

**COMMENTARY**

Early advice on managing children with cancer during the COVID-19 pandemic and a call for sharing experiences

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We are living very difficult times. The pandemic caused by SARS-CoV-2 (COVID-19) is rapidly affecting the delivery of care for children with cancer around the world. We have written this commentary to facilitate the dissemination of helpful information and useful links, and to place in perspective what we do and do not know about the COVID-19 pandemic and its impact in the practice of paediatric oncology.

Generally speaking, the impact that this virus may have on the paediatric population, and the management of children with cancer, remains unclear and poorly documented. The next two sections outline what has been published or communicated via academic websites, both in children and adults with cancer.

1 | COVID-19 IN THE PAEDIATRIC POPULATION

So far, very few reports describe the impact of COVID-19 in the paediatric population. Dong et al described the epidemiology of the infection in 2143 suspected or confirmed cases in Chinese children aged up to 18 (median age 7 years).¹ In this publication, only 4.4% of children were asymptomatic, while the majority (89.7%) presented with mild or moderate symptoms. Children under 1 year of age were more likely to develop severe or critical forms (10.1%). One child died from the infection. This report does not mention any relationship

with underlying conditions, including cancer. A recent systematic literature review suggests that children account for < 5% of diagnosed COVID-19 cases, and that they often have milder disease than adults.²

Only one report has described the clinical course of COVID-19 in children with cancer. Chen et al described the case of a child with high-risk acute lymphoblastic leukaemia on maintenance chemotherapy who developed a neutropenic fever and cough in late January 2020, 8 days following a course of moderate-dose cyclophosphamide and cytarabine.³ Chest CT showed bilateral pneumonia with mild pleural effusion. The patient tested positive for Influenza A and was treated with broad-spectrum antibiotics and oseltamvir, without any evidence of improvement. The child remained febrile and a repeat chest CT scan 11 days after symptom onset showed progressive changes. At that time, 2019-nCoV was suspected and testing proved positive. The child was isolated and treated with umifenovir, ribavirin and recombinant interferon α -1b nebulized inhalations, in addition to methylprednisolone and immunoglobulins. Seven days later, the child's blood count had recovered and the 2019-nCoV test result became negative, however, his overall condition deteriorated. Four days later, the 2019-nCoV test was positive again and he required transfer to the intensive care unit for increasing hypoxia. The report did not further document this case.

To this date, there are few published reports of COVID-19 in children with malignancies, though this situation will no doubt change

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rapidly. A description of the Italian experience at a major childhood cancer centre in Lombardy has recently been accepted for publication.⁴ This documents five positive cases in patients with childhood cancer, all of whom had a mild course and survived. Three patients were managed at home, and two in hospital.

We would like to highlight the need to create a system for open case reporting and registration to help advance our knowledge on the disease course in children with cancer and to share experiences in its management. SIOP, St Jude and other stakeholders are working on a multi-stakeholder initiative for the creation of a COVID-19 information resource centre that is planned to include an open registry and a platform for experience sharing.

2 | COVID-19 IN ADULT PATIENTS WITH CANCER

So far, we have had a limited number of reports of COVID-19 cases in adult patients with cancer. Liang et al reported 18 patients in a cohort of 1590 Chinese cases.⁵ Only four of these patients had received chemotherapy or had had a surgical intervention in the preceding month; 12 patients were on follow-up. The report found that compared to the general population, patients with cancer were prone to more severe events (defined as admission to the intensive care unit requiring invasive ventilation or death). However, other factors such as age and current or former smoking habits may also explain this difference.

3 | RECOMMENDATIONS FOR THE PREVENTION OR MANAGEMENT OF COVID-19 IN THE PAEDIATRIC ONCOLOGY POPULATION

So far, no detailed recommendations have been issued regarding the management of children with cancer during this pandemic.⁶ However, some principles are paramount and should be considered for all children with cancer:

- Apply physical isolation for all children with cancer who are currently undergoing treatment. This includes confinement at home between treatments and single-room admission during hospital stay where possible. Outpatient visits should be limited and other means of communication (phone, digital and video communication) should be prioritized.
- Screen patients who present symptoms suggestive of the infection. This screening must be done regardless of the structure—paediatric, general hospitals or oncology centres.
- Limit access to paediatric wards and clinic spaces to one parent only. In these areas, promote, respect and enforce social distancing rules; at least 6 ft. between individuals, and no grouping.
- Where feasible, create a COVID-19 free site for delivery of scheduled cancer care that can only be done in the hospital setting

and which cannot be unduly delayed without compromising the expected cancer outcome. Control who has access to this location.

