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Pandemic Emergency Department Triage Screening: Symptoms Increase Sensitivity

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Pandemic Emergency Department Triage Screening: Symptoms Increase Sensitivity

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Introduction

In the weeks following the January 20, 2020 announcement of the first confirmed case of COVID-19 in the United States, important data was published on the virus' clinical characteristics, including the most common presenting symptoms. One study in Wuhan, China, identified fever (43.8% on admission and 88.7% during hospitalization) and cough (67.8%) as common symptoms. A second study in Washington State identified shortness of breath as an initial symptom in 76% of patients. On February 27th, the World Health Organization released updated case criteria to assist countries with surveillance and identification of suspected cases. Rapid modification of Emergency Department (ED) screening questionnaires to reflect updated case criteria and symptomology of emerging pandemic diseases is a valuable infection control measure.

Case Presentation

Three days after the World Health Organization's (WHO) March 11, 2020 declaration of a pandemic, a 37-year-old female presented to our ED with a 4-day history of cough, shortness of breath, myalgias, and fever. In triage, the patient was screened using a "Travel and Emerging Pathogens" questionnaire, which inquired about recent international travel and direct contact with cases of confirmed MERS or COVID-19. The patient denied all 3 items, and as a result, was moved to an ED hallway where she waited for approximately 30 minutes for evaluation. At that time, ED staff with high clinical suspicion for COVID-19 recommended that isolation precautions be placed.

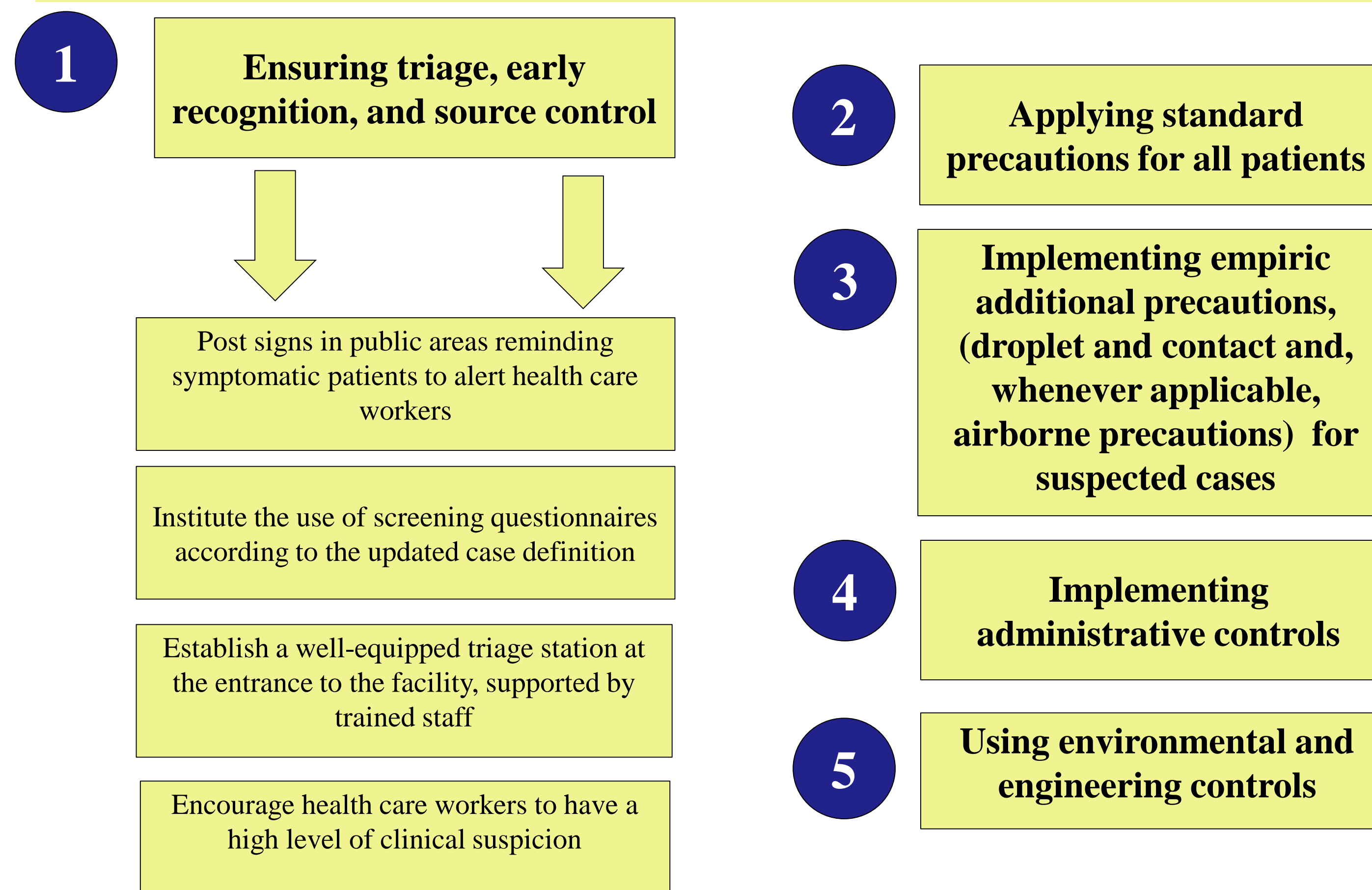
Upon further evaluation, the patient revealed she had taken a public bus trip to Florida six days prior. She stated that several passengers on the bus were coughing and appeared ill. Upon arrival in Florida, the patient began to develop a cough. Her symptoms progressively worsened, and she also developed headache, nausea, and diarrhea, prompting her to return to Detroit to seek medical attention. The patient had multiple chronic health conditions, including hypertension, insulin-dependent type 2 diabetes, and morbid obesity with a BMI of 48.

