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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Letter to the Editor

Incident changes of rotavirus enteritis among children during the coronavirus disease-2019 pandemic in Hangzhou, China

Dear editor,

The report entitled, "Impact of coronavirus disease-2019 (COVID-19) pandemic on measles surveillance in Pakistan," by Rana and colleagues proved to be a rather interesting read [1]. In this report, the authors brought attention to sharp declines in measles cases in Pakistan during the COVID-19 pandemic and here we would like to present the decline in rotavirus enteritis among children during the COVID-19 pandemic in Hangzhou, China.

As a double-stranded and non-enveloped ribonucleic acid virus, rotavirus is a major cause of life-threatening diarrhea in children worldwide, which was responsible for 29.3% of all diarrheal deaths among children under the age of 5 years in 2015 [2,3,4,5,6]. Rotavirus enteritis greatly demonstrated pronounced seasonality and is typically considered a winter disease, especially in nonequatorial due to temperature and humidity changes that significantly affect rotavirus infection. Therefore, enhancing the surveillance of rotavirus enteritis for its outbreak prevention is very important. According to clinical observations, the number of rotavirus enteritis cases among children has significantly decreased during the COVID-19 pandemic in Hangzhou. Hence, we compared rotavirus enteritis incidence among children during the COVID-19 pandemic with rates in the previous 2 years in this study.

The Health Commission of Zhejiang Province released the confirmed cases of COVID-19 in Zhejiang province since January 23, 2020, and reported no local cases in Zhejiang province on April 13, 2020. Therefore, the period from January 23, 2020, to April 13, 2020, is considered the COVID-19 pandemic period in Zhejiang province (period 2). Meanwhile, the corresponding periods of 2018 and 2019 were used as a comparison (period 1). The generalized linear model (GLM) with Poisson distribution was used to assess the effect of the COVID-19 pandemic on the daily number of cases in period 2 compared with period 1. Poisson regression analysis was carried out by R software (version 3.5.3; R Development Core Team 2019). Statistical significance was defined as $P < 0.05$, with two-sided significance tests.

A total of 280 rotavirus enteritis cases among children were identified at Children's Hospital, Zhejiang University School of Medicine in period 2, but the number of rotavirus enteritis cases among children was 4267 in period 1 (2018: 983 cases; 2019: 3284 cases). The cumulative number of rotavirus enteritis cases among children each day in periods 1 and 2 is shown in Fig. 1. According to GLM with the Poisson distribution, the incidence of rotavirus enteritis among children decreased by 84.8% at period 2 (IRR 0.152 [95% CI 0.124–0.186], $P < 10^{-3)}$ compared to that of period 1. The positive rotavirus proportion in feces specimens was 16.7% in period 2, which was significantly lower than that of period 1 (32.6%, $P < 10^{-3}$). Fig. 2 presents the positive rotavirus proportion in feces specimens each day in periods 1 and 2.

The number of rotavirus enteritis cases among children in period 2 was significantly lower than that of period 1. A broken line graph of the cumulative number of rotavirus enteritis cases among children each day in periods 1 and 2 was plotted and presented in Fig. 1, which showed the overall cumulative trend during the COVID-19 pandemic period (period 2) was lower than in the corresponding periods of 2018 and 2019 (period 1). No significant reduction was found in the cumulative number of rotavirus enteritis cases among children each day during the initial phase of the COVID-19 pandemic period (days 1–13) and is the same as the corresponding periods of 2018. However, the cumulative number of rotavirus enteritis cases among children each day showed a sharp decline compared to the corresponding periods of 2018 and 2019 from day 14 since the discovery of previously latent cases takes time even if the COVID-19 pandemic changes the prevalence of rotavirus enteritis among children. A similarly significant incidence reduction of rotavirus enteritis among children by 84.8% in period 2 (IRR 0.152 [95% CI 0.124–0.186]) compared to that of period 1 was found by the analysis of GLM with the Poisson distribution. Additionally, the positive rotavirus proportion in feces specimens in period 2 significantly reduced compared to that of period 1. Fig. 2 shows the positive rotavirus proportion in feces specimens each day in periods 1 and 2; the positive rotavirus proportion in feces specimens each day in period 2 was generally less than that of period 1. The lowest positive rotavirus proportion in feces specimens was 0% in period 2, which was not found in period 1.

