Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Commentary

Duration of quarantine in hospitalized patients with severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) infection: a question needing an answer

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In December 2019, a new form of pneumonia was observed in Hubei Province, China [1]. Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) was subsequently found to be responsible for this condition, defined as coronavirus disease 2019 (COVID-19) [2]. The virus has now spread outside Chinese borders with 82,297 cases and 2804 deaths worldwide as of 26th February 2020 [3]. After infection, symptoms appear after an incubation time of 3–5 days, with 80% of those infected developing mild disease, 15% developing severe disease, and 5% requiring support in an intensive care unit (ICU) [4]. Overall, the estimated case-fatality rate is between 0.4% and 2.9% and the basic reproduction number is approximately 3.28 [4,5]. SARS-CoV-2 is a new pathogen for humans and no immune protection exists; as such, everybody can be potentially infected. Moreover, no primary prophylaxis measures (vaccination) or effective treatments are available. If the above percentages are applied to the worldwide population, it appears clear why all measures should be considered to avoid further spread of the virus and prevention of the saturation and collapse of health systems and the most catastrophic pandemic since 1919 Spanish flu.

Isolation of those affected and the use of personal protective equipment (PPE) are the mainstay to block transmission of this pathogen, which is presumed to occur through respiratory droplets. A 14-day quarantine period is applied to subjects coming from endemic areas or who have had contact with confirmed cases. It is assumed that if the subject does not develop any signs or symptoms compatible with COVID-19 during the 14-day quarantine period, he/she is not infected and thus the quarantine can be removed and the subject can return to the community. Domiciliary quarantine of 14 days after a positive test is also applied for patients diagnosed with mild disease who do not need medical support.

These rules are effective for controlling infections in the community, but several doubts arise when it is necessary to transpose them into the hospital setting. Hospitals are a delicate place in epidemics; they collect fragile persons who can be exposed to the virus and are subsequently re-admitted to the community, thus spreading the infection. Indeed, the ongoing outbreak in Northern Italy has been linked to a single infected patient who accessed a community hospital where he transmitted the virus to several other patients and healthcare workers [6]. Moreover, the isolation of patients in the hospital setting imposes a significant burden in terms of PPE used by healthcare workers, space dedicated to these patients, and

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time spent in their management. Even more complex is the situation of patients in ICUs, where viral spread is facilitated by endotracheal tubes and manoeuvres performed on the respiratory tract. Therefore, a clear definition of the timing of infectiousness and the intensity of viral spread is mandatory to alleviate the burden on the healthcare system.

Unfortunately, the data available on this topic are scarce, and consist of measurements of viral shedding without assessment of infectivity. Kim *et al.* [7] assessed the viral load kinetics of SARS-CoV-2 in upper and lower respiratory tract materials in the first two confirmed patients in Korea. They employed real-time reverse transcriptase polymerase chain reaction (rRT-PCR) to detect SARS-CoV-2, and converted cycle threshold (CT) values of rRT-PCR into RNA copy number. The detection limit of rRT-PCR was 2690 copies/mL. Overall, viral load above the detection limit was detected until 14 and 25 days after symptom onset and for 13 and 11 days after first detection in the two patients, respectively [7]. Of note, both patients received treatment with lopinavir/ritonavir. Zou *et al.* analysed viral load in repeated nasal and throat swabs obtained from 17 symptomatic patients [8]. They also employed rRT-PCR and considered a CT of 40 as the detection limit. Higher viral loads were observed in nasal swabs and in samples collected soon after symptom onset. Only two patients presented positive samples, and only in nasal swabs, 14 days after symptom onset and with low viral load.

In conclusion, more data on the duration of viral spread and infectivity in hospitalized patients, especially in ICUs, is badly needed to better define the quarantine period and avoid nosocomial transmission. Before the availability of such data, the canonical 14-day quarantine period should be respected.

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