

# Legacy of COVID-19 infection in children: long-COVID will have a lifelong health/economic impact

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## INTRODUCTION

Studies have repeatedly shown that children less frequently and less severely manifest acute COVID-19 infection<sup>1</sup> However, as with the whole of the world population, children have been subjected to the direct and indirect effects of lockdowns, restricted education and social interactions, with potential lifelong impacts on mental and physical health.<sup>2</sup>

## LONG-COVID

It has become apparent from follow-up of adults who had been hospitalised with the infection that lingering, and sometimes debilitating symptoms and signs, are relatively common.<sup>3</sup> Even those with milder infections have reported persistent problems often known as long-COVID. Studies of this ill-defined syndrome in adults have begun to characterise constellations of symptoms and signs. While some are clearly directly due to organ damage during the acute phase of the illness (persistent lung function deficits; cardiovascular, renal and neurological problems), others are less easily attributed, including fatigue, poor concentration, shooting pains and impaired quality of life seen more frequently in women rather than men.<sup>4</sup> A *Lancet* editorial, 'Facing up to long COVID', highlighted the increasing number of people suffering prolonged symptoms after recovery from the acute phase of COVID-19 infection. The editorial asks for research to elaborate on the risk factors, clinical features, diagnosis, management and outcomes.<sup>5</sup> A similar

editorial, 'Meeting the challenge of long COVID', has appeared in *Nature Medicine*.<sup>6</sup> Sadly, neither editorial appeared to recognise that children and young people are also adversely affected. With increasing demand on health services, the UK National Institute for Clinical Excellence has published guidelines on management.<sup>7</sup> The guidelines inappropriately categorise children with the elderly both in rudimentary suggestions for organisation of services and requirements for research.

There were anecdotal reports of long-COVID in children, but it was left to the media to highlight the issue (see *Mirror* 1 November 2020—Children hit by long-COVID too—despite claims they are more likely to get hit by a bus.) The office for National Statistics in the UK reported that the highest prevalence of long-COVID after 12 weeks was in those aged 25–34 years (18.2%) and lowest in the 2–11 years age band (7.4%).<sup>8</sup> This is in accord with the most recent study from Australia, which followed 151 children (median age 3 years) for 3–6 months who predominantly had mild or asymptomatic infection followed in only 8% with ongoing symptoms.<sup>9</sup> However, evidence from other small long-term outcome studies in children suggests that more than a half having at least one persisting symptom 4 months after COVID-19.<sup>10</sup> Our experience is that preschool children rarely have long-COVID symptoms but those in the 6–18 age groups are significantly more frequently affected.

One of us (FS) has personal experience of long-COVID both in herself and her children. Her feelings are encompassed in the following statement: 'The issue of not being believed is a common one, and the fear of being considered over-anxious and/or Munchausen's by proxy is very difficult. There has been a real resistance to exploring the situation around children, and the narrative that most children are fine and unaffected has been unchallenged. This leaves parents of children with ongoing symptoms in a very difficult position, in terms of being

supported by healthcare practitioners and believed by schools etc. Feels like a vicious circle—without evidence nobody will research it but without research there is no data!' She is the co-founder of Long-COVID Kids which was started 3 months ago and now has 2200 parent members. Many are keen to talk about their children. The website has some of the stories and photos [www.longcovidkids](http://www.longcovidkids). FS has also published a *BMJ* blog (<https://blogs.bmj.com/bmj/2020/10/16/counting-long-covid-in-children/>) and a *BMJ* letter highlighting the lack of focus on children.<sup>11</sup> Listening to the commentaries of three mothers of children with long-COVID during the 14th session of the All Party Parliamentary Group on Coronavirus should be a salutary experience for all paediatricians (<https://www.youtube.com/watch?v=V-oUTIkT3tw&feature=youtu.be>).

The comments from parents have included descriptions of very alarming neuropsychiatric sequelae. Reports are now appearing on this topic though focused on adults.<sup>12–13</sup> The increasing number of reports of a high frequency of tics and Tourette syndrome in children has been hypothesised as being functional though an accompanying editorial has challenged this.<sup>14–15</sup> Reports from members of the Long-COVID Kids group suggest that tics and other Tourette-like symptoms are a common feature of COVID-19 infection sequelae. The features are very similar to the condition known as paediatric autoimmune neuropsychiatric disorders associated with streptococcal infection.<sup>15</sup>

## CONCLUSIONS

There is an urgent need to study the impacts of the pandemic on all children as well as those who have had acute infection followed by long-COVID. Such research will help to elaborate on clinical features, mechanisms and strategies to mitigate adverse outcomes. The direct effects must be distinguished from those induced by lockdowns, school closures, parental loss of income, quarantine and other illnesses. This will provide the evidence to influence government action and design of appropriate service provision to protect children and young people from the potentially lifelong adverse effects of the pandemic. Thankfully, a large UK investigation of 3000 infected and 3000 uninfected children has now been funded, 'The CLoCK Study'. The next step will be trials of interventions to mitigate the potentially lifelong adverse effects of this devastating pandemic.

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