To simplify, the COVID-19 pandemic indeed changed the prevalence of rotavirus enteritis among children in Hangzhou. This change is not due to the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) itself, but mainly to the series of strict measures taken during the COVID-19 pandemic. Rotavirus is transmitted mainly through the fecal-oral route and predominantly through a close person-to-person contact [7]. Strict measures cut off this route of transmission to some extent, together with the increased awareness of personal hygiene. SARS-CoV-2 transmission in Hangzhou is now under control, but the global pandemic continues. Therefore, uncertainty arises on the prevalence trend of rotavirus enteritis among children, and continuous monitoring of the trend is worthwhile. A limitation of this study should be noted: as a single-center study, the conclusion may differ in other regions and further studies from other geographical areas are required.

In conclusion, the prevalence of rotavirus enteritis among children declined during the COVID-19 pandemic, and continued monitoring of this change is worthwhile to prevent an explosion of rotavirus enteritis among children in the wake of COVID-19.

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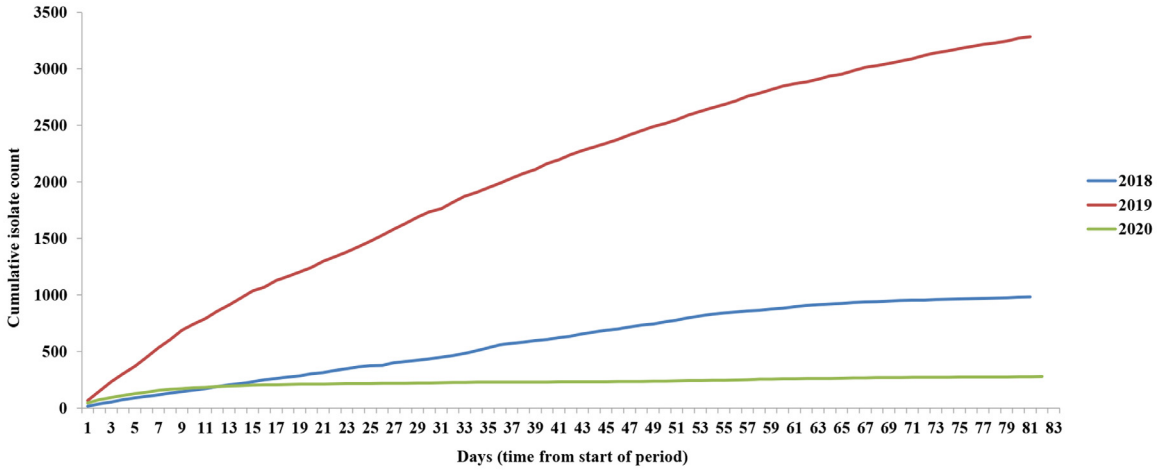

Fig. 1. Cumulative number of rotavirus enteritis cases among children each day in periods 1 and 2, Period 1: from January 23, 2018, to April 13, 2018, and from January 23, 2019, to April 13, 2019; Period 2: from January 23, 2020, to April 13, 2020.

