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Letter to the Editor

Dynamics of faecal SARS-CoV-2 in infected children during the convalescent phase*Dear editor,*

We read with interest the recent paper in this Journal by He et al. who reviewed the current evidence on COVID-19 and concluded that faecal shedding of SARS-CoV-2 should not be ignored as one of the possible transmission routes of the virus.¹ We would like to share findings from our paediatric patients who were positive for nucleic acid testing for SARS-CoV-2 in stools up to 8–20 days after clearance of viral RNA in respiratory specimens.

With the World Health Organization declaring a pandemic, the outbreak of coronavirus disease 2019 (COVID-19) poses a global threat with the highest risk impact.² The aetiological agent is a newly identified pathogen which was later renamed as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). There has been accumulating evidence suggests that the virus plagues people ubiquitously, although paediatric patients seem to present with distinct characteristics from infected adults.^{3–6}

Between January 17, 2020 and February 23, 2020, a total of 3 children with laboratory confirmed COVID-19 was reported in Qingdao, Shandong Province, China. Baseline characteristics and clinical, laboratory, and radiological data were collected. Dynamic profiles of real-time reverse transcription polymerase chain reaction (RT-PCR) results in throat swabs and faecal specimens were closely monitored till March 10, 2020, the final date of follow-up.

All the three paediatric patients were diagnosed with mild pneumonia and fever was the most consistent and predominant symptom at any time during the illness. Only one child had gastrointestinal symptoms. All children were in stable condition during the course of hospitalisation and none of them required respiratory support or intensive care. Their laboratory and radiological features were not typical for COVID-19. The three infected children showed good response to supportive and anti-viral treatment with a relatively short time to resolution.

Surprisingly, we found SARS-CoV-2 remained detectable in faeces of paediatric patients for approximately 4 weeks, whereas negative conversion of viral RNA in respiratory specimens occurred within 2 weeks after disease onset. Two children showed negative results for faecal detection of SARS-CoV-2 20 days after clear-

ance of viral RNA in the respiratory tract, while another child persistently tested positive on faecal samples even 8 days after respiratory samples turning negative. Chronological changes in RT-PCR results of respiratory and faecal specimens are shown in Fig. 1.

In general, children appear to be less severely affected by SARS-CoV-2 in contrast with adult patients.^{3–6} The mechanism underlying this youthful resilience to COVID-19 is yet to be systematically determined. Notably, asymptomatic infection is not uncommon amongst children. A recent study on the prevalence of COVID-19 in children demonstrated that 39 of 171 (27.7%) laboratory confirmed cases did not have any symptoms of infection.³ An asymptomatic child had SARS-CoV-2 RNA detectable in faeces at least 9 days after viral clearance in the respiratory tract.⁷ It might be possible that asymptomatic children infected with SARS-CoV-2 go undetected and represent as important contributors to virus transmission in the community, causing the pandemic to propagate. Aggressive efforts should be made to prevent spreading of the infection in schoolyard environments.

Faecal shedding of viral RNA has been constantly reported in patients infected with SARS-CoV-2.^{7–10} One study reported over half of the 17 patients had faecal samples positive for SARS-CoV-2 detection, although virus copies in stools were less than those in respiratory specimens.⁸ However, the researchers did not mention age distribution of these patients, neither did they investigate the duration of faecal samples positive for nucleic acid testing. Another study on paediatric cases indicated that viral loads in the gastrointestinal tract might be greater than that in the respiratory system. Eight out of ten paediatric patients were positive for nucleic acid testing in rectal swabs after respiratory specimens showing negative.⁹ Hence, SARS-CoV-2 may exist in the digestive system for a longer duration and convalescent patients with prolonged faecal shedding of SARS-CoV-2 may be an infectious source if fitness for discharge is based on respiratory testing.

In the face of a novel disease, scientists and clinicians still have much to learn about the potential routes of virus transmission. Evidence so far raises the possibility of faecal-oral transmission, reinforcing the need for nucleic acid testing of stool samples from COVID-19 patients during the convalescent phase. Close surveillance of convalescent patients would be crucial to curb the COVID-19 pandemic, and maybe outbreaks yet to come.

		Days since negative conversion of SARS-CoV-2 in throat swabs																														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Case 1		+	+	+	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Case 2		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-
Case 3		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	+	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-

+ Faecal specimen RNA positive
- Faecal specimen RNA negative
NA not available

Fig. 1. Timeline for Detection of SARS-CoV-2 RNA in Respiratory and Faecal Specimens.

Days since negative conversion of viral RNA in throat swabs are shown in numbers with grey boxes. Boxes with red plus sign denote the days when faecal specimens were positive for reverse transcription PCR testing. Boxes with minus sign represent the days when viral RNA was not detectable in faecal samples. NA means faecal specimen was not collected from the patients on that day and laboratory result was not available.

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