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Ebola Fever: Reconciling Ebola Planning With Ebola Risk in U.S. Hospitals

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West Africa is currently in the grip of a terrifying outbreak of Ebola virus disease (Ebola). As of this writing, the outbreak has infected 2127 persons, 1145 (54%) of whom have died. The outbreak currently involves Sierra Leone, Guinea, Liberia, and Nigeria; however, nations around the world are bracing for the possible arrival of travelers, expatriates, and aid workers from West Africa seeking care for documented Ebola or undifferentiated febrile illnesses that might prove to be Ebola.

Hospitals in the United States are scrambling to develop plans to manage patients with suspected or confirmed Ebola. A major emphasis of planning is specifying measures to protect health care personnel and prevent transmission within health care facilities. However, infection prevention and control teams are struggling to reconcile official guidance from the Centers for Disease Control and Prevention (CDC) with the temptation to maximize precautions that exceed CDC recommendations.

The CDC recommends placing patients with suspected or confirmed Ebola in a single-patient room and instituting contact and droplet precautions (1). These entail donning a fluid-impermeable gown, gloves, a surgical mask, and either goggles or a face shield. If the patient has "copious" secretions, the CDC also recommends shoe and leg coverings. If an aerosol-generating procedure is planned (such as intubation or bronchoscopy), the CDC recommends wearing an N95 mask and placing the patient in a negative-pressure room. Despite this guidance, many hospitals are planning to place all patients in negative-pressure rooms at all times, to compel all personnel to wear full-body hazardous material (HazMat) suits, and to require N95 masks or powered air-purifying respirators rather than surgical masks at all times.

Hospitals' decisions to maximize precautions are understandable given the horrific mortality of this disease and reports of ongoing transmission in African hospitals. Fears among U.S. providers are undoubtedly further spurred by the dramatic footage of ambulance workers in Madrid, Spain, and Atlanta, Georgia, wearing full-body HazMat suits and personal respirators to transport infected patients. However, these excessive measures are unwarranted.

The CDC's guidance is evidence-based. There have been more than 20 Ebola outbreaks in the past 40 years (2). Through these outbreaks, public health agencies and researchers have gained considerable experience in the control and prevention of this disease (3, 4). Ebola is transmitted by direct contact with patients' bodily fluids, especially blood. Other risk factors, such as contact with fruit bats or eating fruit that has been nibbled by fruit bats, are not germane to U.S. hospitals.

Sharing airspace with an infected patient is not a risk factor. Transmission requires direct physical contact and is inefficient. Studies of household contacts of patients with Ebola are informative in this regard. Among 173 household contacts of 27 patients with confirmed Ebola, the transmission rate was only 16% despite none of the standard infection control precautions routinely employed in U.S. hospitals being used (5). Of the 173 householders, 78 reported no physical contact with the infected patient. None became infected. Among those who did have physical contact, the risk for Ebola was highest after contact with patients' blood. Other investigators have reported similar findings (6).

Another study evaluated contamination of the care environment (7). Investigators took 54 clinical specimens from 26 laboratory-confirmed Ebola cases. The researchers were able to isolate Ebola virus from 16 of the 54 specimens, including saliva, stool, semen, breast milk, tears, blood, and skin swabs. They then took 33 environmental samples, including swabs from a stethoscope used to examine an infected patient, a bed frame, a bedside chair, a patient's food bowl, a patient's spit bowl, the floor, intravenous fluid tubing, and the skin of 3 patient attendants. None were positive. The only extracorporeal specimens that tested positive for Ebola virus were a physician's blood-stained glove and a bloody intravenous insertion site.

A case investigation from South Africa further affirms both the effectiveness of standard precautions and the very real risk for transmission through body fluid exposures (8). About 18 years ago, an anesthetics assistant in Johannesburg developed fever, headaches, and mental status changes associated with thrombocytopenia, hepatitis, and progressive renal failure. She was eventually diagnosed with Ebola 12 days after hospitalization. A case investigation was initiated, and her disease was ultimately attributed to care she had provided for a patient 3 days before the onset of her illness. She had helped to insert a central venous catheter in a patient with a febrile, multisystem disease of unknown etiology. The index patient had already recovered and been discharged, but investigators were able to locate him and

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retroactively confirm Ebola by isolating the virus from a semen specimen. The investigators estimated that more than 300 health care personnel provided care to these 2 patients, including invasive procedures, before Ebola was diagnosed, yet there were no additional transmissions despite the lack of Ebola-specific precautions.

These investigations affirm the appropriateness of the infection control practices recommended by the CDC. A fluid-impervious gown, gloves, a surgical mask, and a face shield are adequate to protect health care personnel from direct contact with blood or other body fluids during routine care. N95 masks or personal respirators are only necessary during aerosol-generating procedures.

Exceeding these recommendations may paradoxically increase risk. Introducing new and unfamiliar forms of personal protective equipment could lead to self-contamination during removal of such gear. Requiring HazMat suits and respirators will probably decrease the frequency of provider–patient contacts, inhibit providers' ability to examine patients, and curtail the use of diagnostic tests. Patients without Ebola may also inadvertently be harmed because Ebola precautions will be required for all suspected cases even though malaria and other infections are more likely in patients from West Africa presenting with fever. Using extra gear inflates patients' and caregivers' anxiety levels, increases costs, and wastes valuable resources. More insidiously, requiring precautions that exceed the CDC's recommendations fans a culture of mistrust and cynicism about our nation's public health agency.

As health care professionals, we strive to provide evidence-based care driven by science rather than by the media or mass hysteria. We need to apply these principles to planning for Ebola as well.

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