

shows insufficient coverage among students currently being trained as HCPs in university hospitals within the Paris area. Thus, all unvaccinated students (20.7%) and ≈5% of the 50% who have received 1 dose could be susceptible to measles. Moreover, a rather low proportion of students knew that measles vaccination was recommended, as described for HCPs (7), which may explain the insufficient coverage.

In France, this situation has resulted in several measles outbreaks within hospitals in recent years (8). Particular efforts should be made in certain units, such as pediatrics, because an early waning of maternal antibodies has been demonstrated (9). Measures should be taken to reinforce the vaccination policy in this well-defined group; information can be obtained and follow-up vaccinations can be provided easily during their training period. A mandatory health check could contribute to increasing the vaccination coverage (10).

Our study provides original data for measles vaccination coverage in HCSs in France. A similar conclusion applies to HCS-recommended vaccines for which we found insufficient coverage (<50% had received a pertussis booster in the past 15 years and only 6/27 without a history of varicella have been vaccinated against varicella). Such evaluations should be performed regularly. Although our data were collected from a representative sample of students in Paris, it is likely that the situation is qualitatively similar in other regions and therefore could contribute to future nosocomial epidemics. Mandatory vaccination of HCPs against vaccine-preventable diseases protects not only the HCP and his/her family, but also protects the patient. Increased vaccination of this group should contribute to a better control of measles outbreaks in France.

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Toxigenic *Corynebacterium ulcerans* in Woman and Cat

To the Editor: Diphtheria and diphtheria-like illness are caused by *Corynebacterium* spp. that harbor the diphtheria toxin-encoding *tox* gene. Recently in many industrialized countries, cases of diphtheria-like infection caused by toxigenic *C. ulcerans* have outnumbered those caused by toxigenic *C. diphtheriae* (1,2). *C. ulcerans* infection was originally associated with consumption of raw milk and dairy products or contact with cattle, but *C. ulcerans* has increasingly been isolated from domestic animals such as pet dogs and cats (3–5). So far, isolation of an identical toxigenic *C. ulcerans* strain from an animal and its owner has been documented only for dogs (3,4) and a pig (6). We report the isolation of an identical toxigenic *C. ulcerans* strain from an asymptomatic pet cat and a person with pharyngeal diphtheria-like illness; therefore, it might be speculated that the woman

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has acquired her infection from the cat.

In November 2010, an 86-year-old woman with arterial hypertension and rheumatoid arthritis was admitted to an ear, nose, and throat clinic in Dresden, Germany, with a 3-day history of sore throat, hoarseness, and nasal respiratory obstruction. Fever was not reported. Because the patient had visible fibrinous rhinitis, a nasal and pharyngeal swab was obtained before treatment with amoxicillin was begun. The patient had no history of recent travel abroad or contact with livestock. Her complete vaccination status against diphtheria was unknown, but she had received a vaccination booster in 2006.

Toxigenic *C. ulcerans* grew from culture of the nasal swab specimen; it was identified by biochemical differentiation (API Coryne code 0111326; bioMérieux, Nürtingen, Germany), *rpoB* sequencing (6), and MALDI-TOF analysis (MALDI Biotyper; Bruker Daltonics, Bremen, Germany) (7). Toxigenicity was verified by real-time PCR (8) and a modified Elek test (6).

Because the microbiological result suggested diphtheria-like illness, the patient was transferred to an infectious diseases department in an academic hospital, where she was isolated and treated with amoxicillin for 12 days. Because the patient's condition was stable and no severe complications occurred during her hospital stay, she was not given diphtheria antitoxin. Her predominant symptoms, such as sore throat and earache, improved after antimicrobial drug therapy, and she recovered quickly. Electrocardiogram performed before discharge from hospital showed no signs of myocarditis or other toxin-related effects, such as neurologic disorder.

Although person-to-person transmission of *C. ulcerans* has not yet convincingly been demonstrated, an outbreak investigation involving

the patient's close contacts (6 family members, the physician, and 19 nurses and other health care workers) was conducted. Although all close contacts had completed the series of diphtheria toxoid vaccinations, they were all given postexposure prophylaxis with erythromycin.

Because of the zoonotic potential of human *C. ulcerans* infections, nasal and pharyngeal swab samples were collected from the patient's asymptomatic pet cat. Strains of tox-positive *C. ulcerans* (which we named KL251 and KL252) grew on culture; the API Coryne code was identical to that of the human isolate KL246. In contrast to the human isolate, which yielded a weakly positive Elek result, both isolates from the cat showed Elek-negative results.

