

What should be done to protect children from COVID-19 in the UK?

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THE START OF THE PANDEMIC

When COVID-19 reached the UK in early 2020, the emphasis was, appropriately, on caring for adults. From spring to autumn 2020, COVID-19 had minimal direct impact on children, with few severe cases or deaths.¹ School closures and other restrictions meant children were mixing much less than usual, and when schools reopened they were protected by bubbles and, at times, masks. This also meant that children suffered fewer severe respiratory illnesses than in a 'normal' year.² However, children's health was affected in other ways: many elective National Health Service (NHS) treatments were suspended, space was taken in several UK paediatric intensive care units (PICUs) by adult patients, and unmet need grew for diagnosis and treatment of physical and mental health problems and for child protection. So there were a range of risks to children, but what about direct risks from COVID-19?

Serious illness requiring intensive care is relatively rare in childhood. Across the four nations of the UK, 26 PICUs are commissioned, but in 2020 a single PICU was unlikely to admit more than a few children with severe COVID-19. However, among them there were some with a pandemic-related paediatric phenotype, the paediatric multisystem inflammatory syndrome temporally associated with SARS-CoV-2 (PIMS-TS; affecting the kidneys, heart, lungs and brain).³ The existence of an excellent national audit, collecting data from PICUs, allowed it to be characterised, while further insights came from enrolment of children in large national studies, such as the International Severe Acute Respiratory and emerging Infection Consortium (ISARIC) study and Randomised Evaluation of COVID-19 Therapy (RECOVERY) trials.

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FROM ALPHA TO DELTA

Fortunately, the initial policy responses were effective and paediatric cases fell, but by autumn 2020 a new Alpha variant had emerged, spreading rapidly once schools returned. Over 3 winter months (see [figure 1](#)) NHS England recorded 2603 hospital paediatric admissions, the national audit recorded 348 PICU admissions (COVID-19 infection and PIMS-TS), and the Office for National Statistics (ONS) recorded 5 deaths caused by COVID-19 in children aged under 15 years old, and 14 deaths in children aged 15–19 years old. Underlying health conditions emerged as risk factors for adverse outcomes, especially deaths.¹ Following a calmer period in spring 2021, during which schools resumed and the adult vaccination programme progressed, 'Freedom Day' in England on 19 July removed most remaining mitigations, including in schools. The new and more contagious Delta variant spread rapidly in all confined spaces, including schools, and although very few infected children were seriously ill, high rates of COVID-19 infection meant that the absolute numbers rose steeply.

There was, however, some good news. The UK medicines regulator, the Medicines and Healthcare products Regulatory Agency (MHRA), approved the Pfizer/BioNTech vaccine for use in children aged 12–15 years on 4 June 2021, and the reduced (1/3) dose Pfizer/BioNTech vaccine for use in children aged 5–11 years on 22 December 2021. However, in contrast to equivalent bodies elsewhere, the Joint Committee on Vaccination and Immunisation (JCVI) did not follow regulatory approval of these vaccines with their own prompt approval for use in healthy children. The JCVI minutes (19 August 2021) indicate that only a threshold for PICU admission 'greater than 100 per million', which was the risk faced by children with underlying health conditions and similar to the 'adult at risk definition', justified offering vaccination. Approvals were therefore granted only for children with underlying health conditions or living with a vulnerable family member. The JCVI were concerned about rare cases of post-vaccine myocarditis, which despite having a mild clinical course, carries the potential for longer-term risks.⁴ Yet the US Centers for Disease Control and Prevention found the risk of myocardial injury from COVID-19 greatly exceeded the risk from vaccination in children aged 12–15 years old,⁵ with an even better safety profile for the vaccine approved for use in 5–11 year olds, for whom the risk of myocarditis is ~1 per million.⁶ In the European Union, Israel and North America children aged 12–15 years received

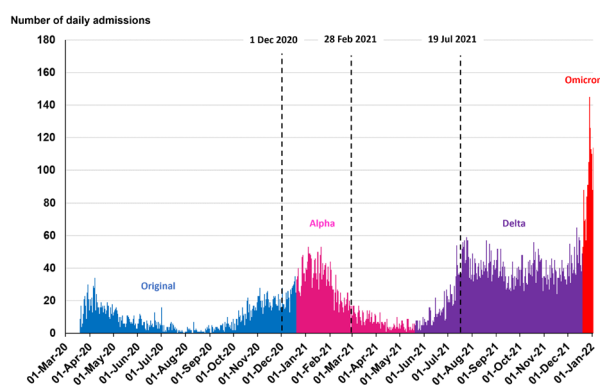


Figure 1 The figure depicts 13 922 hospital admissions recorded by NHS England among children who tested positive for COVID-19 between March 2020 and end of December 2021 (<https://coronavirus.data.gov.uk/details/download>). The eras have been colour-coded based on the prevailing variant types (Original, Alpha, Delta and Omicron). We have marked the dates (3 winter months from December 2020 to end of February 2021, and the period from 19 July 2021 to the end of the year) between which we present the number of PICU admissions recorded in the COVID-19 Custom Audit (<https://www.picanet.org.uk/COVID-19/>) and deaths in children and young people where the certificate of death indicated that COVID-19 was causal (<https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/datasets/weekly-provisional-figures-on-deaths-registered-in-england-and-wales>). NHS, National Health Service. These data were checked on 14th January 2022, and source data may be affected by subsequent updates.

vaccination from Summer 2021, adding younger children in late 2021. In the UK, vaccination was approved for healthy children aged 12–15 years old on 13 September 2021 and for children aged 5–11 years old on 18 February 2022. Unfortunately, there have been reported delays in accessing vaccination among vulnerable groups, and the message, that any benefits of vaccination in healthy children ‘are marginal’, may have left parents confused about the reasons to vaccinate their children.

