
ASPHER Technical Report on “Children and COVID: Closing or keep opening the schools: the consequences” April 2021



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BACKGROUND

Due to the alarming worldwide levels of COVID-19 transmission in March of 2020, the WHO characterised this disease as a global pandemic [1]. Given the absence of therapeutics or a vaccine at the pandemic's initial stages, the world has witnessed a global exponential growth transmission phase of the disease, which forced countries to implement various interventions at an unprecedented scale to prevent and control its dissemination. Therefore, governments decided to take aggressive measures by placing cities and nations under complete confinement (implementing physical distancing, banning large gatherings, closing schools, and stopping all but essential travel) to reduce the virus transmission rate and avoid overwhelming healthcare systems [2].

Flaxman et al. [3] identified that lockdown measures might have averted 3.1 million deaths from COVID-19 across 12 European countries and have successfully reduced the R, the transmission rate, to an average of 0.66. On the other hand, emerging clinical evidence and epidemiological data show a low prevalence of COVID-19 in children experiencing asymptomatic to mild forms of the disease, hence not significantly contributing to the virus's spread. In fact, young people under 20 years old are 56% less likely to contract COVID-19, and only 2-4% of deaths could be prevented because of school closures [4].

Even though it is difficult to predict what the future holds, it comes with no doubt that COVID-19 will not be eradicated anytime soon, urging to integrate school opening policies into future public health plans. Therefore, it is vital to address the psycho-social and educational difficulties endured by children as a result of lockdowns to draw lessons for future pandemics and the education professionals. This idea is reinforced by the WHO's Statement on the 28th December 2020¹, noting that other pandemics could emerge in the future, calling for worldwide preparedness for much worse pandemics than COVID-19.

I. SARS-CoV-2 TRANSMISSION

a) Uncertainty of SARS-CoV-2 transmission at the beginning of the pandemic

It is crucial to identify and fully understand SARS-CoV-2 transmission mechanisms to make appropriate decisions regarding the schools' opening or closing. Similarly to other respiratory diseases, like influenza, COVID-19 may be transmitted by contact and droplets. Even though both diseases have similarities, there are major differences regarding transmission mechanisms. Since children are

¹ <https://www.who.int/publications/m/item/covid-19-virtual-press-conference-transcript--28-december-2020>

important drivers of influenza transmission, it was suggested at the beginning of the COVID-19 pandemic that children were also one of the main vectors for spreading the virus in congregate settings [2]. The fact that children were less affected by the COVID-19 than adults was early demonstrated by epidemiological data from China [5]; ever since, other countries such as the US [6] and Italy [7] confirmed that finding. The attack rate for the age group from 0-19 years old is very low compared to adults [1; 5]. It is estimated that children account for <2% of the total COVID-19 cases.

b) Changes due to the spread of the variant SARS-CoV-2 VOC 202012/01

Viruses constantly change through mutation, and new variants of a virus are expected to develop over time. A new variant may emerge and disappear while others may persist and could be more contagious and lethal. Globally, since the beginning of the pandemic, multiple variants of the virus that causes COVID-19 have been documented. One has been particularly of interest - the British variant: on 14th December 2020, United Kingdom authorities reported the identification of a variant referred to as SARS-CoV-2 VOC 202012/01 to the WHO². How and where SARS-CoV-2 VOC 202012/01 originated remains unclear. This variant was first detected in the UK in November 2020 and scientists suspected it could spread more easily in the children population and alter children and schools' role in spreading the virus. However, despite transmissibility uncertainty, researchers stated how it is essential to keep the schools open and as safe as possible by implementing mitigation measures [8]. Strong mitigations measures are also being highlighted as a key point when the school reopened in the UK at the beginning of March 2021, especially due to increased in transmission with more infectious and possibly more virulent variants [9]. This situation highlights that much remains unknown about the spread of COVID-19 in children, representing a call for increased surveillance to guide decisions about school closures.

c) The outbreak in school-setting

Several reports showed that the transmission from children to adults or other children was very rare, whereas the most acquired infections were from close contacts with adults within families. One example about an infected child that attended three schools while symptomatic in the French Alps showed that he did not transmit the virus to any of the people he was in close contact with [6]. Another

² <https://www.who.int/csr/don/31-december-2020-sars-cov2-variants/en/>

follow-up in Ireland was done when three children and three adults contracted the virus and were still in contact with students in the school settings. Among the 1,025 child and adult contacts with these six patients, no cases were confirmed during the pre-symptomatic, symptomatic and follow-up period (14 days) [10]. An additional case report was identified in the UK about a pediatric patient who was in contact with many students, with no virus transmission to any of the pupils being reported [11]. In addition, findings show that the transmission of COVID-19 between students or staff in school settings does not pose a high risk in areas with low community transmission, which means that putting efforts on interventions aimed at children might have a relatively small impact on reducing COVID-19 transmission. Children and adolescents may also play or visit their friends when schools are closed, but as this young population is not at zero risks of infection, they may still contribute to the pandemic's spread.

