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Controlling the Ever-Present Methicillin-Resistant *Staphylococcus aureus*

ABSTRACT & COMMENTARY

Source: Chaix C, et al. Control of endemic methicillin-resistant *Staphylococcus aureus*: A cost-benefit analysis in an intensive care unit. *JAMA* 1999;282:1745-1751.

Henri mondor hospital near paris has been afflicted with endemic methicillin-resistant *Staphylococcus aureus* (MRSA) since the 1970s, a problem familiar to many American medical centers. In view of this, Christian Brun-Buisson and colleagues implemented a control program in the early 1990s that included selective screening in selected high-risk units like ICUs. A 30% reduction in the incidence of MRSA followed this effort.[1]

Few American hospitals have adopted the practice of selected screening for MRSA, perhaps because the cost-benefit was unclear or because the commitment to control was lacking. Now, Chaix and colleagues have published their cost analysis in a major American journal, the *Journal of the American Medical Association.*

Quite simply, the keystone to the control program featured cultures of several sites plated to selective media for specific detection of MRSA in ICU patients, first on admission and then weekly thereafter. As soon as a patient was found to be colonized or infected, the patient was placed in contact isolation in a single room. Isolation was continued until discharge or eradication of loss of colonization. Treatment of colonized patients included chlorhexidine body washes on alternate days. Mupirocin was used to decolonize the nares in those patients with only nasal carriage.

Models for cost determination have been well worked out by Chaix et al. Of note for the reader, the average nurse's salary was $46,000 for 1700 hours of work, or $27 per hour, while the average physician's salary was $70,000 for 1700 hours, or $41 per hour. Isolation costs were determined over the duration of the patient's stay. The overall intent of the study was to determine the ranges of probabilities that being an MRSA carrier at the time of ICU admission

Volume 19 • Number 10 • February 15, 2000 • Pages 73-80

INSIDE

that would make the strategy of targeted screening (in the terms of sensitivity analysis) favorable.

The results were compelling. During the study from 1993-1997, 85 patients became infected with MRSA and 27 were chosen for analysis compared to controls. Compared to controls, MRSA cases were more likely to have a longer stay, have a fatal outcome, and undergo multiple procedures. The medical costs for the MRSA patients were $9550 (mean) vs. $6040 for controls (P = 0.007), and a total cost of $30,225 for MRSA patients vs. $20,950. The total extra cost for contact isolation was $655-$705 for patients isolated for an average of 20 days. Using sensitivity analysis, if the MRSA carriage rate on admission was 4%—as Chaix et al had previously determined—the transmission of MRSA was reduced 15-fold by the isolation precautions. The control measures became cost beneficial when the targeted reduction of MRSA infection was reduced only by 14%.

Some other data generated by the study are interesting. The time per day attributable to isolation precautions was 20 minutes if there was full compliance with isolation precautions. For a given patient, the total nursing time for contact isolation was 3 h 25 min to 6 h 40 min. The total cost of contact isolation and screening per patient was $365-$705 if there was full compliance. These costs compare to excess medical and total costs of $3500 and $9275, respectively, for each MRSA infection.

COMMENT BY JOSEPH F. JOHN, MD

There was a time (that none of us can remember) when all strains of *S. aureus* were penicillin susceptible. That only lasted a year or two after the introduction of this antibiotic! Now there are few no penicillin-susceptible strains. There was a time when most *S. aureus* were susceptible to semisynthetic penicillins. That lasted a bit longer but, eventually, the gene labeled *mecA* has entered a large majority of hospital strains of *S. aureus* and almost all nosocomial strains of coagulase-negative staphylococci. The result of the spread of *mecA* has been a huge increase in the use of vancomycin during the last decade. In fact, in 1998, vancomycin accounted for 10.4% of all IV antibiotic use when 11,980,614 patients received some form of IV antibiotics.[2]

As the epidemic of MRSA has progressed, thousands of papers, clinical and basic, have been written about MRSA. Control of MRSA has been elusive at best, with some centers, in fact, during the 1990s just throwing up their hands in dismay and ignoring attempts at control. Yet, in the last few years, several papers—including one from Chaix et al, who also authored the current paper—have appeared showing that, with proper methodology and resources, control was possible.[1] Skeptics awaited data showing that successful control programs were also cost effective.

