

## Acceptance of Public Health Measures by Air Travelers, Switzerland

**To the Editor:** Infectious diseases can spread rapidly by air travel, as did severe acute respiratory syndrome (SARS) in 2003. Public health measures at airports might protect passengers and employees from such diseases and delay spread into the general population. The SARS epidemic was contained largely through traditional public health interventions (1,2). These interventions included recommendations to postpone nonessential travel, provide public health information and face masks, screen passengers at entry or exit by questionnaire, measure ear temperatures, provide medical examinations, isolate case-patients, and quarantine contacts.

For a future influenza pandemic, the World Health Organization does not encourage entry screening for any pandemic phase but leaves this decision for screening to each country (3). Switzerland currently considers entry screening, albeit not by infrared thermal scanning (4,5). Many travelers to developing countries do not obtain health information or use preventive measures (6). However, to be effective, public health measures must be communicated to and accepted by travelers. Current knowledge on acceptance of public health measures by air passengers is limited. Compliance with quarantine measures seems to depend on consistency of policies and credibility of public health messages (7).

To investigate passenger knowledge, communication preferences, and acceptance of public health measures for a hypothetical respiratory disease pandemic, we conducted a cross-sectional survey among passengers departing from EuroAirport Basel-Mulhouse-Freiburg (Haut-Rhin, France) to European destinations, and from

Zurich Airport (Kloten, Switzerland) to Asian or North American destinations during the summer of 2007. Data were collected by a pretested, self-administered, 23-item questionnaire (in English, French, and German), which was distributed to all adult passengers in the departure waiting areas. Information was analyzed by basic statistical methods,  $\chi^2$  and *t* tests, and logistic regression adjusting for sex, age group, airport, residence region, solitary traveling, and business travel.

A total of 2,633 passengers were approached and asked to participate. The response rate was 71%. Most passengers who refused to participate did so because of language difficulties. After we excluded passengers <18 years of age, data for 1,880 participants (1,081 at EuroAirport and 799 at Zurich Airport) were analyzed. Mean (SD) age was 39.8 (14.7) years; 54% were female, 58% had a university degree, 97% were currently feeling healthy, 30% were traveling alone, 37% were traveling for business reasons, 30% were residents of Switzerland, 42% were residents of other European countries, and 15% were residents of the Americas.

Passengers were asked about acceptance of public health measures in a hypothetical severe respiratory disease pandemic. Results are shown in the online Appendix Figure (available from [www.cdc.gov/EID/content/15/5/831-appF.htm](http://www.cdc.gov/EID/content/15/5/831-appF.htm)). A total of 71.6% would cancel their trip if postponement of nonessential travel was recommended, 93.7% would wear face masks, 93.2% would fill out a health questionnaire, and 89.1% would accept having their ear temperature measured on arrival. If fever were detected, 88.1% would undergo a short physical examination. If persons were diagnosed with a disease and were receiving treatment, 92.3% would accept isolation for 7 days. If feeling healthy but were seated next to someone with a cough on the airplane, 69.2% would accept 7-day quarantine at home (residents of Switzerland) or

hotel (travelers to Switzerland) and would monitor their health. Fewer persons from the Asia-Pacific region would accept these requirements. Male passengers and all passengers >30 years of age indicated they would be more compliant than other passengers with nearly all measures. However, many female travelers explained that they would not consider traveling during a pandemic.

There were no differences in questionnaire responses between the 2 airports. Other questions concerned information status and seeking. In a pandemic, 93.5% of passengers would acquire information before departure about the situation and preventive measures; 67% would consult the Internet, 59% their family doctor, 49% the media, 37% health authorities, 25% their travel agent, 23% travel medicine centers, 20% the airport, and 17% friends and relatives. For their current trip, 22.4% sought pretravel advice on infectious diseases. This seeking of advice was more frequent in those departing to overseas destinations from Zurich Airport. Information sources were the family doctor (38%), the Internet (34%), the media (26%), friends and relatives (22%), a travel agency (19%), health authorities (11%), travel medicine centers (10%), and the airport (7%). A total of 17.4% noticed the official posters regarding avian influenza.

