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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1 RUNNING TITLE: <u>Hospital quarantine for COVID-19</u>

- 2 Duration of quarantine in hospitalized patients with severe acute respiratory
- 3 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 the Chinese province 15 of Hubei.[1] The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) 16 was subsequently identified as responsible of this condition, defined coronavirus 17 disease (COVID-19).[2] The virus has now spread outside Chinese borders with 18 82,297 cases and 2,804 deaths worldwide at the 26th of February.[3] After infection, 19 symptoms appear after an incubation time of 3-5 days, with 80% of those infected 20 developing a mild disease, 15% a severe disease and 5% will require support in 21 intensive care unit (ICU).[4] Overall, the estimated case-fatality rate is comprised 22 between 0.4% and 2.9% and the basic reproduction number is approximately 23 3.28.[4,5] SARS-CoV-2 is a new pathogen for humankind and any type of immune 24 protection exist, thus everybody can be potentially infected. Moreover, no primary 25 prophylaxis measures (vaccination) nor effective treatments are available. If the 26 above represented percentages are applied to the worldwide populations, it appears 27 clear why any measure should be considered to avoid a further diffusion of the virus 28 and prevent the saturation and collapse of health systems and the most catastrophic 29 30 pandemic since 1919 Spanish flu. 31 Isolation of those affected and the use of personal protective equipment (PPE) are 32 the mainstay to block transmission of this pathogen, which is presumed through 33 respiratory droplets. A 14 days quarantine is applied to subjects coming from endemic areas or who had contact with confirmed cases. It is assumed that, if in this 34 period the subject does not develop any sign or symptoms compatible with COVID-35

19, he is not infected and thus the quarantine can be removed, and the subject 36 returned to the community. Domiciliary quarantine of 14 days since a positive test is 37 applied also for patients with a diagnosed mild disease who did not need medical 38 support. 39 40 These rules are effective in controlling infections in the community, but several 41 doubts arise when it is necessary to transpose them in the hospital setting. Hospitals are indeed a delicate place in epidemics: they collect fragile persons who can be 42 43 exposed to the virus and are subsequently readmitted to the community thus spreading the infection. Indeed, the ongoing outbreak in Northern Italy has been 44 linked to a single infected patient who accessed to a community hospital where he 45 transmitted the virus to several other patients and health-care operators.[6] 46 47 Moreover, the isolation of patients in the hospital setting impose a significant burden in terms of PPE used by the health-care operators, space dedicated and time 48 employed in their management. Even more complex is the situation of patients in 49 ICU, where viral spreading is facilitated by endotracheal tubes and manoeuvres 50 performed on the respiratory tract. Therefore, a clear definition of the infectiousness 51 52 timing and intensity of viral spreading is mandatory to alleviate the burden on the health-care system. 53 Unfortunately, the data available on the topic are scarce and composed only of 54 measurements of viral shedding, without an assessment of the infectivity. Kim et 55 56 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 57 reverse transcriptase polymerase chain reaction (rRT-PCR) to detect SARS-CoV-2 58 and converted cycle threshold (CT) values of rRT-PCR into RNA copy number. The 59 detection limit of rRT-PCR was 2,690 copies/mL. Overall, viral load above detection 60 61 limit was detected until 14 and 25 days after symptoms onset and for 13 and 11 days after the first detection, respectively.[7] Of note, both patients received treatment 62 with lopinavir/ritonavir. Instead, Zou and colleagues analysed viral load in repeated 63 nasal and throat swabs obtained from the 17 symptomatic patients.[8] They also 64 employed rRT-PCR and considered a CT of 40 as detection limit. Higher viral loads 65 were observed in nasal swabs and in samples collected soon after symptoms onset. 66 Overall, only two patients presented positive samples, and only in nasal swab, 14 67 days after symptoms onset, and with low viral load. 68 In conclusion, a larger amount of data about duration of viral spreading and 69 infectivity in hospitalized patients, especially in ICU, is badly needed to better define 70 quarantine period and avoid nosocomial transmission. Before their availability, the 71 72 canonical 14 days period of guarantine should be respected.
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- 79 [1] Zhu N, Zhang D, Wang W, Li X, Yang B, Song J, et al. A Novel Coronavirus
- from Patients with Pneumonia in China, 2019. N Engl J Med 2020:727–33.
- 81 doi:10.1056/nejmoa2001017.
- 82 [2] Naming the coronavirus disease (COVID-2019) and the virus that causes it n.d.
- https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-
- guidance/naming-the-coronavirus-disease-(covid-2019)-and-the-virus-that-
- 85 causes-it (accessed February 27, 2020).
- 86 [3] Novel coronavirus (COVID-19) situation n.d.
- https://experience.arcgis.com/experience/685d0ace521648f8a5beeeee1b9125cd
- 88 (accessed February 27, 2020).
- 89 [4] Wu Z, McGoogan JM. Characteristics of and Important Lessons From the
- 90 Coronavirus Disease 2019 (COVID-19) Outbreak in China Summary of a
- 91 Report of 72 314 Cases From the Chinese Center for Disease Control and
- 92 Prevention. JAMA J Am Med Assoc 2020:E1–4.
- 93 [5] Liu Y, Gayle AA, Wilder-Smith A, Rocklöv J. The reproductive number of
- 94 COVID-19 is higher compared to SARS coronavirus. J Travel Med 2020:1–4.
- 95 doi:10.1093/jtm/taaa021.
- 96 [6] Covid-19 Situazione in Italia n.d.
- 97 http://www.salute.gov.it/portale/nuovocoronavirus/dettaglioContenutiNuovo

98		Coronavirus.jsp?lingua=italiano&id=5351&area=nuovoCoronavirus&menu=vu
99		oto (accessed February 27, 2020).
100	[7]	Kim JY, Ko J, Kim Y, Kim Y, Kim J, Chung Y, et al. Viral Load Kinetics of
101		SARS-CoV-2 Infection in First Two Patients in Korea. J Korean Med Sci
102		2020;35:1–7.
103	[8]	Zou L, Ruan F, Huang M, Liang L, Huang H. SARS-CoV-2 Viral Load in
104		Upper Respiratory Specimens of Infected Patients. N Engl J Med 2020:1–3.
105		