A nasopharyngeal swab was sent to the state laboratory and the patient was admitted to a negative-pressure room. Her test results confirmed COVID-19 infection.

Timeline of Events

12/31/19	• A cluster of cases of pneumonia reported in Wuhan, Hubei Province, China
1/2/20	• WHO publishes suspect case criteria that focused on patients with pneumonia and recent travel history to Wuhan
1/13/20	• 1 st confirmed case outside of China appears in Thailand
1/20/20	• 1 st confirmed case in the United States appears in Washington State
1/30/20	• WHO declares COVID-19 a Public Health Emergency of International Concern
2/27/20	• WHO broadens case criteria to include acute respiratory illness symptoms with no alternative etiology and a residence in any country with local transmission reported
3/10/20	• 1 st two confirmed cases in Michigan (Wayne & Oakland counties) • 998 total confirmed cases in the United States
3/11/20	• WHO declares COVID-19 a pandemic
3/12/20	• 12 total confirmed cases in Michigan, including first confirmed Michigan case with no travel history • 1,630 total confirmed case in the United States
3/14/20	• Case patient presents to our ED • 33 total confirmed patients in Michigan • 2,771 total confirmed cases in the United States
4/30/20	• 3,175 total patients admitted within our hospital system • 40, 399 total confirmed cases in Michigan • 1,095,023 total confirmed cases in the United States

Infection prevention and control strategies to prevent or limit transmission in healthcare settings (WHO)



Discussion

Historically, beta-coronaviruses have high rates of transmissibility in healthcare settings. A review of a 2014 MERS outbreak in Saudi Arabia classified 43.5% of all cases as nosocomial infections, while other outbreaks in Saudi Arabia in 2013 and South Korea in 2015 linked 100% to healthcare setting. Studies of the 2002-2003 SARS outbreak found that 21% of all cases occurred in healthcare workers, and that the admission of a single index patient in one hospital led to a disastrous superspreading event that infected 76 individuals. Data for COVID-19 is still limited, but one case series in Wuhan, China presumed that 41% of hospitalized patients with COVID-19 pneumonia acquired the disease in a healthcare setting.

Containment and isolation practices are less effective during pandemics like COVID-19 that involve asymptomatic carriers and lengthy pre-symptomatic states. ED triage plays an important role in identifying possible COVID-19 cases to minimize exposure to other patients and staff. A recent study at Singapore General Hospital (SGH) found that early inclusion of symptoms into COVID-19 ED triage screening protocols helped to contain the disease. In fact, from January 1 to April 1, 2020, 84.2% of all confirmed COVID-19 patients requiring hospital admission were detected by the SGH triage screening process. This allowed for rapid segregation of at-risk individuals to a separate part of the ED with heightened isolation precautions. After an extended period of surveillance the study reported zero cases of intra-ED nosocomial infection.

Emerging pathogen screening questionnaires that utilize travel history and contact with confirmed cases become less sensitive as local community transmission becomes the predominant source of infection. On March 14, 2020, the day our patient arrived in the ED, there were 33 confirmed cases of COVID-19 in Michigan and 2,771 confirmed cases throughout the United States. Our patient presented with a constellation of symptoms that met case criteria established by the WHO two weeks prior. However, she was not immediately identified by the ED triage emerging pathogens questionnaire as a COVID-19 risk, and therefore the initiation of isolation precautions was delayed.

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