The current paper by Chaix et al does just that, the setting again an ICU in one of France's largest hospitals. The largest issue for American hospitals is likely who is going to pay for the admission (and possibly the weekly) cultures. The admission culture cost the French hospital only $15. Moreover, for a figure of costs of control of $500, the savings was $3500. Estimates may be excessive due to a lower rate of carriage on admission (unlikely at most of our large medical centers) or an extremely low rate of transmission (unlikely from the overall rates of infection at most of our medical centers). Even if savings were less than seven-fold times the cost of the MRSA control, it is hard to make an argument for not implementing this type of control.

So how will U.S. hospitals infested with MRSA respond to the French challenge? My guess is that we will continue to support the traditional assumption that isolating patients upon accidental discovery of MRSA

Infectious Disease Alert, ISSN 0739-7348, is published twice monthly by American Health Consultants, 3525 Piedmont Rd., NE, Bldg. 6, Suite 400, Atlanta, GA 30305.

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GST Registration Number: R128870672.

Periodical postage paid at Atlanta, GA.

POSTMASTER: Send address changes to ***Infectious Disease Alert***, P.O. Box 740059, Atlanta, GA 30374.

Back issues: $18.

Missing issues will be fulfilled by customer service free of charge when contacted within one month of the missing issue's date.

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Subscription Prices

United States
$219 per year (Student/Resident rate: $110).

Multiple Copies
1-9 additional copies: $197; 10 or more copies: $175.

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carriage or infection does in fact suffice as control. Implementation of the French approach may be somewhat painful at first, but Chaix et al emphasize that their hospital workers became facile at the control methodology—perhaps a confounding variable in their study—to implement selective screening.

The French program worked for a hospital that had only 15-30% of all *S. aureus* isolates determined to be methicillin resistant. Many American centers now have 60% or even more MRSA, so the benefits to a selective screening approach should be even more impressive and, certainly, more cost beneficial.

About the only aspect of the control program that dulls my enthusiasm is the inclusion in the French approach of whole-body washings of those patients colonized with MRSA with 4% chlorhexidine on alternate days. Since the nares are by far the most common site of colonization and probably the major site for perpetuation of MRSA, I would recommend that some centers may choose to use nasal mupirocin on nasal MRSA carriers at a first attempt to lower MRSA infection rates. For those hospitals willing to move to whole-body washings with chlorhexidine, however, the payoff will likely be more immediate and more financially gratifying. ❖

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Pumping Azithromycin

ABSTRACT & COMMENTARY

Synopsis: *Nearly half of Neisseria gonorrhea strains isolated from patients in Uruguay expressed the mtr phenotype, with increased antibiotic efflux, with reduced susceptibility to azithromycin.*

Source: Zarantonelli L, et al. Decreased azithromycin susceptibility of *Neisseria gonorrhoeae* due to mtrR mutations. *Antimicrob Agents Chemother* 1999;43:2468-2472.

Azithromycin is becoming an increasingly popular and cost-effective agent for use in sexually transmitted diseases (STDs), especially in developing countries with *Neisseria gonorrhea* with increasing rates of resistance to other agents. Zarantonelli and colleagues in Uruguay examined the antimicrobial susceptibility of 51 consecutive isolates obtained from males with uncomplicated acute gonococcal urethritis. As anticipated, many of the isolates were multidrug resistant. Two-thirds demonstrated chromosomally mediated resistance to tetracycline; seven (13.7%) additional isolates had high-level plasmid-mediated resistance to tetracycline.

In addition, clinical isolates with decreased susceptibility in vitro to azithromycin were readily detected. While the MICs for azithromycin remained well within the "susceptible" range (0.32-0.5 mcg/mL) and none were greater than 0.5 mcg/mL, further analysis revealed that the mtr phenotype was expressed by 23 (45%) of the strains. Nearly half the strains with broadly decreased susceptibility to erythromycin, azithromycin, and tetracycline exhibited the mtr phenotype. The mtr phenotypic isolates were generally only ~1/10 as susceptible to azithromycin as the non-Mtr strains.

