with antibiotics demonstrates that a single dose or 3 days of treatment at most is sufficient for most patients. As to the choice of antibiotic, evidence demonstrates equivalency, if not superiority, of a fluoroquinolone in the treatment of individuals with TD, compared with every other class of antibiotic [3–5]. Data also support the use of azithromycin in individuals for whom fluoroquinolones are contraindicated or who develop TD in areas of the world with a high rate of fluoroquinolone-resistant Campylobacter-associated TD, such as South and Southeast Asia [6]. The use of rifaximin is supported in areas of the world where Escherichia coli-associated diarrhea is common, such as Mexico [3]. Although the introduction of rifaximin provides an alternative antibiotic, there may be potential drawbacks with this agent. It is not recommended for treatment of individuals with diarrhea in whom there is mucosal invasion with a pathogen, such as Shigella species, Campylobacter species, or in some cases, Salmonella species [5, 7]. In addition, although it is felt that the risk of development of resistance to rifaximin may be low, a recent study indicates that resistance can develop during treatment [5]. There is also the theoretical risk that widespread use of rifaximin will further induce resistance.

Finally, Dr. Connor [1] notes that the development of irritable bowel syndrome following TD is a potential reason for considering prophylaxis for most travelers. Although the reported incidence of irritable bowel syndrome at 6 months after TD ranges from 4% to 14% [8–10], the true incidence of this syndrome is not clear, and all contributing factors to the syndrome and its potential prevention have yet to be defined.

The guidelines panel welcomes continued investigation into TD, one of the most common ailments of travelers. Nevertheless, until there is clear supporting evidence to change recommendations, the current Infectious Diseases Society of America guidelines on the management of TD should be followed, including attention to choice of food and beverage and, in the event of diarrhea, prompt self-treatment (hydration, symptom control, and short-course antibiotic treatment in selected patients). At present, chemoprophylaxis should be restricted to well-informed travelers in whom the benefits clearly outweigh the risks.

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Hantaviruses: Underestimated Respiratory Viruses?

To the Editor—In a recent invited article, Hall [1] communicated interesting guidelines on how to contain influenza and other respiratory viruses. Lacking, however, were specific measures concerning hantavirus, the latest airborne virus discovered in the New World that, since 1993, has been described as the agent of the highly fatal hantavirus cardiopulmonary syndrome. The total number of cases of hantavirus cardiopulmonary syndrome during the period 1993–2007 was ∼2500, with an overall mortality of 30% (D. Enria, personal communication). This is com-
parable to the 774 fatalities among 8096 cases of severe acute respiratory syndrome registered by the World Health Organization during the period November 2002–July 2003 [2] and higher than the 200 fatalities among 328 cases of avian influenza since 2003 [3]. Moreover, related hantaviruses in Eurasia can target the lungs [4], in addition to the kidneys, causing hemorrhagic fever with renal syndrome.

Hantaviruses are spread to humans via aerosolized excreta from chronically infected wild rodents, the reservoir of hantaviruses in nature [5]. The main European agent, Puumula virus, can survive and be transmitted to other rodents for up to 15 days after being excreted [6], whereas Hantaan virus, the most important serotype in Asia, can remain infectious under optimal conditions (high humidity and at a temperature of 4°C) for up to 96 days [7]. Hantaviruses are 80–120 nm in diameter and can form small-particle aerosols with infectious capacity because of their ability to spread to a distance, as proven in laboratory rodent experiments [6] and as suggested in a case-control study after an outbreak of Puumula virus infection in Belgium [8]. The principal European reservoir of Puumula virus is the bank vole (Myodes glareolus), which prefers to make its burrows under stacks of wood in or near the forest. Thus, cutting or extracting wood logs from the forest was confirmed to be the most important risk factor (OR, 25.5; 95% CI, 5.7–114) for contracting hemorrhagic fever with renal syndrome [4].

Close contact with rodents prior to human hantavirus infections is seldom mentioned. Conversely, sightings of rodents from a distance appeared to be the most important difference (χ² = 13; P < .01) between case patients and uninfected troops after a 1990 outbreak of Puumula virus infection among American military personnel during maneuvers near Ulm, Germany [9]. Interhuman transmission of hantaviruses has been reported thus far only for Andes virus in Argentina. Prolonged and close contact in confined spaces (e.g., a 14-h bus trip on a seat near an index patient with hantavirus cardiopulmonary syndrome) seems to be a prerequisite for transmission, suggesting but not proving that large-particle droplet aerosols are a possible second means of transmission of infection [10].