A recent study about infections in schools in England [12] found that 1.24% of pupils and 1.29% of staff tested positive for COVID-19 in schools, from a sample of 10,000 tests in November 2020. A higher positive COVID-19 infection level was found in secondary schools in comparison to primary schools. From this finding, the authors concluded that closing schools would have only a temporary effect on the number of active COVID-19 cases. Consequently, the best strategy was considered to be diminishing COVID-19 transmission levels in the broader society while keeping the school as open and safe as possible.

According to a meta-analysis published in the journal *Jama Pediatrics* [13], children and adolescents have lower susceptibility to COVID-19, with an odds ratio of 0.56 for being an infected contact compared with adults. It also seems important to distinguish between children aged between 6-10 years old (whose infections seem to be less frequent), and older children.

A recent study modelled various safe protocols for reopening schools during the COVID-19 pandemic in France [14]. Under a scenario with stable epidemic activity, if schools were closed, it was found that reopening only pre-schools and primary schools would lead to up to 76% [67, 84] occupation of intensive care unit beds, with the other middle and high schools reopening later. Inversely, if all schools from the pre-school to the high school level reopened immediately, there is a risk to overwhelm the ICU system.

In sum, according to the literature [15], the SARS-CoV-2 transmission in the school setting is relatively rare. However, several points need to be noted as limitations for the identification of cases in the school settings: it does not include asymptomatic cases (due to incomplete testing cases that lead to difficulties in identifying asymptomatic cases), and the uncertainties about the location of transmission could also underreport the number cases in the school setting. Nonetheless, there is more scientific

evidence that schools comprise a minority of settings for COVID-19 transmission. Several studies confirmed that outbreaks of COVID-19 in schools comprise a relatively low share of all COVID-19 outbreaks during periods when schools were open. Therefore, reopening schools as safe as possible, in compliance with each country's COVID-19 health response, is in the best interest of children, given that practical protective measures are taken to ensure the safety of students, staff, and their families.

II. DURATION OF THE SCHOOL CLOSING

Most European countries implemented school closures in March 2020 (the starting date of the pandemic in Europe), often until the summer. However, since September 2020, the school issue has been debated differently from one country to another according to various school cultures and decision-making processes. For the past year, all the European countries have been faced with the same dilemma in finding a balance between the population's health safety and the education and psychosocial damage caused by school closures. According to UNESCO and UNICEF³, the average length of school closures in Europe did not exceed ten weeks, while, for instance, reaching thirty-eight weeks in the United States and twenty-two weeks worldwide. The place/role given to schools is related to the country's history and symbols. In France, during the first wave, the Ministry of National Education has claimed to have one of the shortest school closures in Europe, from March 16th to May 11th 2020, stating: "National education is based on the principle that no child should be left behind". Sweden and its Nordic neighbours could also claim to be champions of school opening, as kindergartens, primary and secondary schools were never closed, even at the peak of the first wave, and only high schools, with students over 16 years old, provided distance learning. In comparison, Germany closed its schools for 23.6 weeks, the UK for 25.9 weeks and Italy for 30 weeks, while in the U.S. students went without face-to-face instruction for 43.1 weeks, and Canadians stayed home for 36.7 weeks.