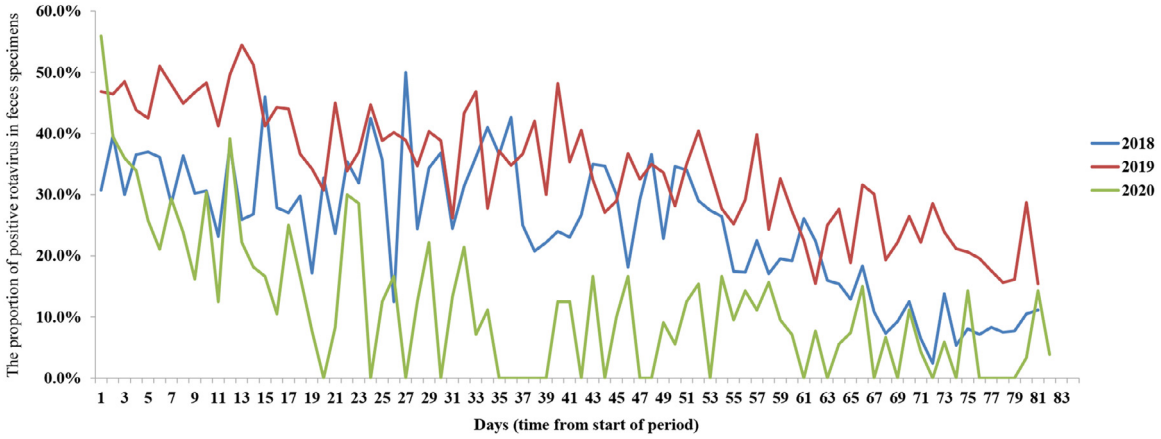

Fig. 2. Positive rotavirus proportion in feces specimens each day in periods 1 and 2 Period 1: from January 23, 2018, to April 13, 2018, and from January 23, 2019, to April 13, 2019; Period 2: from January 23, 2020, to April 13, 2020.

Declaration of Competing Interest

All authors have declared that there is no conflict of interest.

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References

1. Rana MS, Usman M, Alam MM, Mere MO, Ikram A, Zaidi SSZ, Salman M, Sharif S, Umair M, Khurshid A, et al. Impact of COVID-19 pandemic on Measles surveillance in Pakistan. *J Infect* 2021;**82**(3):414–51.
2. Yu J, Lai S, Geng Q, Ye C, Zhang Z, Zheng Y, Wang L, Duan Z, Zhang J, Wu S, et al. Prevalence of rotavirus and rapid changes in circulating rotavirus strains among children with acute diarrhea in China, 2009-2015. *J Infect* 2019;**78**(1):66–74.
3. Troeger C, Khalil IA, Rao PC, Cao S, Blacker BF, Ahmed T, Armah G, Bines JE, Brewer TG, Colombara DV, et al. Rotavirus vaccination and the global burden of rotavirus diarrhea among children younger than 5 years. *JAMA Pediatr* 2018;**172**(10):958–65.
4. Sun ZW, Fu Y, Lu HL, Yang RX, Goyal H, Jiang Y, Xu HG. Association of rotavirus vaccines with reduction in rotavirus gastroenteritis in children younger than 5 years: a systematic review and meta-analysis of randomized clinical trials and observational studies. *JAMA Pediatr* 2021;**175**(7):e210347.
5. Schwartz LM, Zaman K, Yunus M, Basunia AH, Faruque ASG, Ahmed T, Rahman M, Sugimoto JD, Halloran ME, Rowhani-Rahbar A, et al. Impact of rotavirus vaccine introduction in children less than 2 years of age presenting for medical care with diarrhea in rural Matlab. *Bangladesh.* Clin Infect Dis 2019;**69**(12):2059–70.
6. Dian Z, Sun Y, Zhang G, Xu Y, Fan X, Yang X, Pan Q, Peppelenbosch M, Miao Z. Rotavirus-related systemic diseases: clinical manifestation, evidence and pathogenesis. *Crit Rev Microbiol* 2021:1–16.
7. Crawford SE, Ramani S, Tate JE, Parashar UD, Svensson L, Hagbom M, Franco MA, Greenberg HB, O'Ryan M, Kang G, et al. Rotavirus infection. *Nat Rev Dis Primers* 2017;**3**:17083.

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