

COVID-19 Pandemic and Children's Health – Mitigating Unintended Consequences

Dear Editor,

At the time of writing, Singapore has over 58,000 Coronavirus disease 2019 (COVID-19) cases and 29 deaths; children have been largely spared, comprising less than 0.2% of cases and none with severe disease.

Knowledge of the epidemiology of COVID-19 has grown significantly over the past months.¹ Initially, assuming the worst, pandemic preparation by paediatric facilities in healthcare institutions mirrored their adult counterparts in capacity building.² This included reduction of services that were of lesser priority, and decongestion of ambulatory and general inpatient services to preserve resources for essential care. Similar measures have largely remained in place especially in many parts of the world with ongoing community transmission. Evidence has emerged that children are largely spared from the severe direct consequences of COVID-19.³ Although preventive measures have proven effective in limiting the transmission of COVID-19,⁴ reports of unintended harm in children with other ailments have surfaced.

Through this letter, we sound the alert, examine the barriers to the receipt of optimum healthcare for non-COVID-19 conditions in children, and propose mitigating measures.

An unintended consequence of the pandemic response has been the development of physical, psychosocial and systemic barriers in accessing paediatric healthcare. We present case reports from developed countries and Singapore that describe unintended consequences (Table 1), which likely represent the tip of an iceberg. In resource limited nations, an estimated 10–20% deficit in essential child health expenditure and a 10% increase in child malnutrition is projected to result in 250,000 child deaths over 6 months.⁵ In the Singapore cases, the common theme was parental attempt to avoid a healthcare visit in preference of home-based therapy or monitoring. This was extremely unusual for Singapore, where healthcare is easily accessible.

Alarmed by the no-show rates of our outpatients and as members of the Paediatric Ethics and Advocacy Centre, we examined barriers to optimum healthcare for

all children, deduced the causality and conceptualised a framework of mitigating measures grounded on ethical and clinical principles.

We first highlight possible contributing factors for unintended consequences.

Parental healthcare-seeking attitude is perhaps the most important and proximal determinant of a child receiving timely medical care. Reasons for an inappropriately raised parental threshold for seeking care include fear of acquiring COVID-19 from a visit, limitations in transportation, perceived long waiting times in emergency departments and inability to afford care. The need for essential visits like vaccinations for the well child may not be fully appreciated by caregivers, despite well-known consequences of disease outbreaks due to decrease in herd immunity following missed vaccinations in other countries.⁶ Such altered health seeking attitude of caregivers can thus lead to reduced utilisation of medical services even when essential services have been continued amid the pandemic, for example in Singapore.⁷

Restructuring of clinical operations led to reduction in capacity of ambulatory paediatric care worldwide. Telemedicine, as an alternative, has been slow to compensate for this gap.

Redeployment of general practitioners and paediatricians for COVID-19 care at the heights of the pandemic potentially lowered the capacity of care for non-COVID-19 paediatric patients in many countries.

Reallocation of scarce resources framed by fundamental principles of pandemic resource optimisation include giving priority to those who are most afflicted, maximising benefits in terms of the number of lives saved and life years gained, being equitable, recognising instrumental value and rationing.^{8,9} Thus access to hospital supplies, diagnostic and therapeutic tools may become inadvertently restricted for non-COVID-19 patients.¹⁰

The uninterrupted natural progression of paediatric ailments is meant to be checked by several layers of safety nets. This can get shortchanged during a pandemic through a “swiss cheese” mechanism resulting

Table 1. Unanticipated harm to children with non-COVID-19 conditions during the pandemic

