

Adapting pediatric health care responses to the COVID-19 pandemic in Japan: A clinical perspective

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Abstract: The COVID-19 pandemic required our pediatric health care staff to adjust to many irregularities and solve serious issues in our routine clinical practice. In outpatient clinics, many children exhibited common cold symptoms that mimic COVID-19, thus we initially screened patients *via* an interview form, then later *via* SARS-CoV-2 antigen test. Cluster infections were entirely avoided by following systematic, everyday precautions. Patients' quality of life has been difficult to maintain during the pandemic, due to social and staffing restrictions. Other unexpected repercussions – such as an unexpected lack of seasonal virus infections, then a respiratory syncytial (RS) virus outbreak – required agile management of hospital resources. While we must continue to adapt our treatment programs in response to the evolving COVID-19 crisis, it remains essential to support the well-being of children through regular health check-ups, mental health support, educational opportunities, proper socialization, and close communication with parents and families.

Keywords: COVID-19, pandemic, child, health care delivery, clinical application

Introduction

In late 2019, novel coronavirus (severe acute respiratory syndrome coronavirus 2: SARS-CoV-2) infection (COVID-19) was first reported from Wuhan, China (1) and subsequently spread worldwide. As in other countries, Japan experienced several waves of COVID-19 (Figure 1) that forced its pediatric healthcare providers to quickly adapt to multiple issues. In this communications report, we offer our perspectives on key issues that we as Japanese pediatricians experienced during the pandemic and offer insights into how we continually adapted our treatment programs in response to the ongoing crisis.

A brief chronology of the COVID-19 pandemic and Japan's official response

Near the very start of the pandemic, we at the National Center for Global Health and Medicine (NCGM) assisted with charter flights evacuating Japanese citizens, including children, from Hubei, China (2). Shortly thereafter, the first wave reached Japan (Figure 1) and the government declared a state of emergency (similar to a lockdown) in which all residents were urged to avoid public contact.

While the number of COVID-19 pediatric patients did not spike like that of adults, each subsequent wave brought renewed social restrictions. Schools were closed and social activity was restricted, resulting in prolonged lifestyle changes. For children, these closures had a significant impact on their well-being – particularly on socialization and mental health (3). We learned from the first wave that it is essential for children to continue to have proper conditions for learning and fostering social relationships *via* group activities. As such, in subsequent waves, schools tended to avoid closing, instead implementing measures such as online classes and staggered attendance. During the onset of the 6th wave (the omicron variant outbreak), however, pediatric COVID-19 patient numbers increased drastically, such that schools and nursery schools had no choice but to temporarily close due to cluster infections.

COVID-19 in children is mostly transmitted *via* family contact (4,5). While infected children normally exhibit only light symptoms or asymptomaticity (4-6), during the 6th wave children exhibited more pronounced symptoms such as fever, sore throat, nasal discharge, increased cough, and even febrile convulsions in some younger children. While most children with COVID-19 show mild symptoms, for younger children and those

