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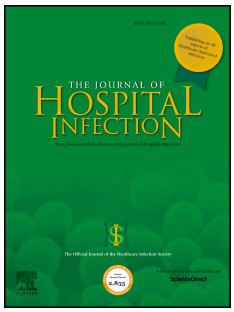

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Preparedness and proactive infection control measures against the emerging Wuhan coronavirus pneumonia in China

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(Word count: 800)

Sir,

In response to the official announcement of a cluster of pneumonia of unknown etiology, which has an epidemiological link to a wet market in Wuhan, China on 31 December 2019,[1] we present our proactive infection control measures for immediate prevention against hospital outbreaks due to such imported case into Hong Kong. Hong Kong is a cosmopolitan city in south China with an unique history in confirming the first case of human infection due to avian influenza A H5N1 in 1997[2] and severe acute respiratory syndrome-associated coronavirus (SARS-CoV) in 2003.[3] Patients with H5N1 and SARS-CoV had both initially presented with either community- or hospital-acquired pneumonia of unknown etiology and not responding to broad-spectrum antimicrobial therapy with typical and atypical coverage. Epidemiological exposure to wet markets with contact of poultry and civet, respectively, was subsequently recognized as a risk factor for acquisition of novel pathogens.[3] Based on our previous experiences with novel respiratory infections we recognized the utmost importance of infection control preparedness in our healthcare system. Our preparedness level includes alert, serious level-1, serious level-2, and emergency; the level of activation is determined according to a risk assessment. Infection control measures and administrative support are enhanced with reference to the different levels of preparedness. With this infrastructure, we have overcome the challenge in pandemic influenza A in 2009,[4,5] and emergence of avian influenza A H7N9 in 2013.[6,7]

To prepare for this emerging infectious disease, fever screening was set up in the airport and high speed rail station, especially focusing on flights and trains coming from Wuhan. Travelers with fever ≥38^{o}C are referred to public hospitals for assessment.

In the public hospital system, the key measures include a surveillance system to identify any suspected case for early isolation in an airborne infection isolation room (AIIR). Standard, contact, droplet, and airborne precautions were implemented during patient care practices for the suspected cases, before the mode of transmission is known. The surveillance definition comprises clinical criteria (any patient with fever and acute respiratory illness, or pneumonia), plus a travel history to Wuhan, China within 14 days before onset of symptoms, irrespective of any wet market exposure. For the purpose of surveillance, a triage station is set up at the Accidental and Emergency Department (AED) and outpatient clinics, where personal protective equipment (PPE) with surgical mask, face shield or equivalent, gown as minimum. Patient fulfilling the clinical and epidemiological criteria are immediately isolated in an AIIR for further assessment. Face-to-face right-on-time education was provided for frontline healthcare workers in the AED, acute medical wards, isolation wards, intensive care units, general wards, ambulatory day centers, physiotherapy, occupational therapy and pharmacy. In addition, open staff forums were provided during the first week of preparedness in the hospitals. During the training sessions staff were reminded to be alert in identifying suspected cases, and to use infection control measures by wearing N95 respirator, face shield or equivalent, glove and gown when performing aerosol generating procedures on all patients in both AIIR and general wards, in case suspected patients were missed by the surveillance system. In addition, we also took this opportunity to remind our staff regarding the administrative support of the hospital preparedness plan for emerging infectious diseases, including waste and linen management, environmental cleaning, and supply of PPE.

Before identifying the etiological agent, the diagnostic strategy includes a two-tier approach. The first tier is to screen the upper respiratory specimen (nasopharyngeal aspirates or nasopharyngeal flocked swab) by Biofire (FilmArray Respiratory Panel 2), which is a molecular diagnostic test to detect 17 respiratory viruses and 4 bacteria in 1 hour. The second tier is to investigate the FilmArray RP2-negative specimen for pan-coronavirus PCR[8] with modification so as to detect 23 coronavirus known to be present in human, animals, and bats within 24 hours. Pan-coronavirus PCR-negative specimens would be further investigated by performing Nanopore sequencing is used to identify the novel agent. Within the first 10 days of surveillance and this testing strategy fifty-five patients fulfilling the surveillance criteria were admitted to hospitals in Hong Kong; none have tested positive for novel agent to date.

A novel coronavirus was identified in patients with pneumonia in Wuhan within one month of outbreak. This was faster than the time required to identify SARS-CoV (Table).[3] The viral genome (GenBank accession MN908947) has the highest similarity (89%) to a SARS-related member of the *Sarbecoviruses* (MG772933), a subgenus within the *Betacoronavirus* genus. However, the transmissibility, morbidity, and mortality of this novel coronavirus remain unresolved. Without the availability of effective antiviral therapy and vaccine, we have to be vigilant in enforcing infection control preparedness and measures to prevent importation of index patient and minimize the risk of nosocomial transmission.

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Table. Comparison of public health response and discovery of etiological agent to the emerging coronavirus infection from SARS-CoV to novel coronavirus in China

	SARS-CoV	Novel coronavirus
Date of first reported case (retrospective analysis)	16 November 2002 [3]	12 December 2019 [a]
Place of first reported case	Foshan, Guangdong Province, China [3]	Wuhan, Hubei province, China [a]
Date of first reported in social media	At the end of December 2002	30 December 2019 [b]
Date of first release by Health Official in China	11 February 2003 [c]	31 December 2019 [d, e]
Date of first official response from Department of Health, HKSAR	11 February 2003 [f]	31 December 2019 [g]
Date of discovery of a novel agent	21 March 2003 [3]	9 January 2020 [h]
Place of discovery of a novel agent	Hong Kong [3]	China [h, i]
Duration of first reported case to official release of outbreak (day)	87	19
Duration of first reported case to discovery of a novel agent (day)	125	28

HKSAR, Hong Kong Special Administrative Region, China; SARS-CoV, severe acute respiratory syndrome-associated coronavirus.

[3] Refer to number 3 in the reference list

[a] https://edition.cnn.com/2020/01/08/health/china-wuhan-pneumonia-virus-intl-hnk/index.html. Accessed January 10, 2020

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[c] WHO receives reports from the Chinese Ministry of Health of an outbreak of acute respiratory syndrome with 300 cases and 5 deaths in Guangdong Province. https://www.who.int/csr/don/2003_07_04/en/. Accessed January 10, 2020

[d] https://www.who.int/csr/don/05-january-2020-pneumonia-of-unkown-cause-china/en/. Accessed January 10, 2020

[e] http://wjw.wuhan.gov.cn/front/web/showDetail/2019123108989. Accessed January 10, 2020

[f] https://www.dh.gov.hk/english/press/2003/03_02_11.html. Accessed January 10, 2020

[g] https://www.info.gov.hk/gia/general/201912/31/P2019123100667.htm. Accessed January 10, 2020

[h] https://www.sciencemag.org/news/2020/01/mystery-virus-found-wuhan-resembles-bat-viruses-not-sars-chinese-scientist-says. Accessed January 12, 2020

[i] https://www.sciencemag.org/news/2020/01/chinese-researchers-reveal-draft-genome-virus-implicated-wuhan-pneumonia-outbreak. Accessed January 12, 2020