

## BRIEF COMMUNICATION

**Risk of novel coronavirus 2019 transmission from children to caregivers: A case series**

World Health Organization (WHO) characterised coronavirus disease 2019 (COVID-19) as a pandemic on 11 March 2020.<sup>1</sup> As of 5 April 2020, more than 1 133 000 confirmed cases have been documented globally.<sup>2</sup> In China, the majority of reported cases were adults, while 0.9% were below 15 years of age.<sup>3</sup> A recent systematic review showed that children have accounted for 1–5% of diagnosed COVID-19 cases.<sup>4</sup> COVID-19 in children appears to be mild and mostly acquired by household exposures.<sup>4–6</sup> The potential risk of transmission from infected children to adults is of concern due to prolonged detection of the SARS-CoV-2 RNA in respiratory specimens and faeces.<sup>6</sup> We studied the possibility of transmission from infected children to their caregivers.

The first three paediatric COVID-19 cases in Thailand were detected as part of epidemiologic investigations among three

family clusters. Case 1 was a 6-year-old Chinese boy who travelled to Thailand with his family; the index case in this family was his grandmother who developed symptoms on day 2 after arrival in Thailand. Case 2 was a 4-year-old Thai girl; the index case was her father who reported occupational exposure to foreign tourists. Case 3 was an 8-year-old Thai boy; the index case was his grandfather who developed symptoms on day 3 after returning from a 4-day trip to Japan. Nasopharyngeal and throat swabs obtained from the three cases were positive for SARS-CoV-2 RNA by real-time reverse-transcription polymerase chain reaction assays on 27 January (case 1), 7 February (case 2) and 25 February (case 3) 2020. WHO advises all confirmed COVID-19 cases, even mild cases, to be isolated in health facilities,<sup>7</sup> and according to Thailand's containment policy, each child was therefore hospitalised individually in a negative pressure room; case

**Table 1** Clinical characteristics and laboratory findings among case patients

	Case 1, 6-year-old boy	Case 2, 4-year-old girl	Case 3, 8-year-old boy
Underlying allergic rhinitis	Yes	No	Yes
Symptoms	Afebrile, mild nasal congestion, mild cough	Afebrile, mild nasal congestion, mild cough	Afebrile, mild rhinorrhea, mild cough
Chest radiographs	Thickening perihilar lung marking	Thickening perihilar lung marking	Thickening perihilar lung marking
Haematocrit, %	37	40	41
white blood cell count, $\times 10^9/L$	5.1	6.7	7.6
Neutrophil, %	36	30	43
Lymphocyte, %	52	54	47
Platelet count, $\times 10^9/L$	248	409	256

**Table 2** Timeline of real-time reverse-transcription polymerase chain reaction assays results for SARS-CoV-2 RNA in respiratory specimens among children and their caregivers

		Days of illness (child)																	
		2	4	6	8	10	12	14	16	18	20	22	23	24	25	26	27	28	29
Case 2																			
Child		+	+	+	+	+	+	+	+	+	+	–	–	Discharged					
Caregiver		–	ND	ND	–	ND	ND	ND	–	ND	ND	ND	–						
Case 3																			
Child		+	+	+	+	+	+	+	+	+	+	+	ND	+	ND	–	–	Discharged	
Caregiver		–	ND	ND	–	ND	ND	ND	–	ND	ND	ND	ND	–	ND	ND	–		

+, SARS-CoV-2 RNA was detected; –, SARS-CoV-2 RNA was not detected; ND, not done.

1 was isolated with his grandfather who was also infected with COVID-19, while cases 2 and 3 were isolated with their healthy caregivers.

All children had very mild respiratory symptoms for 1 day before admission. No other symptoms were documented. Physical examinations revealed unremarkable. Complete blood counts and chest radiograph interpretations were as shown in Table 1. All children were administered only oral antihistamine; no intravenous fluids, oxygen therapy, antimicrobial agents or antipyretic drugs were administered. Their symptoms were resolved within a few days. No child had fever for the entire duration of their stay in the hospital; all were in good conditions and recovered uneventfully.


During isolation in our hospital, children and their caregivers were advised to wash hands frequently and not share personal items. Surgical masks were provided to them, although compliance with the use of masks was observed to be poor. No other personal protective equipment was provided. Respiratory swabs were collected from each child on alternate days and tested sequentially for SARS-CoV-2 RNA. Children were allowed to be discharged when their swabs turned negative for SARS-CoV-2 RNA on 2 consecutive days; this happened on days 15, 23 and 27 of illness for cases 1, 2 and 3, respectively.

To assess the possibility of transmission, nasopharyngeal and throat swabs from the caregivers of case 2 (grandmother, aged 53 years) and case 3 (mother, aged 32 years) were collected on day 1 of isolation, followed by weekly, and finally on the day of discharge with their children. Swabs were tested for SARS-CoV-2 RNA by real-time reverse-transcription polymerase chain reaction assays targeting the *N* and *ORF1ab* genes (limit of detection = 100 copies/mL). All respiratory swabs from both caregivers were negative and none of them developed any symptoms throughout the period of stay in the hospital, details as shown in Table 2. On follow up over the phone on day 14 after discharge, caregivers reported no symptoms.

Concerns have been raised that children could possibly be a source of infection to adults.<sup>8,9</sup> While our study revealed no evidence of transmission from mildly ill, afebrile children to their caregivers despite prolonged positivity of the SARS-CoV-2 RNA in their respiratory specimens, our findings are consistent with WHO's recommendations for alternatively managing patients with mild COVID-19 disease at home.<sup>10</sup> However, due to limited cases in our study, further research with larger sample size would be needed to better understand children's role in the transmission of COVID-19 to adults including their caregivers.

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