III. MEASURES TO REDUCE COVID-19 TRANSMISSION AT SCHOOL

a. Reinforcement of Non-Pharmaceutical Measures

Since the beginning of the COVID-19 pandemic, most European countries have introduced measures to reduce the disease transmission, such as introducing pupils' class groups, physical and social

³ <https://en.unesco.org/covid19/educationresponse#durationschoolclosures>

distancing, ventilating the classroom according to the country's climate, moving sports activities outdoors, regular cleaning of surfaces, and improving hand hygiene. The use of masks is also highly recommended for children, even for those younger than ten years old, as initially recommended by ASPHER [16]. A literature review [17] highlighted that safety measures for reopening schools should be based on a low level of COVID-19 infection and strictly defined thresholds above which an immediate reaction could be done to any additional COVID cases and to avoid clusters. This review revealed that respecting physical distancing by reducing the class sizes, avoiding the mixing among children, and a gradual school reopening appeared as effective strategies to limit the spread of the pandemic combined with large-scale testing, contact tracing and isolation measures.

b. Promote mass testing in school

Testing for COVID-19 is one crucial measure stated by the OCDE⁴ in May 2020 as “a way to lift confinement restrictions”. Different approaches of COVID-19 testing have already been rolled out since the beginning of the pandemic, such as: household testing, individual testing and the testing of incoming travellers, irrespective of whether or not they are displaying symptoms but depending on their country. Recently, in the face of uncertainties of COVID-19 transmission among/by children, a question has recently emerged about the possibility of massive testing in this population group. Therefore, school-based testing appears both an important issue in slowing down the spread of the epidemic and a complicated logistical challenge. It is necessary to organise the campaign for a very broad number of children to ensure enough health care staff to conduct the test while considering the very young age of many children who will be tested regularly. In this context, many countries have already engaged in mass-testing programmes in school for several months, as presented in the following examples. For example, in Austria [18], a national-level school population testing programme has been introduced, and only children who participate are allowed to attend face-to-face teaching. This program complements the NPIs measures already in place, including testing for all school children aged 6-18 years old, teachers, and any maintenance personnel present in school every two days. The results of the self-administered anterior-nasal (AN) Ag tests are available in 15 minutes, having defined protocol measures to be activated in positive COVID-19 cases. The last available national data from the week between the 26th February to 4th March 2021 reported a positive test result rate of 0.08% (from more than 990,000 students and about 1.3 million tests). During the same week, 0.29% of teaching and maintenance personnel received a positive test. The United Kingdom [19] rolled out a screening plan to reopen schools on 8th March 2021, aiming to identify pupils with COVID-19 positive results as

⁴ <https://www.oecd.org/coronavirus/policy-responses/testing-for-covid-19-a-way-to-lift-confinement-restrictions-89756248/>

early as possible, especially those asymptomatic. Each family with children will receive two tests per person, per week, to be taken at home. The UK government did not include primary school pupils in this programme as they contribute to “a low level of transmission” declared by the UK government. Since the 22nd February 2021, in Belgium [20], schools experimented with a testing plan over six weeks targeting approximately 2,500 teachers and school staff. It appeared that 24 COVID-19 positive cases (0.3%) had been identified out of 6,636 samples and two clusters: one in Wallonia and another in Brussels. The experiment will not be extended to all Belgian schools. This would create logistical issues as it would require the delivery of materials to all schools, the deployment of health professionals and the involvement of already overburdened school directors. In Spain, school screening measures vary according to region and school. Catalonia is a region particularly affected by the COVID-19 pandemic that did not wait to roll out screening plans in schools. Since September 2020, the region has assigned 400 staff personnel to monitor the number of COVID-19 cases in schools and 100 nurses to test pupils and staff. In France, the Haute Autorité de Santé authorised⁵ on the 11th February started the rollout of the COVID-19 testing on a large scale in schools, piloting the experiment in several schools.

Overall, many benefits of testing in school could be observed:

- Ensure early identification of infection cases, hence starting contact tracing and initiating prevention and control measures and finally, to reduce the transmission.
- Identify infection in the most vulnerable children at higher risk to contract severe disease for better care and prevention.
- Document the role of children in the transmission of COVID-19 in the school settings.

❖ **Several recommendations may be formulated for mass testing in schools:**

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| <ol style="list-style-type: none">1- If mass testing is to be implemented in school, communication about the protocol is essential. Namely, it is important to:<ul style="list-style-type: none">- Clearly design and communicate the testing protocol to parents. As parent’s adhesion is needed, the clearer the design and communication, the highest will be the number of COVID-19 tests.- Prepare training resources to learn how to perform the test at home.- Maintain communication with parents.- Organise what to do in case of a positive test, namely regarding a safety space, definition about who should be applying the procedures and what to do with the other people that had contact with the suspicious case. Each case should be treated as a single process.2- Reinforce mass-testing children and adolescents in the school setting according to the WHO Europe guidelines and ECDC recommendations. |
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⁵ https://www.has-sante.fr/jcms/p_3237053/fr/tests-rt-pcr-salivaires-la-has-etend-leur-utilisation-et-definit-les-modalites-pratiques-de-realisation