The following infection control procedures have been proposed since the early 1990s by the Belgian Reference Laboratory for Hantaviruses and were later sanctioned by the National Institute for Public Health, Brussels, Belgium [11]: (1) avoid camping or sleeping on grounds with many rodent burrows (as was the case in the epidemic in Ulm, Germany), (2) turn your back to the wind when working on such grounds or when cutting wood in the forest, (3) ventilate indoor locations (e.g., lodges, barns, and basements) with signs of rodent infestation, and (4) after ventilation, wet-mop floors with a bleach solution (to which the liquid-enveloped hantaviruses are sensitive).

In the absence of a hantavirus vaccine, these simple and cheap measures can be effective, particularly during military activities at war. After consultation, they were implemented by the US Medical Service in Bosnia, a region where several pathogenetic hantavirus serotypes are endemic. During and after the Bosnian War, only 1 confirmed case and 1 suspected case of hemorrhagic fever with renal syndrome (2 [0.1%] of 1913 cases) were recorded in American forces deployed in Bosnia [12], in contrast to >300 cases in Bosnian patients admitted to the University Hospital in Tuzla in northeast Bosnia (i.e., the same American sector) during the same period [13]. Moreover, 39 other cases of hemorrhagic fever with renal syndrome were seroconfirmed in Bosnians in Sarajevo, Bosnia and Herzegovina [14, 15], and at least 100 more cases were seroconfirmed in Zagreb, Croatia [16]. The vast majority of these cases occurred in military personnel in the field.

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Education Reduces Ventilator-Associated Pneumonia Rates

To the Editor—Given our particular involvement in infection prevention in the intensive care unit, we read with great interest the article by Apisarnthanarak et al. [1] that reported a significant reduction in ventilator-associated pneumonia (VAP) rates after implementation of a focused education intervention. The data provided by Apisarnthanarak et al. [1] are important, because they may convince others to set up an educational program to prevent VAP. With this letter, we want to encourage clinicians to dare to question the level of knowledge about evidence-based recommendations in their units and to take into account potential barriers to changing habits. Getting your team to be informed and educated about recommended prevention strategies appears to be a cornerstone when it comes to fighting VAP. Recently, the level of knowledge about evidence-based guidelines for the prevention of VAP was assessed in a sample of 638 intensive care unit nurses by means of a reliable and validated multiple-choice questionnaire [2, 3]. Preventive strategies covered by the questionnaire included oral endotracheal intubation, frequency of ventilator circuit changes, heat and moisture exchanger, frequency of humidifier changes, closed suction system, frequency of change in suction system, drainage of subglottic secretions, kinetic beds, and semirecumbent positioning [3]. The respondents’ mean score on the questionnaire was 41.2% correct [2], demonstrating a poor knowledge of evidence-based guidelines for VAP prevention.

These disappointing results add a new perspective to understanding low rates of adherence to VAP guidelines, as reported elsewhere [4–6]. Obviously, knowledge of what is recommended is a primary condition for adherence. As a consequence, educational programs may play a pivotal role in improving guideline adherence and, subsequently, in reducing rates of VAP.

A recent study by Sinuff et al. [7] has identified education tailored to the learning preferences of the target group as a strategy to overcome potential barriers to adherence. This finding stresses the importance of involving all members of the interprofessional team in the development and implementation of educational programs. Moreover, participants in the same study [7] suggested that their adherence to guidelines might be improved by a system of reminders and audit feedback. Indeed, reminders and regular feedback may help to ensure long-term beneficial effects. In addition, appreciation, acknowledgement, and—why not?—celebration of positive team results may be supportive for sustaining joint efforts to reduce infection rates and for creating a constructive team culture. Finally, educational programs were shown to be successful when integrated into quality programs that take a multifaceted and multiple-step approach [8]. Such programs may help to empower caregivers, heighten their awareness of individual responsibilities within the multidisciplinary team, and facilitate a reduction of complexity in implementation processes.

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