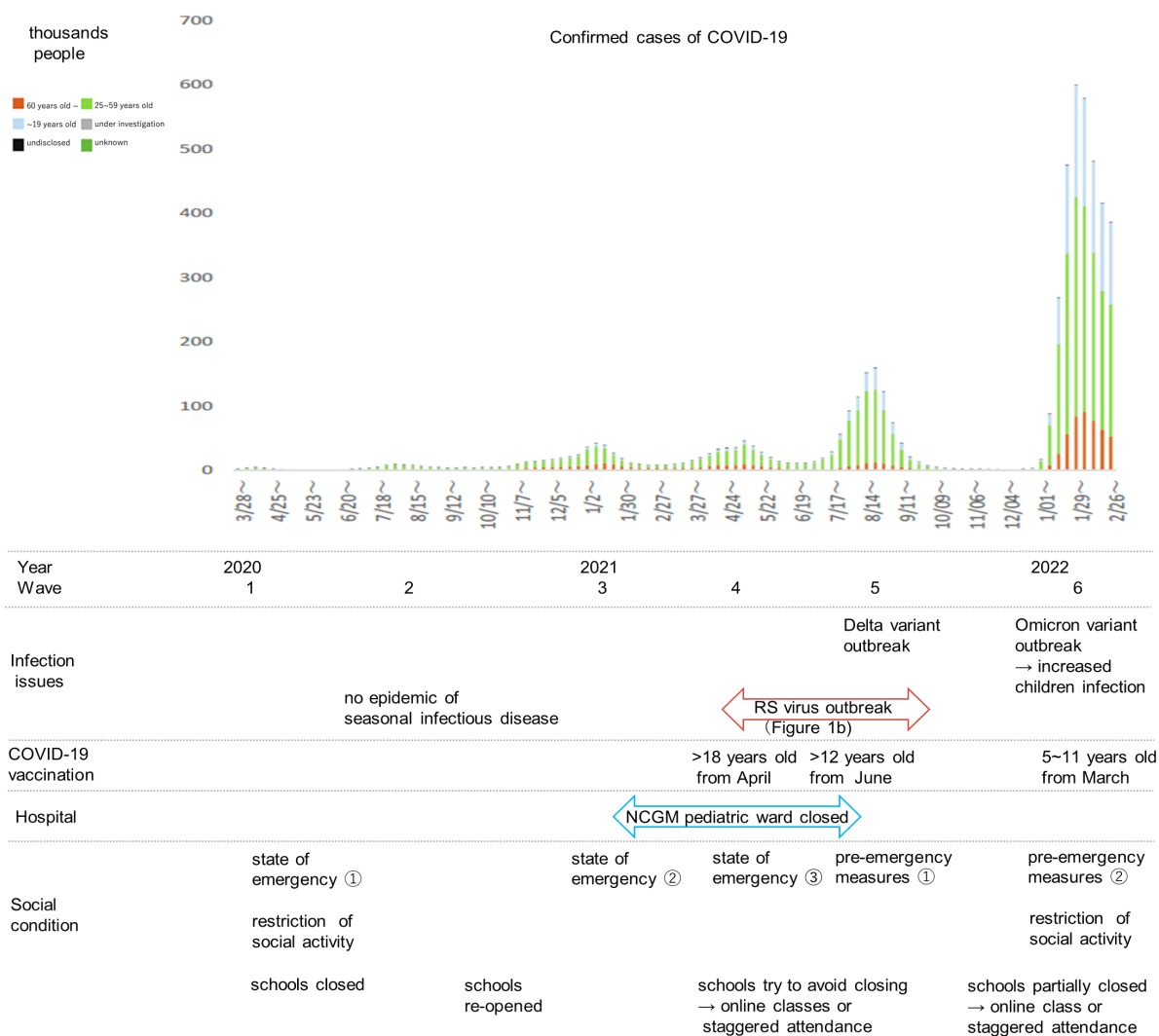


Figure 1. The COVID-19 pandemic and its impact in pediatric field in Japan. Data source: Ministry of Health, Labour and Welfare. 76th COVID19 infection control advisory board distributed data (published March15, 2022). <https://www.mhlw.go.jp/content/10900000/000913201.pdf>

with underlying disease, caregivers and parents need to be aware of the risk of severeness (7,8). Japan began vaccinating children 12 years old and over in June 2021 and 5-11 years old starting March 2022.

Prolonged quarantine has often been imposed on adults (including health care workers) who have been in close contact with infected children of family members. This has led to health care worker shortages, prompting the Japanese government to shorten the length of quarantine in order to help ease the situation.

Management of outpatient clinics

In the early stages of the pandemic, we had little information about the clinical features of pediatric patients with COVID-19; early reports suggested that children were mostly contracting COVID-19 from family members (4,5). Many children visit hospitals with common cold symptoms, such as fever and respiratory symptoms, which mimic COVID-19 symptoms. As

it is often initially difficult to distinguish between the common cold and COVID-19, we began requiring patients to fill out an interview form (Supplemental Table S1, <https://www.globalhealthmedicine.com/site/supplementaldata.html?ID=51>). The form asks not only about the patient's condition, but also their family's condition, whether they have been in crowded places, or had any contact with SARS-CoV-2-infected people. Patients who report having contact with the infected or suspected infected are then asked to enter an isolation room for examination by staff wearing appropriate personal protective equipment.