Because the study was conducted when no major international disease outbreaks were occurring, passengers answered hypothetical questions about an imaginary future pandemic. Therefore, attitudes and behavior might be difficult to predict from these results and would depend on the perceived severity of the pandemic disease. Similar surveys among the general population showed comparable results. During an influenza pandemic, 75% of Europeans would avoid public transportation (8). In the United States, 86% would stay at home in quarantine and 94% would stay in isolation (9). A survey in Hong

Kong Special Administrative Region, People's Republic of China reported 74% would wear face masks in public, 87% would make declarations at border crossings, and 88% would comply with quarantine policies (10).

**Nicole Senpinar-Brunner,  
Tobias Eckert,  
and Kaspar Wyss**

Author affiliations: Swiss Tropical Institute, Basel, Switzerland (N. Senpinar-Brunner, T. Eckert, K. Wyss); and Federal Office of Public Health, Bern, Switzerland (T. Eckert)

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Address for correspondence: Tobias Eckert, Federal Department of Home Affairs, Federal Office of Public Health, Communicable Diseases Division, Schwarztorstrasse 96, 3003 Bern, Switzerland; email: [tobias.eckert@bag.admin.ch](mailto:tobias.eckert@bag.admin.ch)

## Near-Fatal Multiple Organ Dysfunction Syndrome Induced by *Plasmodium malariae*

**To the Editor:** We report a case of *Plasmodium malariae*-related multiple organ dysfunction syndrome (MODS) in a healthy immunocompetent patient. Despite extensive investigation, *P. malariae* was the only pathogen identified. The patient's isolates had a combination of mutant alleles that could possibly explain the severity of the infection.

Five weeks after returning to France in November 2006 from Côte d'Ivoire, a 28-year-old French soldier was admitted to our surgical intensive care unit (University Hospital, Rennes, France) because of fever and MODS of suspected infectious origin. The patient had stopped taking his doxycycline for antimalarial chemoprophylaxis 3 days before his admission. During those 3 days he began to experience myalgia, fatigue, nausea,

and vomiting but no fever. He took no medication. He then became unable to move his lower legs and experienced paresthesia just before his condition rapidly deteriorated. He was found at home by the local Emergency Medical Service (EMS) in respiratory distress and shock and required immediate orotracheal intubation for mechanical ventilation. When admitted to the intensive care unit, he had severe acute respiratory distress syndrome (PO<sub>2</sub>/FiO<sub>2</sub>, 65 mm Hg; PCO<sub>2</sub>, 90 mm Hg; with positive end expiratory pressure of 12 cm H<sub>2</sub>O). Transthoracic echocardiography and pulmonary artery catheterization showed severe global hypokinesia with a left ventricular ejection fraction of <10%, right ventricular dilatation, and low pulmonary artery occlusion pressure. Blood tests showed disseminated intravascular coagulation with 30 × 10<sup>9</sup>/L platelets, an international normalized ratio of 3.54, an activated partial thromboplastin time >180 s, and D-dimers at 25.6 µg/mL. He had severe mixed acidosis (pH 6.9 and arterial lactate 4.2 mmol/L) and acute renal failure. Blood cultures were performed. A thin-blood film showed *Plasmodium* spp. within the red blood cells (parasitemia 0.4%). Rapid fluid resuscitation was carried out and epinephrine was given, along with intravenous quinine (1,000 mg over 4 h, then 1,500 mg/d) and broad-spectrum antimicrobial drugs (cefotaxime and ofloxacin).

Massive acidosis developed (pH 6.61; lactate 8.8 mmol/L). A brief cardiac arrest required chest compressions and extracorporeal membrane oxygenation (ECMO) after venoarterial femoral cannulation at the bedside. Continuous venovenous hemofiltration was started. APACHE II and SAPS 2 scores were 38 and 93, respectively. Drotrecogin-α (activated) was given as a 96-h infusion.

Extensive microbiologic investigations included tests for common bacteria at usual sampling sites and tests for specific arboviruses, *Lep-*