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In-person schooling is essential even during periods of high transmission of COVID-19

Alasdair Munro [1,2] Danilo Buonsenso,[3,4] Sebastián González-Dambrauskas [5,6] Robert C Hughes [7] Sunil S Bhopal,[7,8] Pablo Vásquez-Hoyos [9,10,11] Muge Cevik,[12] Maria Lucia Mesa Rubio,[13,14] Damian Roland [15,16]

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For numbered affiliations see end of article.

Correspondence to:
Dr Alasdair Munro, NIHR Clinical Research Facility and Biomedical Research Centre, University Hospital Southampton NHS Foundation Trust, Southampton, SO16 6YD, UK; A.Munro@soton.ac.uk

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During the early phase of the pandemic, school closures were one of the non-pharmaceutical interventions (NPIs) implemented globally to reduce transmission. Given that SARS-CoV-2 will continue to circulate for years to come, school closures may be debated again. As familiar respiratory viruses have returned, their combined pressure alongside COVID-19 caused renewed discussion of closures in the UK and initiation of remote learning in areas of the USA in the winter of 2022.[1 2] This suggests that debates around school closures will continue into the future.

According to the Oxford COVID-19 policy tracker,[3] school closures around the world were rapid and nearly uniform in March 2020. In contrast, the reopening process was much more variable, with different countries using different metrics and criteria to reopen. According to our analysis, the variability in duration of school closures between January 2020 and December 2021 was extreme. A handful of countries had zero days (including Burundi, Tajikistan and Turkmenistan), while Brazil, Panama, Peru and Ukraine required some level of closure for a total of 660 days, and Saudi Arabia for 663 days (figures 1 and 2). These differences highlight the lack of consensus about the efficacy of school closures on reducing COVID-19 deaths.

At the start of the pandemic, the justifications of closing schools included a combination of 'first principles' (anything reducing social contact is valuable) and drawing on previous evidence based on influenza outbreaks.[4] Such interventions have their origins in complex historical precedent, social and medical circumstances. During the 1918 influenza pandemic, school closures were implemented and heavily debated, with experts arguing that harms of closing schools including negative impact on their development with little effect on influenza transmission.[5] Underlying assumptions driving these decisions include[1] children having a larger number of contacts on average than most adults, some school buildings containing poorly ventilated, small rooms which would be considered high-risk environments for transmission and[2] the principle of protecting families (alongside concerns about potential increased risk to educational staff).

Given the emergence of the significant economic, social and health cumulative burden related to prolonged school closures, the argument to further deploy them is weak. Based on current evidence, we argue the harm of closing schools now clearly outweighs the benefits of reducing transmission.

Closing schools limits educational attainment and has other consequences for health

The World Bank estimated that school closures affected 1.6 billion children at the end of 2021, plunging up to 70% of the world's children into learning poverty, defined as being unable to read and understand a simple text by age 10 years.[6] In the UK, school closures have resulted in an estimated £350 billion in lifetime earnings loss for the current generation of children.[7] The World Bank estimate worldwide learning losses with a present value of US$17 trillion.[6]

Educational attainment was heavily impacted, especially among those already disadvantaged such as those with special educational needs and those from lower socioeconomic backgrounds.[8 9] In Uganda, the proportion of primary 3 pupils unable to recognise letters of the alphabet has doubled.[10] In South Africa, grade 4 students lost between 62% and 81% of a year of learning when measured in terms of reading outcomes.[11] A differences-in-differences estimate contrasting to the year prior to the pandemic estimates school drop-out rates in Brazil are estimated to be as high as 35%.[12] Even in countries with remote learning, large attainment gaps were observed between in-person and remote schooling. For example, in the USA, passing rates in maths declined by 14.2% on average and this decline was 10.1% smaller for districts that adopted fully in-person schooling.[13] In the Netherlands, the 'gold standard for remote education, a significant attainment gap equivalent to one-fifth of a school year accrued.[14] These findings suggest the negative impact of school closures on attainment is evident in low-income and middle-income countries, and in high-income settings.