Country	Cases reported	Contributing factors
Israel ^a	Delayed presentation of appendicitis in 7 children leading to higher complication rates	Parental fear leading to delayed healthcare seeking Over reliance on telemedicine Insufficient evaluation
US and Italy ^b	Delayed presentation of diabetic ketoacidosis in 5 children and adolescents requiring higher resource utilisation including intensive unit care	Barriers in accessing healthcare Insufficient evaluation Cognitive bias due to altered thought process of healthcare workers during a pandemic
Italy ^c	Delayed presentations of - Leukaemia in 2 children – one died - Pyelonephritis and sepsis in a young child - Hypovolemic shock due to persistent vomiting in a neonate - Hypoglycaemia due to persistent vomiting for 2 days - Wilms tumour treated as functional constipation for 7 days - 2 children with cerebral palsy who died due to unidentified causes - 1 child with chronic renal failure and dialysis had symptoms for 3 days before seeking help and died subsequently	Fear of contracting COVID-19 Unavailable healthcare provider Barriers in seeking healthcare
Singapore	Delayed presentation of - Child with appendicitis and resultant perforation - 2 children with limb fractures, one presenting after 3 weeks	Parental anxiety around high risk of acquiring COVID-19 in hospital Assumption that access is limited

^a Snapiri O, Rosenberg Danziger C, Krause I, et al. Delayed diagnosis of paediatric appendicitis during the COVID-19 pandemic. *Acta Paediatr* 2020;109:1672-6.

^b Cherubini V, Gohil A, Addala A, et al. Unintended Consequences of COVID-19: Remember General Pediatrics. *J Pediatr* 2020;223:197-8.

^c 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-e1.

from one or more of the above-mentioned factors. Addressing these causes will require coordinated care across multiple levels of society.

We propose several mitigating measures at the parental, healthcare provider and healthcare administrative levels.

Modifying parental healthcare-seeking attitude. Mass communication campaigns, led by the government and healthcare institutions (HCIs) to address parental beliefs and misconceptions on the risk of acquiring COVID-19, may optimise healthcare-seeking behaviour. Raising awareness on availing essential paediatric care would be important. Empowerment of caregivers to manage common childhood ailments should be balanced by education on paediatric “red flag” signs, prompting them to access healthcare. Information on how to access medical care (e.g. facilities that are open for children and their timings) should be made available in the public domain. Dedicated hotlines managed by trained staff can also provide triage services, advice and anticipatory guidance to caregivers.

Guidance to healthcare professionals. Healthcare professionals (HCPs) may face challenges attending to a paediatric patient in the face of protecting the child,

family and the society as a whole from COVID-19 infection. Pandemic regulations and policies may prevent certain individualised diagnostic and therapeutic options that were otherwise feasible in non-pandemic times. Primary care providers may benefit from guidance on provision of alternative interventions to alleviate some of the constraints. Training on the use and limitations of teleconsultations should be provided.

The following ethical principles and values can help HCPs decide on alternative models of care. Appropriate triage and distancing measures at a medical facility may allow caring for an individual while safeguarding public health. By the principle of equity, each child should get the chance to attain an optimum outcome irrespective of COVID-19 status.¹¹ Best interests of a child should be facilitated using a relevant clinical care pathway to decide on the priority of medical care. The risk of harm to the patient from potential exposure during commute or in the hospital should be proportionately less than that due to delayed delivery of medical care. Conversely, providing telemedicine-based consultations and/or home delivery of medication can mitigate the risks of acquiring COVID-19 in “low priority” patients and their accompanying elderly

caregivers. HCPs should remain accountable to the patient by ensuring handover of care should he/she become unavailable during the pandemic. It is acceptable that at a crisis level, only the “highest priority” patients will continue to get ambulatory care. HCPs and HCIs should be able to adapt quickly to maximise resources for patients with or without COVID-19 who need urgent healthcare services.⁸

Optimising healthcare administrative policies.

Unique considerations in children need to be factored in as part of health administrative planning to minimise harm to children unaffected by COVID-19. In Singapore, upholding childhood immunisation as an essential service is a good example. Regular audits and reviews of resource allocations, manpower and service utilisations would help in fine-tuning policies and outbreak response.

Awareness, parental education, collaboration and coordinated measures will be important for continued delivery of healthcare to children who do not have COVID-19 during the pandemic. Paediatric HCPs should increase efforts to continue caring for every child through the safest possible way, remain accessible to their patients, and advocate for their needs, even in the midst of this pandemic.

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