

# A Case of Early Reinfection With Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2)

TO THE EDITOR—It is with great interest that we read the first report of reinfection from severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which represented an important data point in the ongoing coronavirus disease 2019 (COVID-19) pandemic [1–3]. Questions have arisen regarding the timing and severity of reinfections, for which we offer a case report of symptomatic reinfection within 90 days.

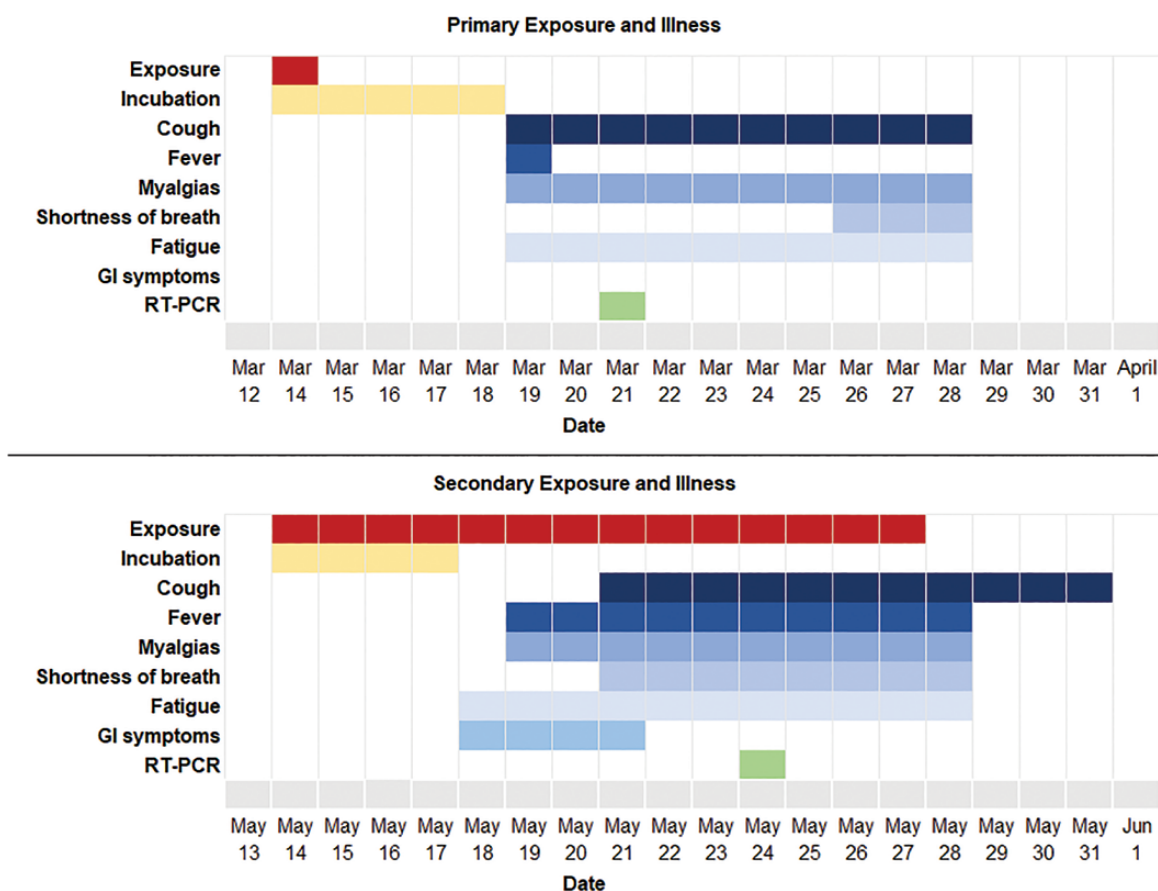
A 42-year-old healthy, male, military health-care provider presented with cough, subjective fever, and myalgias on 21 March 2020 following a workplace COVID-19 exposure and tested positive

by SARS-CoV-2 reverse-transcriptase polymerase chain reaction (RT-PCR; Figure 1). A physical examination was unrevealing and supportive outpatient management was pursued [4]. Clinical resolution of the illness occurred by day 10, and he returned to baseline excellent health for the following 51 days.

On 24 May 2020 he presented with fevers, cough, shortness of breath, and gastrointestinal symptoms, following a confirmed new household exposure to COVID-19. The physical examination revealed a temperature of 100.2°F, pulse of 119 beats per minute with a blood pressure of 124/87 mmHg, and respirations of 24 breaths per minute with oxygen saturation of 92–94% on ambient air. A chest X-ray demonstrated a pulmonary infiltrate. Multiplex respiratory RT-PCR

testing was negative but SARS-CoV-2 Reverse transcription polymerase chain reaction (RT-PCR) was again positive. Notably, the symptoms were significantly worse when compared with the initial syndrome. Serum collected on 1 June 2020 demonstrated the presence of SARS-CoV-2 spike immunoglobulin G antibodies.

Samples were collected as part of the institutional review board–approved protocol Infectious Disease Clinical Research Program (IDCRP)-085. Viral culture was attempted but was unsuccessful. RNA sequencing was performed via the ARTIC Novel Coronavirus 2019 (nCoV-2019) Sequencing protocol [5], the YouSeq SARS-CoV-2 Coronavirus Next Generation Sequencing (NGS) Library prep kit, and SuperScript IV (ThermoFisher Scientific). The



**Figure 1.** Timeline of symptoms and testing. Abbreviations: GI, gastrointestinal; RT-PCR, reverse transcriptase polymerase chain reaction.

consensus genome was generated and single nucleotide variants were determined [6]. Global lineage was determined using a subset of SARS-CoV-2 genomes available from the Global Initiative on Sharing All Influenza Data repository (GISAID; accessed 24 June 2020). Alignments were performed [7] and a maximum likelihood tree was generated [8]. The SARS-CoV-2 genome from the reinfection sample was deposited in National Center for Biotechnology Information (NCBI) GenBank under accession MT840184.

A partial genome sequence was obtained from the initial clinical infection, consisting of sequence fragments totaling 4126 base pair (bp) and distributed across the genome. Sequencing of the sample from the patient's second illness yielded a nearly coding-complete genome of 27 268 bp. A discrete 50 bp region of 0 coverage was observed. The phylogenetic analysis placed this virus in lineage B.1.26, and the genome encoded the D614G variation in the spike protein [9, 10]. A comparison of the partial sequence obtained from the initial infection with the nearly complete sequence obtained from the reinfection identified several potential variations, including 1 high-confidence variation.

The clinical, epidemiological, and sequencing data of this case suggest early reinfection with SARS-CoV-2, only 51 days after resolution of the initial infection. Importantly, this was observed in a young, immunocompetent patient. In contrast to the case reported by To et al [1], this second infection was more severe, potentially due to immune enhancement, acquisition of a more pathogenic strain, or perhaps a greater inoculum of infection, as the second exposure was from within the household.

## Notes

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