In contrast, in Sweden where in-person schooling was prioritised, no drop in educational attainment or widening of inequalities occurred

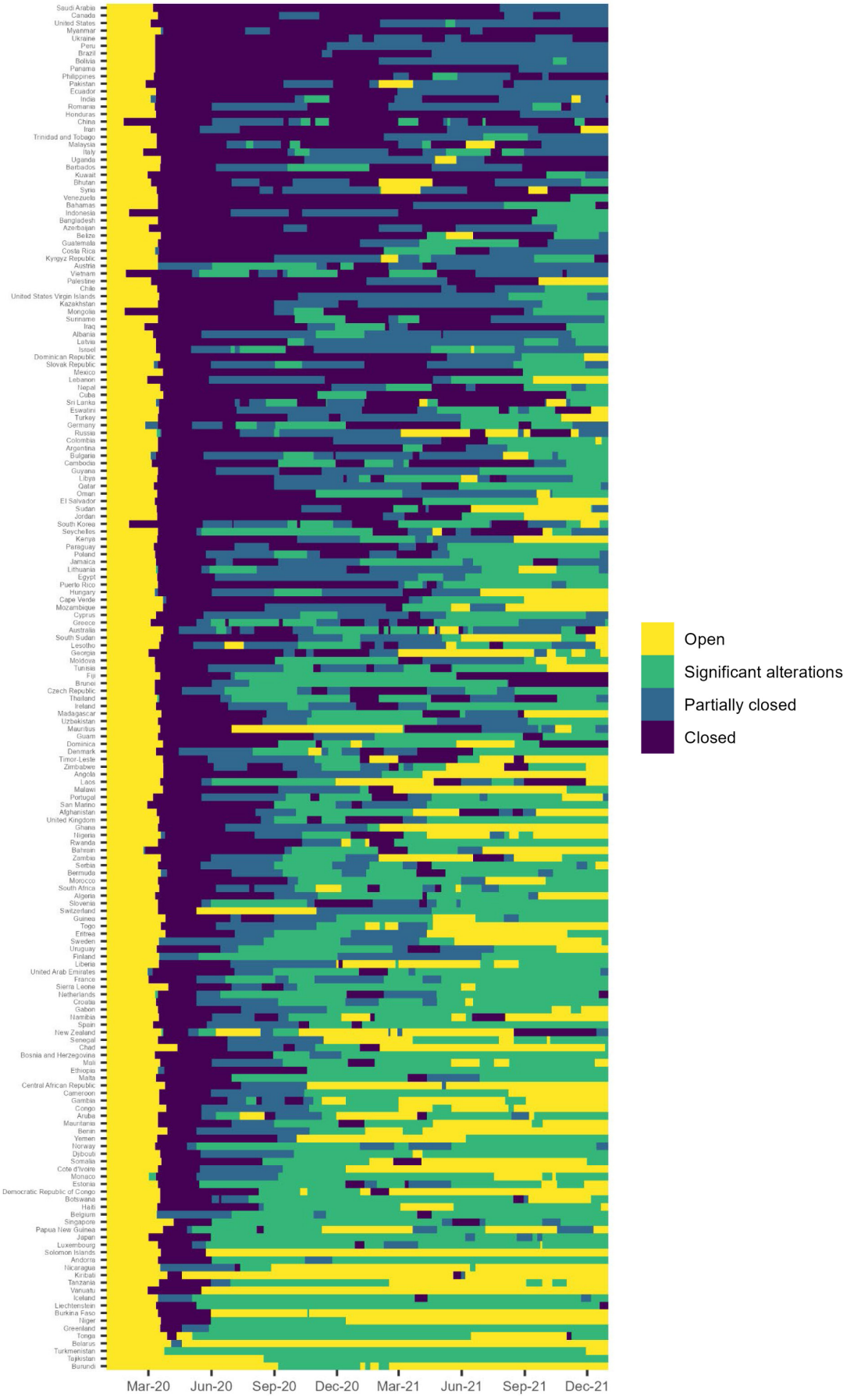

Figure 1 Heatmap of the status of school closures from 1 January 2020 to 31 December 2021.

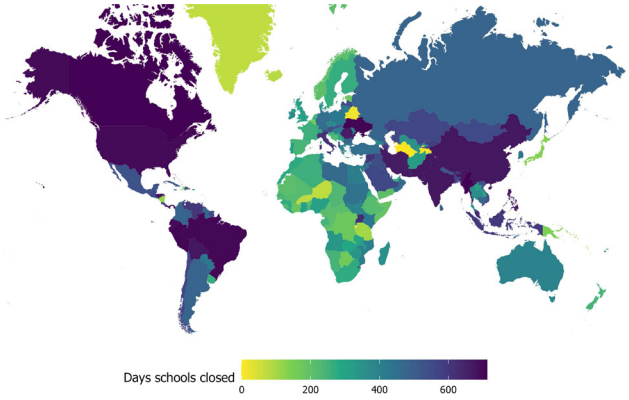

Figure 2 Geographical representation of the number of days of required school closure (Oxford COVID-19 policy tracker score 2 or 3).

