0.094  $\mu\text{g}/\text{mL}$ , and 4 (6%) required an MIC of 0.064  $\mu\text{g}/\text{mL}$ . One patient with aortitis caused by ceftriaxone-resistant *S. Choleraesuis* died of a ruptured mycotic aneurysm.

In the food animal industry, the effect of using antimicrobial drugs has long been a subject of concern (7–9). Evidence from molecular epidemiologic studies (9) suggests that these concerns are genuine and that serious problems must be addressed. This concern is also supported by reports of fatal, invasive, nontyphoidal *Salmonella* infections resistant to quinolones or extended-spectrum cephalosporins (7,10). In Thailand,

enrofloxacin, a veterinary fluoroquinolone, is used in animals in the poultry, swine, and seafood industries. Ceftiofur, a third-generation cephalosporin, is used extensively in swine for treatment and prevention of disease and for growth promotion. When compared with previous susceptibility patterns (5), current nontyphoidal *Salmonella* infections in humans in Thailand are more resistant to quinolones and cephalosporins. Susceptibility to nalidixic acid correlates well with reduced susceptibility to ciprofloxacin. An alarming increase in ceftriaxone resistance in *S. Choleraesuis* may be associated with inappropriate cephalosporin use in swine farming. Major revisions in current policies for use of antimicrobial drugs in food animals in Thailand are warranted.

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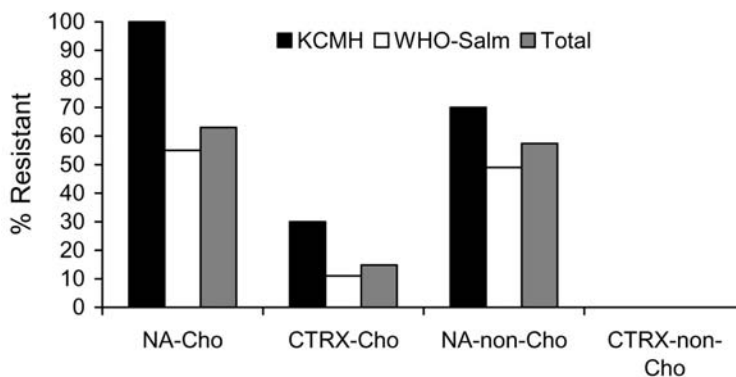


Figure. Percentage of nontyphoidal *Salmonella* isolates resistant to nalidixic acid (NA) and ceftriaxone (CTR), Thailand. KCMH, King Chulalongkorn Memorial Hospital; WHO-Salm, World Health Organization *Salmonella* and *Shigella* Center. Cho, Choleraesuis; non-Cho, non-Choleraesuis. The analysis included 10 Cho isolates from KCMH, 44 Cho isolates from WHO-Salm, 27 non-Cho isolates from KCMH, and 41 non-Cho isolates from WHO-Salm. Two Cho isolates from WHO-Salm with intermediate MICs for ceftriaxone are also included.

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## Fulminant Supraglottitis from *Neisseria meningitidis*

**To the Editor:** A 68-year-old Caucasian woman with non-insulin-dependent diabetes mellitus, hypertension, and peripheral vascular disease sought treatment at an emergency department after experiencing 2 days of pharyngitis and 1 day of fatigue and dysphagia for solid food. The morning of admission she noted dysphagia for solid food and liquids, dysphonia, severe anterior neck pain, neck swelling and erythema, dyspnea, and a temperature of 102.3°F (39°C). A computed tomographic (CT) scan demonstrated substantial neck soft tissue edema and narrowing of the oropharynx and hypopharynx. She received single doses of intravenous ampicillin/sulbactam, clindamycin, dexamethasone (10 mg), and methylprednisolone (125 mg) before being evacuated by air to our intensive care unit (ICU) at Walter Reed Army Medical Center. Intravenous ampicillin/sulbactam, 3 g every 6 hours, and clindamycin, 900 mg every 8 hours, were continued after the transfer. Two doses of intravenous vancomycin, 1 g every 12 hours, were given before vancomycin was discontinued.

Results of laboratory studies were the following: leukocyte count 13.3/mm<sup>3</sup> (71% polymorphonuclear leukocytes, 18% bands) and normal hematocrit, platelet count, blood urea nitrogen and creatinine concentrations, and liver-associated enzymes.

A marker pen was used to track the rapid advance of erythema overnight from her anterior, inferior chin to the top of her breasts (Figure). The infectious disease service was consulted the next morning. When she was examined, her condition had improved; she had normal vital signs, a slightly hoarse voice, and the ability to swallow some saliva. She had no headache or meningismus. The chest erythema was receding. Oral examination demonstrated erythema and an abrasion in the posterior pharynx. Her tongue was not elevated and her uvula was midline. Anterior firm edema without crepitus extended from her chin to the mid-neck. Results of her examination were otherwise unremarkable. The infectious disease consultant recommended restarting a course of vancomycin and discontinuing clindamycin.

A follow-up CT scan with contrast demonstrated anterior cervical soft tissue edema and patent airway with surrounding abnormal thickness and soft tissue density. No abscess or clot was seen. Endoscopic examination in the ICU showed diffuse erythema and generalized supraglottic edema affecting mostly the epiglottis and arytenoids. Dental examination demonstrated no acute pathologic features. Blood cultures at our hospital yielded no growth, and throat culture was negative for group A streptococci.

The patient recovered without requiring intubation (Figure). On the day of discharge, a blood culture from the referring hospital's emergency department was reported to be positive for *Neisseria meningitidis*, serogroup Y. Immediate family members and the otolaryngologists who conducted the endoscopic examina-