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## Modified Measles in a Healthcare Worker After Return From Travel

*To the Editor*—Measles is a highly communicable but vaccine-preventable infectious disease. It has been reported that modified measles, usually presenting with mild symptoms or even no symptoms, could occur in measles-vaccinated individuals during a measles outbreak.<sup>1</sup> Because of the protean clinical presentations of modified measles, it is difficult to raise clinical suspicion and/or make a rapid diagnosis without knowing the history of exposure. Early detection of modified measles would be a great advance in the interruption of disease transmission.

During a measles epidemic, healthcare settings can become a high-risk environment for measles transmission. Infected healthcare personnel can shed the measles virus particles during the prodromal period before clinical characteristics appear<sup>2</sup> and thus transmit the measles virus to susceptible coworkers, patients, and family members.<sup>3</sup> Moreover, susceptible patients in hospitals are often vulnerable individuals who will suffer severe complications of measles.<sup>4</sup> We describe a case of modified measles in a healthcare worker who had returned from travel to another country.

A 26-year-old male doctor, an intern, visited Tokyo, Japan, from May 19 to May 25, 2007, where a measles outbreak had occurred.<sup>5</sup> On June 2, after his return to Taiwan, he presented with fever and arthralgia, followed by a progressive pustule-like skin rash, which initially appeared on his trunk and face on the third day of illness and then extended to the extremities. He was hospitalized the next day. Isolation precautions for airborne pathogen were implemented during medical care. The diagnosis of modified measles was made on the basis of the following findings: (1) the absence of classic manifestations of measles, such as cough, conjunctivitis, co-

ryza, or Koplik's spot; (2) travel to an area where measles is endemic; (3) a self-report of 2-dose measles vaccination in childhood; and (4) the presence of measles IgG in serum obtained at the acute stage of infection and of IgM in serum obtained at the convalescent stage. He was discharged without sequelae after 7 days' hospitalization.

During the prodromal phase of the patient's disease, 2 ambulatory patients and 25 medical personnel had close contact with the patient. The majority of these medical personnel (23 [92%]) recalled prior measles vaccination. Serological tests were performed on 32 staff members who cared for the patient, and 28 (87.5%) had detectable measles IgG in serum. No subsequent case of measles was identified.

Measles is still a major health problem because of its worldwide prevalence and its changing epidemiologic pattern in countries where measles vaccine is widely used.<sup>2</sup> Despite high levels of vaccine coverage, measles outbreaks still occur because of the accumulation of susceptible, unvaccinated persons and/or of persons without an adequate immunological response to measles vaccine. The diagnosis of measles during the present vaccine era has been complicated by the change in the age incidence of measles, the alteration of disease manifestations resulting from previous immunization, and the apparently sporadic occurrence of measles cases.<sup>6</sup> Cases of modified measles, which is characterized by an atypical or mild clinical presentation in a vaccinated patient, have been observed during a sustained outbreak.<sup>1</sup> The transmission of measles to patients exposed to sick healthcare workers has also been documented.<sup>7</sup> The highly contagious nature of the measles virus also underscores the need for appropriate infection control measures to reduce the risk of nosocomial transmission. In the investigation we describe, the delay in diagnosis and confirmation of the index case was problematic, as it resulted in a delay in contact tracing and follow-up.<sup>8</sup>

Acquisition of communicable diseases by healthcare personnel during travel poses a potential threat of nosocomial outbreak. At the present time, there are few rational recommendations for preventing travel-associated illness among healthcare personnel.<sup>9</sup> We suggest that healthcare workers be screened for measles IgG antibodies during their occupational health assessment, and nonimmune and uninfected individuals should be vaccinated. In our institution, studies are ongoing to assess the level of measles immunity in healthcare workers to determine strategies for measles screening and vaccination. To obtain adequate documentation of previous measles vaccination or immunity to measles for a large number of hospital employees when an acute case of measles occurs may be impractical.<sup>7</sup> Thus, vaccination of all employees under these circumstances seems appropriate.<sup>7,10</sup> In particular, measles vaccination status should be confirmed or updated at the time of employment. Moreover, information regarding healthcare personnel's travel to areas where measles is endemic should be regularly documented to allow evidence-based decisions about infection control policy to be made.

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## Risk Assessment in Infection Control: Which Risks?

*To the Editor*—The focus of infection control professionals (ICPs) is on the control of infection risks. ICPs usually work

within a geographically defined setting, such as a hospital, with services organized to control risks within that defined setting. ICPs have to consider both the risks associated with infection and those associated with control strategies, which may themselves have a significant adverse impact on individuals or groups. For example, isolation of hospitalized patients may be associated with non-infection-related adverse consequences.<sup>1</sup>

The importance of dimensions of well-being apart from those directly associated with infection is well illustrated by an example of an infection control dilemma posed in the recent article by Bryan et al.<sup>2(p1079)</sup> We are asked: “Should a postpartum woman being treated for a breast abscess due to methicillin-resistant *Staphylococcus aureus* (MRSA) be allowed to visit her infant in a busy neonatal intensive care unit (NICU) in which MRSA has not yet emerged as a significant problem?” The risks include the potential for infection to damage the infant’s health, to threaten the continuation of breastfeeding, and also to damage other dimensions of well-being related to mother-infant attachment. These risks also threaten other infants who may be in the NICU at the time, as well as in the future, if MRSA becomes endemic.

If we take a very broad definition of health, such as that of the World Health Organization (WHO)—a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity—then risks related to infection, breastfeeding, and mother-infant bonding can be considered risks to health. Many would argue that the WHO definition is impractically inclusive (eg, Saracci<sup>3</sup>). Even so, if we consider that ICPs have a responsibility to consider the *overall well-being and interests of patients*, then we should still take into account the risk of an adverse impact of control strategies on mother-infant bonding.

Some of the recently published work on public health ethics (eg, that of Powers and Faden<sup>4</sup>) has drawn attention to dimensions of well-being outside of a narrow definition of health, referring specifically to health, respect, attachment, personal security, reasoning, and self-determination. Nussbaum<sup>5</sup> has defined 10 capabilities derived from the question: “What activities are...definitive of a life that is truly human?” The list of capabilities comprises life (normal life span); bodily health; bodily integrity; senses, imagination, and thought; emotions; practical reason; affiliation; relationships with other species; play; and control over one’s environment. Nussbaum<sup>5</sup> argues that we should give priority to ensuring that everyone achieves a minimum standard of capability in all of these dimensions.

The Nuffield Foundation has recently published guidance on public health ethics in which they argue in favor of a stewardship model, stating that, as stewards, we have a special obligation to protect the most vulnerable.<sup>6(p144)</sup> The Nuffield Foundation defines vulnerability as “lacking capacity to make informed judgments for oneself, being socially or economically disadvantaged, or...[having] other factors that contrib-