COMMENT BY CAROL A. KEMPER, MD

Based on its exceptionally long half-life and excellent tissue penetration, azithromycin has become an increasingly useful agent in the treatment of STDs, especially in developing countries with a high prevalence of penicillin- and tetracycline-resistant *N. gonorrhea*. Unfortunately, azithromycin resistance is emerging in many of these countries, possibly due to the increasing presence of the mtr resistance phenotype. While some sources describe the mtr resistance phenotype as conferring "reduced permeability" of the cell envelope, the *mtr* gene actually appears to encode a transcription repressor that modulates expression of an mtr operon. Mutations in the *mtr* gene that decrease the level of expression of mtrR allow overexpression of an efflux pump. This energy-dependent efflux pump is responsible for the export of all kinds of hydrophobic substances, including dyes, detergents, and antibiotics such as tetracycline, erythromycin, and azithromycin.

In general, the Mtr phenotype of *N. gonorrhea* raises the MIC two to-fourfold, which is still within the "susceptible" range, but there is concern that additional mutations outside of the *mtr* gene could further reduce its susceptibility and render azithromycin useless. Clinical failure has been documented in patients with gonorrhea receiving 1.0 gram of azithromycin despite azithromycin MICs of 0.125-0.25. Tapsall has suggested that MIC data may not apply gonococci and should not be relied upon to predict success.[1]

The mtr phenotype has been widely detected and now accounts for ~50% of isolates in places like Kenya and Uganda, as well as countries in South America. Studies also suggest that the mtr phenotype is more prevalent in homosexually active men compared with heterosexual men or women, possibly due to increased exposure to hydrophobic substances or antibiotics. There is also concern that the singularly long half-life of azithromycin, which provides a significant advantage in the treatment of such obligate intracellular organisms as chlamydia, may have the unfortunate result of increased selective pressure for resistance in gonococci.[2] ❖

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Evaluation of New Antiretrovirals

ABSTRACT & COMMENTARY

Synopsis: *An open label, randomized, multicenter trial comparing efavirenz plus zidovudine and lamivudine, efavirenz plus indinavir, and indinavir plus zidovudine and lamivudine in the treatment of HIV-1 infection in adults demonstrated excellent efficacy of the protease inhibitor-sparing regimen.*

Source: Staszewski S, et al. Efavirenz plus zidovudine and lamivudine, efavirenz plus indinavir, and indinavir plus zidovudine and lamivudine in the treatment of HIV-1 infection in adults. *N Engl J Med* 1999;341:1865-1873.

Few studies of highly active antiretroviral therapy (HAART) have included a regimen containing newer nonnucleoside reverse transcriptase inhibitors (NNRTIs) as initial therapy in HIV patients. The current study compared the efficacy of two regimens containing efavirenz (efavirenz plus zidovudine and lamivudine, and efavirenz plus indinavir) to a standard three-drug regimen containing a protease inhibitor plus two nucleoside reverse transcriptase inhibitors (NRTIs). The design was an open label, randomized, multicenter trial involving 34 different sites in the United States, Europe, and Canada. Patients were naive to the study drugs and were followed up for a total period of 48 weeks. The maker of efavirenz, Dupont Pharmaceuticals, sponsored the study. A total of 450 patients were enrolled.

After 48 weeks of treatment the regimen of efavirenz, zidovudine, and lamivudine proved more effective than indinavir, zidovudine, and lamivudine in suppressing viral load to less than 50 copies/mL. The superiority of the efavirenz regimen held up with both an analysis based on treatment received as well as analysis based on an intention to treat (90% vs 79% and 64%, $P < 0.05$ vs 43%, respectively, $P < 0.05$). In the intention-to-treat analysis, the regimen of indinavir and two NRTIs was less effective compared with efavirenz regimens (43% vs 47% and 64%, respectively, $P < 0.05$) while in the analysis according to treatment received, the indinavir and two NRTI combination was as effective as efavirenz and indinavir (79% vs 75%). Also, the efavirenz, lamivudine, and zidovudine regimen was significantly more effective than the other two regimens in suppressing HIV RNA to less than 50 copies/mL in patients who had a baseline viral load of more than 100,000 copies/mL (90% vs 72% vs 75%, $P < 0.05$) as well as in patients with viral loads of less than 100,000 copies/mL.