This interview form proved very effective until the 5th wave. However, starting from the 6th wave it became difficult to initially screen COVID-19 cases using just the form. Therefore, we began administering SARS-CoV-2 antigen tests to any patients showing a fever or respiratory symptoms. Suspected infected were given the antigen test in the infection division's isolated room before visiting the pediatric outpatient clinic. These

antigen tests revealed many patients with COVID-19, including asymptomatic cases. As such, we wore N95 masks and eye shields whenever we performed physical examinations.

We focused on keeping the outpatient clinic environment regularly and thoroughly sanitized, as it is difficult to get younger patients to wear masks properly. We installed several circulators in the outpatient clinic and used negative-air-pressure rooms for examining suspected COVID-19 positive patients. In cases of asthma attacks, we avoided nebulizer therapy (which increases the risk of COVID-19 transmission *via* aerosol) without first giving a SARS-CoV-2 antigen test. As of this writing, we have not experienced any COVID-19 cluster infections in our division; we believe this is owing to the everyday infection control precautions systematically taken by all of our staff.

Management of hospitalized patients

Children with COVID-19 were hospitalized in our infectious disease ward, instead of the pediatric ward. Most of our child patients displayed slight-to-moderate symptoms, and merely needed supportive care (6). We do not yet have enough evidence of the effectiveness and safety of antivirals nor antibody therapies for children; as such, such treatments are used sparingly. We experienced one case of novel disease state multisystem inflammatory syndrome in children (MIS-C), in which the patient showed gastrointestinal symptoms, cardiovascular dysfunction, and multisystem inflammation, including Kawasaki disease-like features after SARS-CoV-2 infection (9).

In terms of general care of inpatients, it was difficult to maintain the same quality of life as we had done before the pandemic. It proved problematic to confine quarantined COVID-19 children to their room for the full prescribed term; some even tried to escape. Normally, nursery staff and child life specialists would perform various support activities, however these activities were scuttled to prevent further infections. By the 3rd wave, we had fewer hospitalized children, which eventually led to our pediatric ward being temporarily closed for more than half a year. During this time of closure, many healthcare professionals from our pediatric division were reassigned to support COVID-19 patients elsewhere in the hospital, leaving gaps in patient care. Existing pediatric inpatients were redistributed to beds in various other wards and were not able to use the playroom in the pediatric ward. Visits by family members were generally not allowed. For patients who absolutely needed family attendance, one of the parents, after taking a PCR test for SARS-CoV-2, would occasionally obtain approval to stay with their children at hospital. For family members who were not allowed to visit the hospital, we made efforts to contact them regularly *via* phone and explain their

child's condition; still, many families expressed their anxiousness. Overall, quality of life of inpatients and their families was very negatively impacted.

Regarding newborn babies delivered by COVID-19 infected mothers, we began quarantining them immediately after birth. It has been reported that vertical transmission is rare and that the major cause of COVID-19 transmission from mother to neonate is contact and airborne infection after birth (10). During the early stages of the pandemic we had little information on best practices, so we quarantined newborns for two weeks. Recently however, it is recommended to conduct a neonatal PCR test twice: at 24 hours and at 48 hours after birth; if both tests are negative, the newborn is confirmed to be uninfected with SARS-CoV-2 and is released from quarantine (11).

Impact of the COVID-19 pandemic on the pediatric field as a whole

The pandemic is likely to have an impact on other infectious diseases. Initially, after the first and second wave, seasonal viral infections specific to children (such as respiratory syncytial (RS) virus or Influenza virus) dramatically decreased (12,13). We assume that this was due to infection prevention controls such as hand sanitizing or wearing masks, although there were reports that other respiratory virus infections such as rhinovirus infection were increasing (14). We saw similar trends in detecting other respiratory pathogens from multiplex real-time PCR tests (Filmarray[®]) before hospitalization with respiratory symptoms. In the summer of 2021, an RS virus infection outbreak occurred (Figure 2). The RS virus usually causes cold-like symptoms (such as fever and a severe cough); as such, we needed to conduct differential diagnoses to screen for COVID-19, especially in infants with bronchiolitis and pneumonia complications. We believe that seasonal viral infections are contributing to the development and acquisition of infant immunity. Previous reports from 2020 suggest that many infants were not able to develop immunity to the RS virus and thus were infected during the 2021 outbreak (13). Furthermore, in April 2022, the World Health Organization reported that severe acute hepatitis of unknown etiology was increasing among children in several countries (15). We should expect the pandemic to have unexpected repercussions (*i.e.* influence on other pathogens) on pediatric disease control.

