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Surveillance and public health response for travelers returning from MERS-CoV affected countries to Gyeonggi Province, Korea, 2016–2017

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Dear Editor,

A 2015–2016 surveillance study in Saudi Arabia on Middle East Respiratory Syndrome Coronavirus (MERS-CoV) infections showed that cases of influenza infections were much more common than those of MERS-CoV [1]. These findings indicate that travelers planning to visit MERS-CoV affected countries should be vaccinated against influenza virus. Here, we describe the results from a 2016 and 2017 surveillance study in the most populous province in Korea, the Gyeonggi province (population: 25.5 million; area: 11,730 km^2), and we demonstrate the Korean public health effort to prevent local transmission of MERS-CoV. In 2015, the Republic of Korea experienced a large outbreak of MERS-CoV with 186 laboratory-confirmed cases [2]. In this outbreak, inter-hospital and intra-hospital transmission were determination factors of the MERS-CoV infections [2]. After the outbreak, a Korean national surveillance program with virological testing for MERS-CoV and other respiratory viruses was implemented to rapidly identify infected travelers returning from MERS-CoV-affected countries.

Each suspected case of MERS-CoV was defined as a person who had a lower respiratory tract illness (a cough, sputum or shortness of breath), fever (over 37.8 °C), and an epidemiological link to recent travel (within the past 14 days) to a MERS-CoV-affected country [3]. The demographic and clinical information for suspected cases were collected through patient interviews [3].

Public health officers immediately transferred suspected cases by ambulance to a negative pressure room in an isolation ward of a designated hospital. The officers were equipped with personal protective equipment including disposable coveralls, nitrile gloves, N95 particulate half-masks with a two-strap design, unvented goggles, and boots. Upper and lower respiratory specimens (nasopharyngeal, oropharyngeal swab and sputum) and blood samples of individuals with a suspected infection were immediately collected and transported at 4 °C to the provincial public health laboratory [3]. The delay from the report of the onset of symptoms and notification of the public health authority, to the quarantine time including self-isolation, was recorded.

To identify MERS-CoV, qualitative Real-time Reverse Transcription-Polymerase Chain Reaction (rRT-PCR) testing was performed using the TaqMan method by targeting regions upstream of the envelope (UpE) and the open reading frame 1a gene [4]. A cycle of threshold value ≤ 37 was regarded as positive [4]. Additional rRT-PCR using respiratory swabs was conducted to identify other respiratory viruses including influenza (IFV; A, B), human respiratory syncytial virus (hRSV; A, B), human metapneumovirus (hMPV; A, B), human parainfluenza virus (hPIV; I, II, III), human adenovirus (hAdV), human bocavirus (hBoC), human rhinovirus (hRV), and human coronavirus (hCoV; 229E, OC43, NL63). Table 1 shows the characteristics of the suspected cases. There were 56 male cases among 99 suspected cases. Seven of the suspected cases had underlying disease (either hypertension or diabetes, or both). The median age of the suspected case group was 43 years (range, 1 to 70; mean, 42.3); and the group had a median of 11 contacts (range, 1 to 33; mean, 21.2). The median delay between the onset of symptoms and the notification of the public health authority was 30 hours (range, 0–240 hrs; mean, 21 hrs). In addition, the median time interval was 1.0 hour (range, 0–63 hrs; mean, 3.4 hrs) between notification and patient quarantine of case, and it was 35 hours (range, 2–240 hrs; mean, 53 hrs) between the onset of symptoms and patient quarantine.

In comparison with the United Kingdom (UK), the delay in time between the initiation of symptoms and patient quarantine for the Republic of Korea was relatively shorter (median duration of symptoms and sample testing in UK: 5 days, range: 1–22 days) [5]. In addition, the detection rate of other respiratory virus pathogens was 66.3%, which is higher than reported for the UK (50.3%) [5]. All the specimens obtained during the study were confirmed as MERS-CoV negative. However, a viral etiology was detected in 66 (66%) of the cases as follows: Influenza A H3N2 (23 suspected patients, 23%), hRSV (12, 12%), Influenza B (11, 11%), Influenza A H1N1 (10, 10%), hMPV (7, 7%), hCoV (5, 5%), hAdV (3, 3%), hPIV II (1, 1%), and hBoC (1, 1%). Thus, influenza vaccination prior to travel may benefit individual travelers and save the public health resources.

In addition to the above data, it has been found that a significant fraction of confirmed MERS-CoV cases in previous outbreaks has been linked to issues related to healthcare setting (99%; Republic of Korea in 2015, 43%; Jeddah, Saudi Arabia in 2014) [2,6]. Therefore, the continuous and immediate public health response after symptom onset in a

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Table 1
Characteristics of suspected cases of Middle East Respiratory Syndrome Coronavirus infections (n = 99).

	Number (%)
Sex	
Male	56 (56.6)
Female	43 (43.4)
Age groups, years	
0–18	9 (9.1)
19-65	77 (77.8)
> 65	13 (13.1)
Nationality	
Korean	94 (94.9)
Saudi Arabian	2 (2.0)
UAE	2 (2.0)
Pakistani	1 (1.0)
Interval of public health response[a]	
< 1 hours	62 (62.6)
1 — < 2 hours	11 (11.1)
2 — < 3 hours	7 (7.0)
3 — < 4 hours	4 (4.0)
> 5 hours	15 (15.2)

[a] The time interval between notification of public health authority and the quarantine of suspected case.

suspected case prior to the patient's visit to a health-care facility is important.

Since MERS-CoV infection has a wide spectrum of illness from asymptomatic to severe, some potential cases could have been missed. However, no additional cases from the Gyeonggi Province hospitals have been reported through the Severe Acute Respiratory Infection surveillance network.

In this study, although no cases of MERS-CoV infection were identified in the Gyeonggi Province, Korea, cases of influenza infection were dominant. It remains important for the risk of the importation of MERS-CoV to be reduced through the continued surveillance of travelers returning from MERS-CoV affected countries combined with a rapid public health response. In addition, vaccination against influenza for the travelers prior to their travel should be considered.

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Ethical clearance of this study is exempted as an emergency response. Informed written consent was taken from all suspected cases.

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