Significant increases above baseline CD4 cell counts were found in all three groups at all points (mean increases of 201, 185, and 180 cells/mm^3 in the group given efavirenz and NRTIs, the group given indinavir and NRTIs, and the group given efavirenz and indinavir, respectively). More patients discontinued treatment in the indinavir group due to side effects compared with efavirenz-containing regimens. Among the latter group, rash and CNS side effects were more commonly observed but no patients stopped treatment because of them.

COMMENT BY NILI GUJADHUR, MD

Currently, a limited number of drugs are available for the treatment of patients with HIV infection and there is no consensus on the ideal initial HAART regimen. Many patients are inadequately treated with protease inhibitors because of these agents' side effects (nausea, vomiting, diarrhea, and renal stones), requirements for drug, dietary restrictions, and heavy pill burden. Furthermore, they cause metabolic disturbances such as insulin resistance and hyperlipidemia, leading to increased atherogenicity and cardiovascular risk, lipodystrophy, and peripheral muscle wasting, which, in turn, constitutes a true psychological dilemma for the patient. On the other hand, NNRTIs have a low threshold for emergence of resistance, but have good oral bioavailability and long serum half-lives, thus

enabling a once-daily dosing schedule. Side effects to efavirenz itself include rash, CNS symptoms (e.g., insomnia, dizziness, and somnolence) that disappear with time.

In the present study, in the analysis according to treatment received—which provides a more realistic assessment—the percentage of patients with HIV RNA less than 50 copies/mL was not significantly different in the two groups except at weeks 16 and 48. In the intention-to-treat analysis, more patients in the indinavir, AZT, and lamivudine group stopped treatment because of side effects compared to the efavirenz-containing regimens. Also, patients using the efavirenz regimen had to take fewer pills, which may have generated superior compliance, possibly improving outcomes in that group. Thus, in asymptomatic patients, the NNRTI efavirenz seems as effective—at least in the short run—as protease inhibitors, even in patients with high initial viral loads. The potential for rapid development of resistance with the use of this class of drugs must be weighed against their user friendliness. HIV prescribers need to balance the opportunity for successful long-term suppression of viral replication with compliance. Protease-sparing regimens like the one used in the study have minimal drug interaction, do not require dietary restriction, and involve taking fewer pills. Longer term studies using genotyping and phenotyping of recrudescent HIV will be required to assess the ultimate use of protease-sparing regimens. (*Dr. Gujadhur is Subspecialty Fellow, Division of Allergy, Immunology, and Infectious Diseases, University of Medicine and Dentistry of New Jersey, Robert Wood Johnson Medical School, New Brunswick, NJ.*) ❖

Man's Best Friend?

ABSTRACT & COMMENTARY

Synopsis: *A 7-week-old infant developed purulent Pasteurella multocida meningitis that was originally thought to be caused by Haemophilus influenzae type b. The infection was believed to be transmitted by the fingers of a sibling that had been licked by a pet dog in the home.*

Source: Wade T, et al. *Pasteurella multocida* meningitis in infancy—(a lick may be as bad as a bite). *Eur J Pediatr* 1999; 158:875-878.

Pasteurella multocida, a gram-negative coccobacillus, is the most common agent cause of local infections after a dog or cat bite. Approximately 70-90% of cats and 55% of dogs have this organism in their mouths. Meningitis caused by this organism is unusual, particularly in infants younger than 12 months of age, and a total of only 23 cases were reported in the literature between 1963 and 1996. Wade and associates from St. Mary's College in London describe a seven-week-old infant who presented with fever, irritability, and a bulging fontanelle. Lumbar puncture revealed purulent cerebrospinal fluid (CSF) that contained gram-negative rods. CSF rapid antigen screen was positive for *Haemophilus influenzae* type b. Blood culture was also reported to be positive for *H. influenzae* type b. The child was treated with cefotaxime and, after a stormy course, recovered but was left with neurological sequelae.

Since 1995 any *H. influenzae* organism that is recovered from the blood or CSF in the United Kingdom is sent to a reference lab in Oxford for validation. Extensive testing showed that the organism was *P. multocida*, not *H. influenzae*.

The family of this child owned two dogs and one cat but there was no direct contact between the infant and a pet (no history of licking or of a bite or scratch). Later questioning revealed that a 2-year-old brother whose hands were often licked by the dogs had been seen trying to comfort the infant by letting the baby suck on his fingers.