3- While NPIs measures are highly recommended to prevent an outbreak of COVID-19 in schools, in period that it is difficult to respect several measures during the daily school (as in the canteen), mass testing may be encouraged.

c. Vaccination for children

For the past months, the worldwide vaccination of the adults' population has rolled out. Given that older populations experience the highest-burden of severe disease, hospitalisation, and death related to COVID-19, they also benefit the most from vaccination. Conversely, the low rates of severe disease related to COVID-19 among young populations suggest that they should not be prioritised for vaccination. With an increasing number of at-risk adults becoming vaccinated, health leaders and researchers have now turned their attention to children. Unfortunately, children are not included in many vaccine trials, a mandatory component before mass vaccination can roll out in any sub-population.

Given the accumulation of scientific evidence that vaccines are safe and effective in adult populations, there are many potential reasons [21] to support pediatric COVID-19 vaccination.

- Firstly, pediatric COVID-19 hospitalisation rates have increased in recent months in many countries. A literature review [22] published in December 2020 by the National Institute of Public Health in Québec revealed that in Europe, there is an increase in the number of COVID-19 cases in individuals under 15 years old since the beginning of the pandemic. For instance, in Spain, the number of cases per 100,000 inhabitants for the previous two weeks was equal to 2.9 in May 2020, 280.3 in October and 405.4 in November. The increase was smaller in Germany: 6.3 cases per 100,000 inhabitants in May (for the last two weeks), 24.2 in October and 174.8 in November. Similar trends were observed in Italy, where the number of cases per 100,000 inhabitants increased from 5.1 in May to 463.0 in October.
- Secondly, scientific evidence [23] suggests that children with complex medical conditions appear to be over-represented among the cases reported with severe or fatal COVID-19, such as those living with developmental delay, neuro-disabilities or genetic anomalies. In general, as vaccine availability increases, high-risk children could constitute a prioritised group for COVID-19 vaccination, similarly to annual influenza vaccination recommendations in some countries.
- Thirdly, given that children are also more likely to develop an asymptomatic infection when compared to other age groups, without vaccination they could contribute to undetected community transmission. Pediatric vaccination protects both vaccinated children and adults in

contact with them, including those at school, and within the family and friend groups. A high level of immunity [24] in one given age group, which play a role in transmission as suspected for adolescents, can create herd immunity for other groups. Given that adolescents are suspected of playing a significant role in transmission, the immunisation of children/adolescents could also be effective for adult populations, as demonstrated in immunisation against influenza, pneumococcal disease, and rotavirus, for example [25].

- Fourthly, there is more uncertainty about children contagiousness and infectiousness related to the Indian and South African new variants that could increase the number of cases among children.
- Finally, children are known to be vulnerable members of society who already suffer disproportionately from lockdown and school interruption since the beginning of the pandemic [26].

In Israel [27], the Health Ministry recently recommended the vaccination of children over 12 years old who suffer from specific conditions that sets them among the most vulnerable to COVID-19. Early findings among a sample of 600 children aged between 12–16 years old are encouraging, as they reveal no serious side effects. Further trials are underway to test the vaccine in children. About 2,000 children between 12-15 years old are currently enrolled in a trial of Pfizer Company. The timing for the vaccination of children depends on the results of these clinical trials. On 31st March, Pfizer-BioNTech [28] announced 100% efficacy and robust antibody responses in a phase 3 trial of adolescents between the ages of 12 and 15 years old. Based on the current research, it may be possible to have a vaccine for some children and adolescents before the 2021-22 school year begins. More precisely, it is expected that younger teenagers will be eligible for vaccination in the fall and elementary school children by the end of the year.