- Transfer as many aspects of case management as feasible to remote monitoring in the home or in the child's community.
- Generally speaking, follow basic principles of infection control in order to avoid any risk of cross-contamination.
- The use of appropriate personal protection equipment (PPE) by health care personnel is essential for safe care of patients in paediatric oncology units and to reduce risks of transmission. Use of PPE by patients, family members and hospital staff in general is still a matter of debate. Efforts should be made to identify the optimal use of PPE equipment in case of shortage.

As far as the general management of patients is concerned, there is no reason to discontinue daily activities in paediatric haematology/oncology units or to turn away children with suspected cancer during this pandemic. Whether patients undergoing treatment should have their treatment altered remains unknown though it seems prudent to postpone high-intensity treatments where feasible and to prepare to triage according to prognosis. Based on their experience, Chen et al recommend avoiding intensive chemotherapy for children with leukaemia in remission.³ However, the rarity of cases reported precludes the development of clear chemotherapy guidelines. As more information is available, it may be pertinent to create an international task force to provide evidence-based consensus recommendations.

Services should also anticipate staff shortages due to illness, the need to care for sick relatives or requirements to self-isolate if living with or in close contact with a person suspected of having COVID-19. Experience from other sudden catastrophes, such as the 2011 earthquake in Christchurch, New Zealand, have emphasised the need to move rapidly to 'short staff' rotas that are already deployed for work over extended holiday periods.^{7,8} This can help continuity of care and conserve staff morale through reasonable scheduled 'down time'. Staff also need to be cared for in other ways, with good information and protocols, confidence in their PPE and regular communications with a dedicated COVID-19 response team in their hospital. Clear information for parents and families is also essential and several sources are already available (Table 1).

Several governments and international agencies have provided information and/or recommendations regarding COVID-19 (Table 1). Due to the large amount of misinformation and potentially harmful advice available on the Internet, we strongly recommend to consult guidance from established health authorities. We will be publishing further guidance in the coming weeks, describing clinical consensus on acceptable adaptations to treatment protocols during the COVID-19 crisis. These guidelines will be stratified according to country resource levels.

Finally, our ability to continue our work is closely interdependent with our respective health care systems' ability to respond to this pandemic.⁹ The recent stark warning from physicians in Bergamo, Italy, emphasises the need for the whole of society to be prepared.¹⁰ Urging the people close to each of us to do their part to limit the virus'

TABLE 1 Summary of weblinks (URLs) for recommendation of paediatric and oncology agencies regarding COVID-19