COMMENT BY ROBERT BALTIMORE, MD, FAAP

Wade et al note that of the 23 cases of *P. multocida* meningitis in infants that have been reported, 12 of the infants had exposure to dogs, eight cases had exposure to cats (3 were exposed to both), three cases had no animal contact information, and in only two cases did the parents specifically deny the possibility of any animal contact. In only two cases was there a history of a bite or scratch; in the other 15 there was only possible salivary contact. The probable mechanism for these infections in the absence of a bite or scratch may be that the pet licks the hands of a family member who then transmits the organism to the baby's mouth, who, in turn, may develop pharyngeal colonization followed by invasion and hematogenous spread to the meninges.

P. multocida meningitis or sepsis is frequently misdiagnosed as *H. influenzae* or *Neisseria meningitidis* by microscopy or culture, but definitive identification can be made on the basis of characteristic fermentation patterns. The reason for the false-positive rapid antigen screen test in this case is not clear.

The widespread use of HiB vaccine has virtually

eliminated infections with *H. influenzae* type b in the United States and the United Kingdom, and the occurrence of a case of invasive infection apparently caused by this organism should raise suspicion that something else may be going on.

This case and the others reported in the literature emphasize that there is a risk of having pets in households where there are infants. Nearly all of these cases are preventable by reminding parents in these homes that young infants should not come in close contact with the saliva of dogs and cats, and the rest of the family should be assiduous about hand washing, especially if they might put their fingers in the baby's mouth.

A final point concerning *P. multocida* in older people. The organism can be responsible for severe and even fatal invasive infections in immunocompromised and asplenic individuals.[1] (*Dr. Baltimore is Professor of Pediatrics, Epidemiology, and Public Health, Yale University School of Medicine.*) ❖

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Hepatitis E: A Synopsis of Recent Publications and Presentations

REVIEWS & COMMENTARY

By Philip R. Fischer, MD, DTM&H

Synopsis: *Hepatitis E is increasingly identified in various areas of the world, and animal reservoirs have been found in the United States. Infection is not rare in travelers, but it is often subclinical.*

Hepatitis e virus (hev) is an important cause of acute liver disease in many developing countries. It is felt to be spread by the fecal-oral route, usually causes epidemic illness, and generally affects young adults. Hepatitis E is particularly severe during pregnancy.

A few years ago, a retrospective serosurvey showed that hepatitis E was essentially nonexistent in expatriate American missionaries from 1967-1984.[1] Case reports, however, have identified hepatitis E in travelers,[2] and a survey of California blood donors (1% seropositive) revealed that foreign travel was a risk factor for HEV seropositivity.[3]

In recent months, new publications and scientific presentations reveal an expanding knowledge base about hepatitis E. Several of these are intended to keep our readers up-to-date.

Eli Schwartz and colleagues in Israel reported five cases of HEV infection in travelers and reviewed the literature. They identified the Indian subcontinent as the most likely destination of travelers who became infected. (Schwartz E, et al. Hepatitis E virus infection in travelers. *Clin Infect Dis* 1999;29:1312-1314.)

Beyond case reports identifying the possibility of HEV infection in travelers, however, one wonders how common this illness actually is. Ooi and colleagues from three U.S. travel clinics prospectively evaluated 356 travelers. Interestingly, nine (3%) were already IgG seropositive on entry into the study, and each of these individuals had traveled outside the United States in the preceding five years. New infection was identified in four short-term (8-21 days) travelers (to China, Peru, Russia, and Thailand) even though all four remained asymptomatic. Thus, it appears that new HEV infection can occur in more than 1% of American travelers. Thus, hepatitis E could be similar to hepatitis A in frequency.[4] (Ooi WW, et al. Hepatitis E seroconversion in United States travelers abroad. *Am J Trop Med Hyg* 1999;61: 822-824.)

Meanwhile, epidemics continue to occur. Larasati and colleagues reported to the American Society of Tropical Medicine and Hygiene in Washington, DC, December 1999, about an epidemic in Indonesia that involved more than 500 clinical cases. A full 2% of the population became ill, but 90% of cases occurred in individuals older than 20 years of age. There is, so far, no clear explanation for the apparent sparing of children from hepatitis E during the first two decades of life. (Larasati RP, et al. First time epidemic HEV transmission in Java, Indonesia. *Abstract 537*. 48th Annual Meeting of the American Society of Tropical Medicine and Hygiene, Washington, DC, 1999.)