IV. THE IMPACT ON CHILDREN OF SCHOOL CLOSURES

a) Inequalities consequences for children

While children are generally spared from the worst complications from COVID-19, they experience the pandemic's consequences regarding the interruption to education, lack of socialisation opportunities, and the widening of pre-existent inequities [29]. Therefore, countries are scrambling to create plans to institute in-person learning or equitable distance learning schemes to combat the adverse lockdown-related effects on children. The argument for returning to in-person classes and programmes is clear: it allows for the reinstatement of education, social, and nutritional programs for children that have been partially or fully suspended under lockdowns [29-31]. These programmes

encompass everything from schools, sports, and lunch programs [32;27], to maternal and newborn care, immunisation services, sexual and reproductive health services, protection programmes for children experiencing abuse and children requiring personalised education and care [29]. The closure of these social services has further highlighted how low income, minority, and disabled children are disproportionately affected by the pandemic and uniquely experience the consequences of lockdowns compared to more privileged children [30]. The most vulnerable children have been more likely to experience financial hardship, nutritional deficits, social isolation, discrimination, and domestic violence under lockdowns [30; 31]. In short, opening schools would provide important educational, nutritional, physical instruction and opportunities to minimise the widening inequities experienced by the most vulnerable children. Towards this design, a law has been recently adopted by the Spanish government [34] stating that families with children receiving school meals are entitled to financial aid or direct food supply during school closures.

While the benefits of in-person instruction are immense and all-encompassing, the consequences of prematurely re-opening schools are undeniable. While children under ten years old have been found to transmit SARS-CoV-2 at lower rates than adults, older children have been found to transmit the virus similarly to adults [31]. For example, a recent study in South Korea [31] found that one of the highest transmission rates occurs between school-aged children over ten years old and their household contacts. While uncommon, child to teacher transmission has also been documented, with teacher deaths reported in both the US and Israel and school-related outbreaks occurring worldwide [35;36]. Therefore, while nurseries and elementary school educational facilities may be safe to reopen because of low transmission rates, reopening educational facilities for older children will be dependent on a community's ability to keep COVID-19 prevalence under a safe threshold. As observed in Denmark [37], successful and safe school re-openings are possible with low community transmission and extensive social distancing measures. However, as seen in Israel and the US, without proper community containment, educational facilities with children over ten years old are at high risk of widespread viral transmission [38].

Due to risks associated with school-related outbreaks, many communities and countries are leaning towards moving all schooling into internet-based learning. By instituting distance learning, communities can save the money necessary for creating safe in-person learning space and protect students, teachers, families, and communities from infection. With fears of transmission and outbreak, promoting total distance learning may assuage fears and allow faculty and students to better focus on learning and teaching. Unfortunately, existing gaps in access to the internet and devices for access to educational content make online learning far less equitable than in-person instruction. Indeed, the COVID-19 pandemic has highlighted that even in the wealthiest EU countries, digital inequalities exist:

some schools were well equipped with the necessary infrastructure, material and staff knowledge to support students and pupils, while others were unprepared to tackle the challenge of offering digital education. In addition, not all students and pupils had appropriated access to digital equipment and internet connection at home. Some European governments [34] put in place measures to ensure support for the most disadvantaged families. For instance, the Dutch government has allocated several million euros to purchase laptops for students who do not have equipment at home. In Portugal, lessons were broadcast through a national TV channel, specifically targeting students who lacked appropriate digital equipment and internet connection.

As the pandemic continues to progress, countries, regions, and communities have decided how to balance between the benefits and consequences of each approach regarding schooling and must take care to follow scientific experts' advice and emphasise on protecting the most at-risk and vulnerable children.

b) Mental health difficulties in children

The COVID-19 pandemic has resulted in European governments implementing lockdown measures such as school closures and physical distancing. Children and adolescents are experiencing a prolonged state of physical isolation from their peers, teachers, extended family and friends. While we know that nobody is immune to the pandemic's stress, children appear to be at higher risk, with about 70% more acute cases being identified in pedo-psychiatric urgencies. It is also well documented that good mental health early in life is a key determinant to good mental health in adulthood. Mental health problems represent one of the largest burdens of disease among the youngest.

Few studies have been conducted to investigate the children population's mental health difficulties over the COVID-19 lockdowns. While scientific evidence on the impact of the outbreak on children's mental health remains limited, most studies have revealed increased mental health difficulties related to COVID-19.