Another potential impact of COVID-19 is the delay or avoidance of medical care. During the initial waves of COVID-19, many parents were wary of bringing their children to hospital for routine checkups, vaccinations, and follow-ups. We grew increasingly concerned about such avoidance of routine care. Many clinics, including ours, set aside special hours for outpatient clinics so that non-infected children could visit the hospital safely and get appropriate treatment

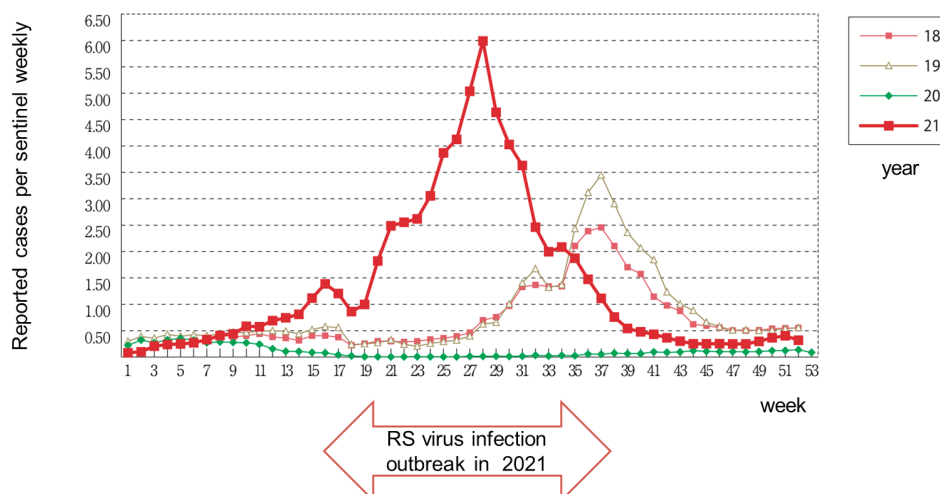


Figure 2. RS virus infection cases reported per sentinel weekly. RS, respiratory syncytial. Data source: Ministry of Health, Labour and Welfare/National Institute of Infectious Diseases Infectious diseases weekly report (published January 17, 2022). <https://www.niid.go.jp/niid/images/idsc/idwr/IDWR2021/idwr2021-51-52.pdf>

or preventive care. We also implemented telephone consultations and follow-ups. During the 5th and 6th waves, patients with COVID-19-like symptoms might have found it difficult to get an appointment at the overwhelmed outpatient clinic. We grew concerned about infants with issues such as bacterial infections who might not attain proper treatment, so we made every effort to not refuse consultations.

A third impact on pediatric care that we have witnessed is the disruption of daily routines. During the first wave of the pandemic, most schools were closed and children had to stay at home. Many faced mental health issues due to this radical change of lifestyle (2). Unable to go to school, meet friends, play outside, nor engage in physical activity, many children suffered physiological stress (16). After schools re-opened, some children struggled to catch up on missed schoolwork, and some even refused to go back to school altogether. Autonomic imbalances and/or mental illnesses such as depression and anorexia have increased; many children visited our hospital with these symptoms during the pandemic. This continued stress on families stuck at home has brought concerns of increased incidence of domestic violence and/or child abuse (17).

Conclusion

The COVID-19 pandemic required pediatric health care staff to adjust to many irregularities and solve serious issues in our routine clinical practice. Children and their families confronted profound difficulties in adjusting to major disruptions to their educational and social activities. In any circumstance it is essential to support the well-being of children through regular health check-ups, mental health support, educational opportunities, and proper socialization, all while maintaining regular communication with their families. Restrictions on

social contact – while effective for limiting SARS-CoV-2 infections – are greatly stressful for hospitalized children and their families. Despite the ongoing emergence of new variants, we expect that vaccinating a wider age range – together with maintenance of standard infection controls and precautions – will bring the pandemic under control so that we may protect the rights and general welfare of hospitalized children.

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