Closer to home, HEV is also lurking. Wondering if an animal reservoir might be more important than the postulated fecal-oral transmission, Kabrane-Lazizi and associates tested serum samples from 239 wild rats collected in various U.S. sites. Seropositivity for HEV was found in 44% of rats from Louisiana, 77% of rats from Maryland, and 90% of rats from Hawaii. Further study will be needed to identify the relationship(s) between the high frequency of HEV infection in rats and the apparent non-endemicity of human HEV in the United States. (Kabrane-Lazizi Y, et al. Evidence for widespread infection of wild rats with hepatitis E virus in the United States. *Am J Trop Med*

Hyg 1999;61:331-335.) Pigs have also been suggested to be potential HEV reservoirs.

It seems that the global HEV situation is evolving even as our understanding of clinical hepatitis E grows. Fortunately, preventive intervention is also being developed. At the recent American Society of Tropical Medicine and Hygiene meeting, Shrestha reported a successful HEV vaccine trial. Forty-four Nepalese volunteers received a series of three injections (0, 1, and 6 months) of a recombinant hepatitis E vaccine. Vaccination was well tolerated with no serious adverse reactions. All vaccine recipients showed serological evidence of protection by the end of the study. Larger studies are planned. (Shrestha SK, et al. A safety and immunogenicity study of a recombinant baculovirus expressed hepatitis E vaccine in healthy Nepalese volunteers. *Abstract 1089*. 48th Annual Meeting of the American Society of Tropical Medicine and Hygiene, Washington, DC, 1999.)

What should travel medicine practitioners do with this new information about hepatitis E? First, we should continue to advise travelers to avoid sources of fecal-oral contamination and to shy away from close, personal contact with wild animals. Second, realizing that more than 1% of travelers might become infected, pretravel consultation, especially for pregnant travelers, should include a careful discussion of risks and risk avoidance so travelers can judiciously plan the timing and itinerary of their travel. (*Dr. Fischer is Associate Professor of Pediatrics, Department of Pediatrics & Adolescent Medicine, Mayo Clinic, Rochester, MN.*) ❖

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CME Questions

11. What is the average reduction in medical costs that a MRSA selective screening program will realize for each MRSA infection prevented?

a. $1500
b. $2500
c. $3500
d. $4500

12. *Pasteurella multocida*:

a. is more commonly found in the mouths of pet dogs than pet cats.
b. may be mistaken for *Haemophilus influenzae* by microscopy or culture.
c. infections in infants are usually associated with a dog or cat bite.
d. is a common cause of meningitis in infants.

13. Hepatitis E virus:

a. principally affects young adults.
b. occurs only in humans and not in animals.
c. occurs only on the Indian subcontinent.
d. infects less than 0.5% of travelers from the United States.
e. is a less severe illness in pregnant vs. nonpregnant women.

14. Which of the following statements is *false*? The mtr phenotype seen in strains of *Neisseria gonorrhea*:

a. results in overexpression of a hydrophobic efflux pump.
b. reduces the susceptibility of the organism to tetracyclines, macrolides, and azalides.
c. increases the susceptibility of the organism to quinolones.
d. can be detected in up to 50% of isolates in developing countries.

15. Protease-sparing regimens, like the one used in the study by Staszewski et al:

a. have minimal drug interaction.
b. do not require dietary restriction.
c. involve taking fewer pills.
d. need longer term studies using genotyping and phenotyping of recrudescent HIV to assess the ultimate use of them.
e. All of the above

16. The adult female *Triatoma sanguisa* found in the baby crib of an 18-month-old in rural Tennessee was carrying *Trypanosoma cruzi*.

a. True
b. False

17. Two Canadians contracted malaria after vacationing in:

a. Costa Rica.
b. Honduras.
c. Mexico.
d. Belize.
e. Great Britain.

In Future Issues:

Fever and Neutropenia

UPDATES

By Carol A. Kemper, MD, FACP

Trypanosoma cruzi in Tennessee

Source: Herwaldt BL, et al. *J Infect Dis* 2000;181:395-399.

