

“I Really Didn’t Want To Come In”: The Unseen Effects of COVID-19 on Children

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The effects of COVID-19 on children’s health are multifaceted. In comparison to adults, children typically experience far milder physical consequences when infected with the virus. A notable exception is the newly described multisystem inflammatory syndrome associated with COVID-19 (MIS-C), which has proven to be a source of significant morbidity among the children it affects.¹ Nevertheless, even those children not infected with COVID-19 have suffered due to the disease. School closures have deprived children of opportunities for social and academic growth and, in some cases, the provision of food, social services, medication administration, and many different therapies. Social distancing rules have limited play among children, which is crucial to their development and mental health. The impact on children who have lost family members, including parents, is monumental. Amidst all of this observable suffering, however, the pandemic poses a less visible threat to the health of children.

It is well documented that concern about exposure to COVID-19 has led many adults to avoid emergency departments (EDs) around the world. We believe parents may be avoiding ED visits for their children for the same reason. In the United States, ED volumes dropped approximately 50% during spring 2020.² While EDs saw increasing, and at times overwhelming, numbers of patients with COVID-19, the number of patients presenting with other life-threatening medical issues, including heart attacks and strokes, declined.^{3,4} Data from the National Center for Health Statistics this past spring revealed nationwide increases in deaths due to nonrespiratory causes such as diabetes, heart disease, and stroke.⁵ ED avoidance and unprecedented lack of access to outpatient care, though with the intent to reduce overall risk, are likely significant contributors to these deaths.

Pediatric patients, especially the most vulnerable, are similarly at risk for deleterious health-related consequences from ED avoidance and from limited access to primary and outpatient specialty care. Data from Europe indicate dramatic drops in pediatric ED (PED) volumes, as well as an increase in the proportion of ED visits leading to hospitalization.^{6,7} These studies suggest that when patients do ultimately present to the PED, they may be more seriously ill.

At our institution, we have seen many COVID-19-negative patients whose medical care has been negatively influenced by the pandemic. A few months ago, a 1-month-old infant with an underlying health condition presented to the PED in extremis after weeks of progressively worsening feeding issues. The infant had been closely followed by the primary care provider (PCP) and subspecialty team via phone calls, televisits, and some office visits. Both physicians and parents had tried to resolve the feeding issues within the outpatient context, explicitly hoping to avoid potential exposure of this fragile patient to COVID-19 in the hospital. On eventual presentation to the PED, the infant was profoundly dehydrated, with significant electrolyte derangement and an acute abdomen, requiring admission to the intensive care unit. Ultimately, a new diagnosis of Hirschsprung disease was made, and the infant was hospitalized for several weeks for weight gain.

Later this summer, a school-aged child with a history of poorly controlled type 1 diabetes presented to an affiliated community hospital comatose and with Kussmaul respirations. Prior to the pandemic, a school nurse administered the child’s morning insulin. Since school closed, the patient had been responsible for administering this dose of insulin while the parents

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worked outside the home. Despite close and frequent communication between the patient's endocrinology team and the family, the patient's glucose and ketone levels began to rise. The parent administered repeated boluses of insulin at home in an attempt to avoid the perceived exposure risk associated with an ED visit. On presentation to the PED, the patient was profoundly altered, with a pH of 7.0. When transfer to a tertiary care center was recommended, the patient's parent expressed persistent concerns about COVID-19 exposure in the larger hospital, although ultimately consent to transfer was given.

A third case from this summer provides an example of a different type of patient affected by COVID-19: the neonate whose birth circumstances were altered due to the virus. A 3-day-old, full-term infant presented to the ED with hypothermia after PCP referral. The parents had considered both home birth and hospital delivery earlier in the pregnancy, ultimately opting for home birth due to concerns about COVID-19 exposure in the hospital. The pregnancy and delivery were uncomplicated. The neonate did not receive the first hepatitis B vaccine, erythromycin eye ointment, or vitamin K after delivery. In the first 3 days of life, the patient had voided once and stoolled once per day. The patient's mother, inexperienced with breastfeeding and without access to a lactation consultant, was unsure about latch or emptying of her breasts. At the first pediatrician visit, the infant was noted to be hypothermic to 35°C, intermittently bradycardic to the 80s, and with diminished arousal. In the PED, a full sepsis work-up was initiated. Though multiple attempts were made by different providers, only a minimal amount of blood could be drawn, presumably due to dehydration. Of note, the neonate received vitamin K subcutaneously prior to lumbar puncture.

Pediatricians across the country have gone to great lengths to protect their patients and to provide high-quality care both inside and outside the office during this unprecedented time. Nevertheless, these 3 cases illustrate the detrimental effects of COVID-19 on the delivery of pediatric health care. The first 2 cases in particular demonstrate the limitations of even close and consistent phone and televisit follow-up. Telehealth has

provided a lifeline for patients and families during the pandemic, and, in most cases, has provided an excellent temporary substitution for office visits. There are, however, limitations to care without physical evaluation. Had the children in the first 2 cases been evaluated in person sooner, they may have been referred to a higher level of care more expediently. Likewise, in all 3 cases, parental reservations about exposing their children to COVID-19 through a trip to the hospital, however well-intentioned, likely played a role in the eventual severity of illness with which each child presented to the hospital.

If we are encountering children in the PED with severe illness due to delayed presentation to care, what about the children we aren't seeing? As COVID-19 cases rise daily in the United States, we must be aware of the possibility of ED avoidance. We propose a multimodal approach to combat this dangerous phenomenon. Inpatient and ED-based pediatricians must maintain clear and open lines of communication with outpatient colleagues so that we can partner in considering which cases warrant prompt ED evaluation, even in the midst of a pandemic. All pediatricians must remind families that our hospitals remain open and ready to treat children safely. We must promote community awareness of the numerous safety precautions we take every day so that patients and families can feel comfortable seeking care at the hospital; the message of ED and hospital safety must be even more robust for caregivers of our particularly vulnerable children. As always, how we communicate with patients and their families matters. Validating and addressing concerns about COVID-19 exposure, while providing reassurance about the safety of our hospitals, could save children's lives.

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References

1. Riphagen S, Gomez X, Gonzalez-Martinez C, et al. Hyperinflammatory shock in children during COVID-19 pandemic. *Lancet*. 2020;395:1607-1608.
2. Wong LE, Hawkins JE, Langness S, et al. Where are all the patients? addressing COVID-19 fear to encourage sick patients to seek emergency care. *NEJM Catalyst*. 2020. doi:10.1056/CAT.20.0193
3. Moroni F, Gramegna M, Ajello S, et al. Collateral damage: medical care avoidance behavior among patients with acute coronary syndrome during the COVID-19 pandemic. *JACC*. 2020. doi:10.1016/j.jaccas.2020.04.010
4. Deerberg-Wittram J, Knothe C. Do not stay home: we are ready for you. *NEJM Catalyst*. 2020. doi:10.1056/CAT.20.0146
5. Woolf SH, Chapman DA, Sabo RT, et al. Excess deaths From COVID-19 and other causes, March-April 2020. *JAMA*. 2020. doi:10.1001.jama.2020.11787
6. Lazzarini M, Barbi E, Apicella A, et al. Delayed access or provision of care in Italy resulting from fear of COVID-19. *Lancet Child Adolesc Health*. 2020;4:E10-1.
7. Happle C, Dopfer C, Wetzke M, et al. Covid-19 related reduction in paediatric emergency healthcare utilization—a concerning trend. *BMC Pediatrics*. [under review]. 2020. doi:10.21203/rs.3.rs-2

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