

# Emergency Department Processes for the Evaluation and Management of Persons Under Investigation for Ebola Virus Disease

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**Introduction:** Due to the recent Ebola virus outbreak in West Africa, patients with epidemiologic risk for Ebola virus disease and symptoms consistent with Ebola virus disease are presenting to emergency departments (EDs) and clinics in the United States. These individuals, identified as a person under investigation for Ebola virus disease, are initially screened using a molecular assay for Ebola virus. If this initial test is negative and the person under investigation has been symptomatic for < 3 days, a repeat test is required after 3 days of symptoms to verify the negative result. In the time interval before the second test result is available, manifestations of the underlying disease process for the person under investigation, whether due to Ebola virus disease or some other etiology, may require further investigation to direct appropriate therapy.

**Materials and Methods:** ED administrators, physicians, and nurses proposed processes to provide care that is consistent with other ED patients. Biocontainment unit administrators, industrial hygienists, laboratory directors, physicians, and other medical personnel examined the ED processes and offered biocontainment unit personal protective equipment and process strategies designed to ensure safety for providers and patients.

**Conclusion:** ED processes for the safe and timely evaluation and management of the person under investigation for Ebola virus disease are presented with the ultimate goals of protecting providers and ensuring a consistent level of care while confirmatory testing is pending. [Ann Emerg Med. 2015;66:306–314.]

Please see page 307 for the Editor's Capsule Summary of this article.

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## INTRODUCTION

### Background

In recent months, patients with Ebola virus disease have entered the United States health care system. Arriving by air and transferring by specially outfitted ambulances to biocontainment units of a select group of US hospitals, these patients did not pass through the standard entry points for hospitalized patients in the United States: emergency departments (ED) and outpatient clinics. They most likely did not receive the screening regimen recommended by the Centers for Disease Control and Prevention (CDC) for a patient with suspected Ebola virus disease.<sup>1</sup> Since the outbreak in West Africa, increased surveillance at international airports in the United States and active monitoring by state and local health departments of individuals returning to the United States will likely identify patients under investigation for Ebola virus disease

who will require further evaluation. The ED and other health care entry areas in the United States will thus continue to serve as the safety net for validation of travel history and screening for Ebola virus disease.

The CDC has recommended a 3-tiered system for the evaluation and management of patients with suspected or confirmed Ebola virus disease. State and local health officials working with hospital leaders have designated health care facilities within each state to serve in one of 3 capacities: frontline health care facilities, composed of hospitals with EDs that will serve as primary screening sites; Ebola assessment hospitals, facilities prepared to receive and isolate a patient with possible Ebola virus disease and provide appropriate care until a diagnosis of Ebola virus disease is either confirmed or ruled out; and Ebola treatment centers, approved by the CDC to care for and manage a patient throughout the disease process.<sup>2</sup> Ebola treatment centers

### Editor's Capsule Summary

#### *What is already known on this topic*

During the largest outbreak of Ebola virus disease in history, several health care workers with Ebola were transferred to the United States from Africa, and some cases have been diagnosed in the United States.

#### *What question this study addressed*

All US emergency departments (EDs) should be prepared to safely perform initial evaluation and management of a patient with possible Ebola virus disease, with protections in place for staff and other patients.

#### *What this study adds to our knowledge*

Recommendations are given for safe evaluation and treatment of patients with possible Ebola virus disease, including screening, legal issues, diagnostic testing, procedures, and waste management, based on experience from a US Ebola referral center.

#### *How this is relevant to clinical practice*

EDs can use these recommendations to guide local protocols and protective equipment.

are approved by the CDC, and EDs for these facilities benefit from close collaboration with their respective biocontainment unit personnel in developing processes to safely care for these patients if they present through the ED. Frontline health care facilities and Ebola assessment centers may lack the resources of these larger centers and may benefit from guidance in the development of these processes.

Patients with an epidemiologic risk factor (Figure 1) and signs and symptoms consistent with Ebola virus disease (Figure 2) within 21 days are considered a "patient under investigation" by the CDC. In most situations, a laboratory-confirmed case of Ebola virus disease is one that tests positive for the presence of the Ebola virus ribonucleic acid by a confirmatory molecular assay.<sup>3</sup> A patient under investigation with a negative laboratory screen result and fewer than 3 days of symptoms presents an operational challenge to the ED because he or she requires additional testing to reliably exclude Ebola virus disease and must remain in isolation until a second test is negative after 72 hours after the onset of symptoms (it is possible that only 1 screen will be conducted if the patient under investigation presents after having >3 days of symptoms). During this interval, the CDC recommends isolation of the patient in a

private room with its own bathroom, that standard contact and droplet precautions be used, and that health care personnel use appropriate personal protective equipment.<sup>2</sup> Hospitals may choose to isolate these patients in inpatient beds or biocontainment units, but many will hold them in the ED or observation units under ED supervision until laboratory testing confirms or excludes Ebola virus disease.

During the interval between an initial negative laboratory screen result and a follow-up laboratory evaluation after 72 hours of symptoms, the patient under investigation may present other manifestations of the underlying disease process. This could result from Ebola virus disease or some other undifferentiated illness that may require further evaluation and management. Recently, the CDC described 2 patients under investigation who eventually tested negative for Ebola virus but died from other causes and that "efforts to establish alternative diagnoses were reported to have been hampered or delayed because of infection control concerns."<sup>4</sup> These patients appeared to have received a different level of care because of their status as a patient under investigation, suggesting that a well-defined process to ensure consistent and timely care for all patients is essential. The CDC states that an Ebola assessment center should "ensure there is no delay in the care for these patients by being prepared to test, manage, and treat alternative etiologies of febrile illness as clinically indicated" but offers no additional guidance.<sup>2</sup>

We describe a process using the expertise and experience of biocontainment unit and ED personnel to develop processes for the identification, isolation, and care of the patient under investigation presenting to the ED. Because our ED serves a medical center with one of 3 biocontainment units that have actual experience in caring for patients with confirmed Ebola virus disease, our processes and techniques may not be readily generalizable to smaller or less specialized hospitals, but our findings may assist any ED in preparations to screen patients and provide safe and consistent care.

## MATERIALS AND METHODS

The evaluation and management processes in the ED for a patient under investigation described here were developed through expert review and consensus of health care workers and administrators at an active Ebola treatment center with experience in Ebola virus disease management, biocontainment unit work flow, ED patient care, and ED work flow. The reviewers included nurses, physicians, laboratory directors, industrial hygienists, and administrators from both the ED and biocontainment unit.

The initial screening and isolation process for a patient under investigation follows the Ebola viral disease ED

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