during the pandemic.[15] The clinical impact of COVID-19 on children in Sweden and Iceland (where schools also remained open) was in line with other experiences globally.[16] In Iceland, of all 1749 children with SARS-CoV-2 infection from February 2020 to August 2021, none had severe symptoms and 374 (21.5%) were asymptomatic. The source of infection was a household member in 65% of cases and in the country only one probable multisystem inflammatory syndrome in children (MIS-C) case was reported.[16] The impact of COVID-19[17] was in line with other reports from other countries.[18]

Physical and mental health and well-being of children and young people were also impacted by school closures. A recent systematic review including 21 studies from 11 countries covering >96 000 subjects from 3 to 24 years of age found longitudinal deterioration of mental health, with increased depression, anxiety and psychological distress compared with prepandemic.[19] A systematic review of systematic reviews found eight looking at the impact on school closures on mental health of children, all of which reported an associated decline and most notably with symptoms of anxiety.[9] Once more, it also appeared that more vulnerable children were at higher risk, including females, children from lower socioeconomic backgrounds and children with neurodiversity.

School closures also have other long-term consequences for children. As a result of the pandemic, UNICEF reports increased rates of childhood marriage with up to 10 million more girls being at risk of becoming child brides by 2030.[20] UNICEF highlights that school closures lead to girls spending more time at home and unsupervised, increasing their exposure to sexual activity, sexual violence and unwanted pregnancy,[20] exacerbate school drop outs due to financial pressure on households and parents during the pandemic[21] and increase negative effects on nutritional safety among 370 million children not receiving a school meal in 150 countries.[22]

Schools do not inevitably increase COVID-19 transmission

School closures have limited benefits on COVID-19 transmission. A systematic review including 40 studies with lowest risk of bias from 140 countries found little to no impact of school closures on COVID-19 burden.[23] A systematic review of systematic reviews on school closures found six suggesting a reduction of transmission and four which were either uncertain or found no reduction in transmission. The quality of all included studies were low or critically low.[9] In addition, it is difficult to measure the impact of school closures as many studies performed early in the pandemic examine a period when several measures were implemented simultaneously making it almost impossible to identify the impact of single measures[17 24] and studies during the second waves happened in the setting of increased mitigations and staggered implementation of other NPIs.[25]

There may be circumstances when proportionate and effective mitigating measures could be beneficial in school settings following evidence-based interventions that are effective, safe and feasible. For example, identifying least well-ventilated schools and improving building ventilation systems may carry benefits beyond COVID-19 and so be a wise investment for population health in the long term.[26] The use of rapid tests may be a less invasive alternative to quarantining.[27] Face masks have been widely used during the pandemic, especially for older children, although evidence around their effectiveness in community settings such as schools remains uncertain.[9 28]

The overall risk of harm from severe COVID-19 disease is low

Throughout the pandemic, data suggest significantly lower risk of severe outcomes of COVID-19 among children than adults, although the impact of rare severe cases remains relevant.[29] The rate of MIS-C was initially thought to be around 1 in 3000–4000 cases,[30] and current evidence suggests children aged 7 years has the lowest infection fatality rate (0.0023%).[31] While a small number of children suffer prolonged symptoms from postacute COVID-19 syndromes (PACS—also known as 'long COVID') bearing a huge negative impact on quality of life for the child and family, studies comparing adults and children from the same household found that children appear to be at significantly lower risk of PACS.[32] Observational prospective studies with control groups have suggested the incidence of PACS may range from <1% to 2%.[33] Data from the UK indicate that re-infections do not lead to more serious outcomes,[34] and recent studies demonstrate the risk of MIS-C is decreasing, probably due to viral mutations and immunity postinfection and/or vaccination.[35] Vaccines which are safe and effective against severe disease in children with comorbidities are also now available, and increasingly accessible for countries in low-resource settings.

Another key rationale for closing schools was to reduce transmission from school-aged children to vulnerable adults in their households and communities. There are extensive data on this topic. A population-based cohort study examining risk of SARS-CoV-2 infection among 9 334 392 UK adults aged <65 years found that even in the prevaccine era adults living with children during wave 1 and 2 did not have an increased risk of COVID-19 or non-COVID-19 mortality.[36] In Scotland, school teachers had a lower risk of severe COVID-19 than the general population (HR 0.56),[37] and in Sweden the age-adjusted risk of intensive care admission for school teachers was not statistically different to the pooled risk of other occupations (excluding healthcare workers).[38] A study in England and Wales between March and December 2020 found the absolute mortality rates for deaths with COVID-19 were low among those working in schools (from 10 per 100 000 in female primary school teachers to 39 per 100 000 male secondary school teachers) relative to many other occupations (range 9–50 per 100 000 in women; 10–143 per 100 000 in men), although there was weak evidence that secondary school teachers had slightly higher risks.[39] These data highlight low risk of exposure to families and school staff from in-person school, even prior to the availability of vaccines.