Antimicrobial drug susceptibility testing of the 3 isolates was performed on Mueller-Hinton blood agar (supplemented with 5% sheep blood) by using the Etest system after overnight incubation at 37°C and in 5% CO₂. In the absence of standardized breakpoints for *C. ulcerans*, susceptibility was determined by using the Clinical Laboratory Standards Institute criteria for broth microbouillon dilution susceptibility testing for *Corynebacterium* spp. (9). All *C. ulcerans* strains were susceptible to amoxicillin, benzyl penicillin, ceftriaxone, erythromycin, and tetracycline (MICs 0.19–0.5 µg/mL) but less susceptible to clindamycin in vitro (MIC 2 µg/mL).

Sequencing of *rpoB* and *tox* showed 100% homology between the strains from the woman and the cat. Ribotyping revealing a U3-like ribotype (5), and multilocus sequence typing (10) confirmed the clonal identity of the strains.

The cat was given a combined preparation of benzyl penicillin and streptomycin. After completion of therapy, *C. ulcerans* no longer grew from nasal swab specimens from the woman or the cat.

Our findings of transmission of toxigenic *C. ulcerans* between a woman and her cat underline the zoonotic potential of this organism and highlight the need for more studies investigating the carrier status of companion animals such as cats and dogs. Although clindamycin is not a first-line drug for diphtheria therapy, the intermediate susceptibility of *C. ulcerans* against clindamycin underscores the necessity of standardized susceptibility testing for diphtheria cases because clindamycin-resistant toxigenic *C. ulcerans* strains in human infections have been recently reported (6). Toxigenic *C. ulcerans* strains are rare, but the numbers of human wound infections or diphtheria-like disease caused by *C. ulcerans* have increased in the past few years. However, detection of toxigenic *C. ulcerans* is often still incidental, often resulting in delayed specific therapy, including patient isolation or contact tracing.

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Isoniazid-Resistant Tuberculosis, Taiwan, 2000–2010

To the Editor: Vinnard et al. (1) reported that the risk factors associated with initial isoniazid resistance among patients with tuberculous meningitis in the United States during 1993–2005 included young age (25–34 years) and foreign birth (1). In a previous survey, conducted in Taiwan during 2000–2008, we found the rate of antituberculosis drug resistance to be lower for older patients than for younger patients (2); however, current information about the patient characteristics associated with isoniazid-resistant tuberculosis (TB) in Taiwan is lacking. Therefore, to determine the risk factors associated with initial isoniazid resistance among patients with TB in Taiwan, we conducted a retrospective study.

The study was conducted at the National Taiwan University Hospital, a 2,500-bed tertiary care center in northern Taiwan. We analyzed culture-

confirmed *Mycobacterium tuberculosis* isolates obtained from hospitalized patients during January 2000–December 2010. A nonduplicate isolate was defined as 1 isolate collected for evaluation from 1 patient who visited the hospital (as inpatient or outpatient). If multiple isolates were available from a patient, only the one first isolated was analyzed. All specimens were processed and pretreated as described elsewhere (3). Patients with multidrug-resistant TB were excluded on the basis of evidence for differences in the epidemiology of isoniazid-resistant (rifampin-susceptible) TB and multidrug-resistant TB (4). Immigrant populations in Taiwan are limited; therefore, we did not analyze the origin of the patients.

After excluding patients with multidrug-resistant TB, we analyzed 4,289 nonduplicate isolates, of which 3,842 (89.6%) were susceptible to isoniazid and the other 447 (10.4%) were resistant to isoniazid. In terms of demographic associations, patients 34–44 years of age were more likely than those ≥ 74 years of age to have an isoniazid-resistant strain (Table). In addition, patients with extrapulmonary TB were less likely than patients with pulmonary TB to be infected with isoniazid-resistant TB. We also identified 34 patients with TB meningitis. After excluding 2 patients with multidrug-resistant TB, we found that 31 patients (mean age 56.6 years) had isoniazid-susceptible TB meningitis and a 50-year-old man had meningitis caused by isoniazid-resistant TB.

Our results are in agreement with those reported in a previous study in the United States, which found that the rate of isoniazid resistance was lower for isolates from elderly patients (1,4). This phenomenon may be attributable to the reactivation of a dormant infection. Because isoniazid was introduced to Taiwan for the treatment of TB in 1952, elderly persons in Taiwan probably did not