World Health Organization (WHO)	Global pandemic information updated daily; advice for public and technical guidance for health care services	https://www.who.int/emergencies/diseases/novel-coronavirus-2019
USA Centers for Disease Control	Resources for individuals, the community and healthcare professionals	https://www.cdc.gov/coronavirus
World Society for Pediatric Infectious Diseases (WSPID)	Website with links for clinical guidance and international resources	https://wspid.org/covid-19/
Pan American Health Organization (PAHO)	Coronavirus disease (COVID-19); excellent clinical guidance and resources in English and Spanish	https://www.paho.org/en/topics/coronavirus-infections/coronavirus-disease-covid-19
American Society of Clinical Oncology (ASCO)	ASCO Coronavirus Resources for patient care and clinical practice	https://www.asco.org/asco-coronavirus-information
Children's Oncology Group (COG)	Advice for parents in multiple languages	www.childrensoncologygroup.org www.survivorshipguidelines.org
Children's Cancer and Leukaemia Group (CCLG)	Guidance for families, children and young people undergoing cancer treatment	https://www.cclg.org.uk/news
St Jude Cure4Kids	Online St Jude COVID-19 Resource Center	https://www.cure4kids.org/ums/home/ https://www.cure4kids.org/ums/home/groups/detail/documents.php?groups_id=338 (login required)
UK Royal College of Paediatrics and Child Health	COVID-19 Guidance for Paediatric Services	https://www.rcpch.ac.uk/resources/covid-19-guidance-paediatric-services
National University of Singapore	Evidence-based report of COVID-19 science, diagnostics and clinical management	https://sph.nus.edu.sg/covid-19/ (freely available download)
European Society of Paediatric and Neonatal Intensive Care	Statement and practical experience from frontline colleagues in Lombardy region, Italy	https://espn-online.org/News/Latest-News/Practical-advice-from-the-frontline-of-SARS-CoV-2-outbreak
US Oncology Nursing Society	Information for nurses regarding COVID-19 including interim guidelines for PPE use during pandemic – updated daily	https://www.ons.org/coronavirus?utm_source=hl&utm_medium=email&utm_campaign=weeklyupdate_member_corona
US Centers for Disease Control	Managing anxiety and stress related to COVID-19 (in English and Spanish)	https://www.cdc.gov/coronavirus/2019-ncov/prepare/managing-stress-anxiety.html
US American Psychological Association	Guidance for psychologists, practitioners and health professionals and links to resources including resources for parents and caregivers	https://www.apa.org/practice/programs/dmhi/research-information/pandemics
Italy – University of Verona HEMOT Helmet for EMOTions	'Coronavirus: Psychological tips for children and adolescents' emotions' (PDF) in 17 languages	https://www.hemot.eu/2020/02/28/public-health-emergency/#English
COVID-19 Chinese Consultation Center	Resource sharing, online handbook of COVID-19 prevention and treatment, and medical expert communication centre	https://covid-19.alibabacloud.com/
Union for International Cancer Control	Information for adult cancer patients and survivors with links to online resources in English, French and Spanish	https://www.uicc.org/news/cancer-and-coronavirus-coping-double-challenge?

spread – through self-isolation, social distancing and avoiding all non-essential travel – is crucial, as is the coming together of communities to help equip and protect the most vulnerable (including the elderly, homeless or those with underlying health conditions) through the coming months.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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REFERENCES

- Dong Y, Mo X, Hu Y, et al. Epidemiological characteristics of 2143 pediatric patients with 2019 coronavirus disease in China. *Pediatrics*. 2020. <https://doi.org/10.1542/peds.2020-0702>.
- Ludvigsson JF. Systematic review of COVID-19 in children shows milder cases and a better prognosis than adults. *Acta Paediatr*. 2020. <https://doi.org/10.1111/apa.15270>.
- Chen Z, Xiong H, Li JX, et al. COVID-19 with post-chemotherapy agranulocytosis in childhood acute leukemia: a case report.

- Zhonghua xue ye xue za zhi = Zhonghua xueyexue zazhi*. 2020;41:E004. <https://doi.org/10.3760/cma.j.issn.0253-2727.2020.0004>.
4. Balduzzi A, Brivio E, Rovelli A, et al. Lessons after the early management of the COVID-19 outbreak in a paediatric transplant and haemato-oncology centre embedded within a COVID-19 dedicated hospital in Lombardia, Italy. *Bone Marrow Transplant*. 2020. In press.
 5. Liang W, Guan W, Chen R, et al. Cancer patients in SARS-CoV-2 infection: a nationwide analysis in China. *Lancet*. 2020;21(3):335-337.
 6. Yang C, Li C, Wang S, National Clinical Research Center for Child H, Disorders, Children's Oncology Committee of Chinese Research Hospital A. Clinical strategies for treating pediatric cancer during the outbreak of 2019 novel coronavirus infection. *Pediatric Blood Cancer*. 2020;67(5):e28248.
 7. Bond C. Paediatric Oncology care and earthquakes—what's the fallout? 43rd Congress of the International Society of Paediatric Oncology (SIOP). *Pediatric Blood Cancer*. 2011;57(5):715.
 8. Man RX, Lack DA, Wyatt CE, Murray V. The effect of natural disasters on cancer care: a systematic review. *Lancet*. 2018;19(9):e482-e499.
 9. Emanuel E, Persad G, Upshur R, et al. Fair Allocation of Scarce Medical Resources in the Time of Covid-19. *N Engl J Med*. 2020. <https://doi.org/10.1056/NEJMsb2005114>.
 10. Nacoti M, Ciocca A, Giupponi A, et al. At the centre of the COVID-19 pandemic and humanitarian crises in Italy: changing perspectives on preparation and mitigation. *NEJM Catalyst*. 2020. <https://catalyst.nejm.org/doi/full/10.1056/CAT.20.0080>.

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