Faced with the combination of more transmissible variants, low levels of vaccine-induced immunity and removal of many mitigations, between 19 July and the end of 2021 (see [figure 1](#)), NHS England recorded 7249 hospital admissions for children, the national audit recorded 541 PICU admissions (COVID-19 infection and PIMS-TS), and the ONS recorded 27 deaths caused by COVID-19 in children under 15 years old and 19 deaths in children aged 15–19 years old.

SPRING 2022

From the beginning of 2022, with the arrival of the even more transmissible Omicron variants BA.1 and BA.2, case numbers and hospitalisations increased, but we do not have a full understanding of the severity of illness of the children hospitalised. On a positive note, there has been some progress with vaccination: on 20 March 2022, the NHS England COVID-19 Vaccination Statistics reported that 61.7% of children aged 12–15 years and 75.6% of those aged 16–17 years had received their first dose, and 33.2% of children aged 12–15 years and 57% of those aged 16–17 years had received their second dose. Conversely, as of 29th March 2022, the vaccine roll-out for healthy children aged 5–11 years old had yet to commence. To explore the impact of these developments, it will be important to analyse children’s hospital admissions, PICU admissions, and deaths related to COVID-19 in 2022.

ARGUMENTS TO PROTECT

Children are not expected to die nor become critically ill. These are extremely traumatic events for any family, and even with low numbers, each is important to those who are closest. Over and above severe COVID-19 outcomes, there are longer-term clinical concerns, including ‘long COVID-19’, emerging evidence of a possible association with new-onset diabetes² and the implications of neurological manifestations of COVID-19.³ Some have questioned the significance of COVID-19-related hospitalisation in children, arguing that many

hospitalisations are ‘incidental admissions’, when an unrelated condition leads to admission but there is ‘co-incidental’ infection from high community transmission. The ISARIC study found that only 20.6% of child hospitalisations for COVID-19 from the initial and Alpha waves were incidental,⁷ indicating that the vast majority were caused by COVID-19.

Then there is the question of whether vaccination should be limited to children with underlying health conditions or who are in other ways disadvantaged. Prospective studies, including ISARIC, challenge this, as 58% of hospital admissions and 32% of PICU admissions were in otherwise healthy children.⁷ A national study of PIMS-TS found 81% had no underlying health conditions. However 57.5% were of non-white ethnicity³ and just under half of children in ISARIC were of white ethnicity,⁷ a matter of particular concern, as deprived children from Black and South Asian minority groups are more likely to live in families affected by COVID-19 infections, hospitalisations and deaths, to have unvaccinated parents, and to attend less well-resourced schools. Taken together, this evidence makes a compelling case for measures that offer vaccination to all children, but with major efforts to ensure that they reach communities at greatest risk. Unlike adults, children do not choose to remain unprotected by vaccination. We argue that children in age groups for whom effective vaccinations exist (currently over the age of 5 years) should be enabled to receive them promptly. When considering vaccination, children and their families should be counselled about severe COVID-19 outcomes.

Given the high transmissibility of COVID-19, especially the Omicron BA.1 and BA.2 variants of 2022, combined with the risk to although a minority of children, we argue that policies to protect children should go beyond vaccination. We advocate for a major effort towards improving safety in schools, with investment in clean air, using enhanced ventilation by opening windows (where the climate permits) and filters as the main approach. These have been shown to reduce transmission markedly. Masks, which are also effective, can be used as a last resort at times of very high community transmission. Also, from a perspective of protecting children, we argue that societal interventions to reduce community transmission, by protecting children’s caregivers from severe disease, offer direct benefits to children, since children are an integral part of our society. To illustrate this point, the Imperial College London COVID-19 Orphanhood

calculator on 24 February 2022, indicated that in the UK 11 900 children have been orphaned and 14 400 children have lost either a primary or a secondary caregiver to COVID-19. We argue that children’s futures are best protected by safeguarding not only themselves, but also those they most depend upon.

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REFERENCES

- Swann OV, Holden KA, Turtle L, *et al*. Clinical characteristics of children and young people admitted to hospital with covid-19 in United Kingdom: prospective multicentre observational cohort study. *BMJ* 2020;370:m3249.
- Kanthimathinathan HK, Buckley H, Davis PJ, *et al*. In the eye of the storm: impact of COVID-19 pandemic on admission patterns to paediatric intensive care units in the UK and Eire. *Crit Care* 2021;25:399.
- Flood J, Shingleton J, Bennett E, *et al*. Paediatric multisystem inflammatory syndrome temporally associated with SARS-CoV-2 (PIMS-TS): prospective, National surveillance, United Kingdom and Ireland, 2020. *Lancet Reg Health Eur* 2021;3:100075.
- Truong DT, Dionne A, Muniz JC, *et al*. Clinically suspected myocarditis temporally related to COVID-19 vaccination in adolescents and young adults: suspected myocarditis after COVID-19 vaccination. *Circulation* 2022;145:345–56.
- Gargano JW, Wallace M, Hadler SC, *et al*. Use of mRNA COVID-19 Vaccine After Reports of Myocarditis Among Vaccine Recipients: Update from the Advisory Committee on Immunization Practices - United States, June 2021. *MMWR Morb Mortal Wkly Rep* 2021;70:977–82.
- Hause AM, Baggs J, Marquez P, *et al*. COVID-19 Vaccine Safety in Children Aged 5-11 Years - United States, November 3-December 19, 2021. *MMWR Morb Mortal Wkly Rep* 2021;70:1755–60.
- Swann OV, Pollock L, Holden KA, *et al*. Comparison of children and young people admitted with SARS-CoV-2 across the UK in the first and second pandemic waves: prospective multi centre observational study. *medRxiv* 2021.