Going forward

Independent inquiries about how governments have responded to the pandemic and which lessons can be learnt for future ones are necessary. It is vital that the health and well-being of children and other vulnerable populations are put at the centre of these inquiries, with a specific focus on how and why decisions regarding the closure of schools were made. Norway has been an exemplar in this regard,[40] and after pressure from advocacy groups the UK inquiry will also focus on school closures.[41]

Should schools need to close, closures should be time limited, with clear criteria for reopening. There are many resources and tools to help guide the school reopening process, which include the involvement of children, parents and communities.[42] It is important that lack of resources, unrealistic standards or the ability to institute guidelines and possible mitigation measures does not constitute an excuse for prolonging school closures.

Schools should be prioritised for additional financial and human-resource support, which may include extra funding for fragile families; access to volunteers; social and psychological support for children and their families, investment in air quality and ventilation; support for hybrid learning (eg, computers, internet connection) for extremely high-risk families who may temporarily be unable to attend schools.

Countries should produce guidance specifically dedicated to maintaining the operation of in-person schooling to be ready for use to ensure their safe operation and to minimise closures. Importantly, guidance must be feasible and proportional, with specific focus on resources for children with special educational needs or disabilities, and those from disadvantaged populations, who are both at higher risk of infection and the harms of absenteeism. Guidance should include input of all relevant stakeholders, including children and young people, parents, educators and public health professionals.

The priority is that children should attend school, in person, and guidelines for safe opening should be used to aid, not obstruct, the facilitation of this.

Author affiliations
[1]NIHR Clinical Research Facility and Biomedical Research Centre, University Hospital Southampton NHS Foundation Trust, Southampton, UK
[2]Faculty of Medicine and Institute for Life Sciences, University of Southampton, Southampton, UK
[3]Department of Woman and Child Health and Public Health, Fondazione Policlinico Universitario A. Gemelli IRCCS, Rome, Italy
[4]Center for Global Health Research Studies, Università Cattolica del Sacro Cuore, Rome, Italy
[5]Red Colaborativa Pediátrica de Latinoamérica (LARed Network), Montevideo, Uruguay
[6]Departamento de Pediatría y Unidad de Cuidados Intensivos de Niños del Centro Hospitalario Pereira Rossell, Facultad de Medicina, Universidad de la República, Montevideo, Uruguay
[7]Department of Population Health, London School of Hygiene & Tropical Medicine, London, UK
[8]Population Health Sciences Institute, Newcastle University, Newcastle upon Tyne, UK
[9]Departamento de Pediatria, Sociedad de Cirugía de Bogotá Hospital de San José, Bogota, Colombia
[10]Departamento de Pediatría, Facultad de Medicina, Universidad Nacional de Colombia, Bogota, Colombia
[11]Red Colaborativa Pediátrica de Latinoamérica (LARed Network), Bogota, Colombia
[12]Division of Infection and Global Health Research, School of Medicine, University of St Andrews, Edinburgh, UK
[13]Facultad de Medicina, Universidad de Los Andes, Bogotá, Colombia
[14]Pediatra Social Hospital Universitario Fundación Santa fe de Bogotá, Bogota, Colombia
[15]Paediatric Emergency Medicine Leicester Academic (PEMLA) group, Children's Emergency Department, Leicester Royal Infirmary, Leicester, UK
[16]SAPPHIRE Group, Health Sciences, University of Leicester, Leicester, UK

Twitter Alasdair Munro @apsmunro and Damian Roland @damian_roland

Contributors AM is a senior research fellow in paediatric diseases in the UK and is the corresponding author and guarantor. DB is an academic global health paediatrician from Italy. SG-D is an academic paediatric intensive care physician from Uruguay. RCH is an academic public health physician from the UK whose research is focused on global health and child development. SSB is an academic global health paediatrician from the UK. PV-H is an academic paediatric critical care physician from Colombia. MC is a clinical academic in infectious diseases and medical virology from the UK with an interest in global health. MLMR is an academic paediatrician from Colombia. DR is an academic paediatric emergency physician from the UK. AM, DB, SG-D, PV-H and DR conceived the article. AM, RCH and SSB designed the data analysis. AM collated the data and conducted the analysis. All authors were involved in the interpretation of the analysis. AM and DB drafted the manuscript and all authors were involved in editing and approving the final version.

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ORCID iDs
Alasdair Munro http://orcid.org/0000-0002-4317-0742
Sebastián González-Dambrauskas http://orcid.org/0000-0003-4775-227X
Robert C Hughes http://orcid.org/0000-0002-1345-3063
Pablo Vásquez-Hoyos http://orcid.org/0000-0002-4892-5032
Damian Roland http://orcid.org/0000-0001-9334-5144

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