In july 1998, in rural rutherford, Tenn., a mother found an unusual bug in the crib of her 18-month-old son, as well as black spots on the sheets (which had not been changed in 3 weeks). She had never seen this bug before, although she recalled something similar on a recent television program about insects that feed on mammals. Concerned, she took the bug to a local university, where much to everyone's surprise, it was identified as an adult female *Triatoma sanguisa*. The bug was engorged with blood, and its' intestines were stuffed with motile trypomastigotes of *Trypanosoma cruzi* (remember that large black posterior kinetoplast?). Within weeks, the boy developed intermittent fever. Although multiple blood tests for *T. cruzi* antibody and buffy coats were negative (and remained negative for the next 10 months), three separate blood specimens obtained over a three-week period were positive by PCR and DNA hybridization, suggesting that he had persistent low-level parasitemia. He was, therefore, treated with benznidazole for eight weeks with no recurrence of his symptoms and no further evidence of infection.

Investigators exploring the area around the house, which was clean and well built, turned up only one *T. sanguisuga* nymph in a wood pile on a nearby farm. In addition, two dogs on the farm, as well as eight rodents and nine other feral mammals in the area, were tested. Two of the raccoons were actively infected, and one dog had high antibody titers to *T. cruzi*. Two additional adult female bugs were found in the basement and on the front porch the following spring.

At least a dozen species of reduviid bugs—including this triatome—serve as the primary vector for *T. cruzi*. In addition, *T. cruzi* has been reported in 18 different species of mammals in the United States, including Maryland, Georgia, Florida, Arizona, Texas, Utah, and California. Although serological evidence of human infection has been reported in California and Georgia, this is only the fifth reported case of autochthonous human infection in the United States. Remarkably, this case would not have been recognized without the intervention of a very perceptive mom as well as newer molecular diagnostic techniques. ■

British Dog Makes History!

Source: ProMED mail posting. www.promedmail.org, Feb 11, 2000.

The british minister of agriculture and the Royal Marine Bugle Corps welcomed home Adan, a seeing-eye dog, and his owner on Feb. 8, 2000, after a historic five-day trip to France. Adan is the first dog to legally exit and reenter Great Britain without the requisite six-month quarantine. His owner is a 78-year-old former Royal Marine Commando who was injured in the Normandy Campaign, who requested the assistance of his seeing-eye dog in order to visit battlesites and the graves of former Commandos.

Adan's owner was granted a special dispensation three weeks in advance of implementation of Britain's new pilot Pet Travel Scheme. This new policy, which is being tested for one year, allows only cats and dogs who visit certain western countries permission to exit and reenter the country. Owners must still meet fairly rigid requirements, including having all animals registered through microchip technology, certain blood tests and immunizations must be current, and all animals must be cleared by a veterinarian before departure, again in the country they visit, and within 24-48 hours of reentering British soil.

While pet owners welcomed this news, one expert notes that the greatest benefit will be to service and work dogs, such as seeing-eye dogs and the dogs deployed to assist in the aftermath of the recent earthquakes in Turkey. Lengthy quarantines are detrimental to these animals, who require ongoing training to maintain their strength and skills. ■

Is Malaria in Cancun a Problem?

Source: ISTM Travel Medicine list; TRAVELMED@YORKU.CA; Jan. 31-Feb. 1, 2000.

Following a two-week christmas vacation to Cancun, Mexico, two Canadians have been diagnosed with *Plasmodium vivax* malaria. Both travelers had limited their activities to Cancun and the adjoining beaches and had not ventured beyond the city limits. This report is being reviewed by Canadian health authorities, who have the authority to alter recommendations for travel. Because acquisition of *P. vivax* in the major Central American resort areas along the Pacific and Gulf Coasts is uncommon, malaria prophylaxis is generally not recommended (www.cdc.gov/travel/camerica/htm). However, malaria is present throughout the year in rural areas. Malaria prophylaxis is, therefore, recommended for the more rural areas of places like Belize and Costa Rica, although it has been my experience that few American travelers are appraised of this by their travel agents or primary care providers.

This case reminds me of when I took care of a local housewife who spent one week each year with six of her friends relaxing on the island beaches off of Honduras. After her last trip, she required hospitalization for vivax malaria. She reluctantly explained to me that, although they had routinely taken malaria prophylaxis for each of the previous six years, she elected to forego it for this trip because none of them had gotten malaria before! ■