Co-SPACE [39] (COVID-19 Supporting Parents, Adolescents, and Children in Epidemics) survey led by the University of Oxford questioned more than 10,000 parents. Most of them reported that their children's behaviour had got worse over time: an increase of temper tantrums, arguments, children not doing what they are asked, an increase of restlessness/fidgety behaviour levels and difficulties concentrating. These behaviour changes were only observed among children younger than ten years old. The UK's leading children's charity [40] asked 4,000 children and young people aged between 8-24 years old across Great Britain how they had been feeling during the lockdown. At least a third stated

having experienced increased mental health and well-being issues, including stress, loneliness and worry. Boredom (51%), worry (28%) and feeling trapped (26%) were the most frequently emotions reported by children and young people in lockdown. A survey of college students from Changzhi medical college in China showed an increase in anxiety. More precisely, from a sample of about 7,000 college students, the authors revealed that 0.9% of the respondents were experiencing severe anxiety, 2.7% moderate anxiety, and 21.3% mild anxiety [41]. These impacts of the pandemic on children mental health were already denounced from previous emergencies. For example, during the 2003 SARS outbreak in Japan and Canada, an increase of anxiety, depression, and post-traumatic stress disorder for children due to confinement has been reported.

There is also a risk that the outbreak will have a greater effect on children's mental health who accumulate pre-existing vulnerability factors. In the UK, a study found that 83% of respondents under 25 years old with existing mental health problems reported that the pandemic had worsened their mental health status. As described in the literature, children living in poor socioeconomic conditions are also particularly at higher risk, knowing that there is a strong relationship between socioeconomic deprivation and mental ill-health, including during childhood. As the current COVID-19 pandemic is likely to increase financial and social insecurity, this will probably contribute to poor child mental health. Recently, authors explained that deterioration in children mental health appears clearest among families already struggling [42]. In a UK survey, they estimated that children with suspected mental health issues were more than twice as likely to live in households with late payment of bills than those living in families able to pay them [43]. Other factors such as poor parental mental health and exposure to stressful situations were also recognised to increase mental health difficulties.

An additional indicator has been used to indirectly measure the children's anxiety levels: the number of calls to helplines [44] from young people with anxiety symptoms. Stress is also a key factor for the onset of alcohol misuse, with an increase in alcohol sales having been reported among the youth.

For the new EU Strategy on the Rights of the Child 2021–2024 [45], the European Commission, associated with five child rights organisations (ChildFund Alliance, Eurochild, Save the Children, UNICEF and World Vision), have decided to survey children living in Europe and beyond to share their views and influence how the strategy would be shaped and what topics it would prioritise. More than 10,000 children and teenagers have participated in the survey, and the main findings have been summarised in the recent report published in February 2021. The consultation took place during the COVID-19 pandemic. While some children recognised the benefits of increased family time and creative opportunity, items most frequently reported concerned the increase of anxiety, mental stress, feeling

of loneliness, fear of falling behind and money issues. Girls, older children and those from minority groups were disproportionately affected.

❖ **Measures to be considered when deciding whether to reopen the schools, close them, or keep them open**

SCHOOL OPENING

Reinforce hygiene measures

1. Promote healthy hygiene practices already put in place for over a year.
2. Ensure the supplies availability of gel dispensers and soap in strategic places in the school: toilets, classroom, entrance and exits.
3. Continue regular sanitisation and disinfection of toilets, equipment, door and handles: all the most frequently touched surfaces during school days.
4. Promote technical training and its update to school professionals who have to guarantee hygiene by safely using cleaning chemicals for themselves and the school community, with maximum effectiveness and efficiency.
5. Ensure that the supply of disinfection materials for schools is in sufficient quantity and quality. The same should happen with the protective materials for cleaning staff to work safely (aprons, gloves, masks and others).

Minimise the number of contacts between people

1. Organise the drop-off and the pick-up children at different school entrance (if possible) or the same entrance but at different times to limit the contact between parents, children, teachers and staff.
2. Maintain the social bubble at school as much as possible during the school day.
3. Define clear rules of access and circulation in the school by the students' parents/guardians: circulation lines, subsequent cleaning of the used spaces, among others.
4. Ensure the inclusion of air circulation in closed school spaces and in an articulated way in the set of hygiene measures:
 - Regularly ventilate public spaces within the school during breaks and lunchtime, if the climate/weather allows it, and letting the window open during the class to increase the outdoor air circulation as much as possible.
 - Always consider the climatic conditions in the school area and how this can also be a source of other health issues: excessive cold or heat, the existence of mosquitoes that transmit diseases, excess humidity, atmospheric toxins, among others.

Change in school activities

1. To adapt the pedagogy methods to take into account activities restrictions and adaptations:
 - Type and access to pedagogic games.
 - Specific utensils used to make learning easier.
 - Limit the number of working groups and physical interaction in physical education classes.
 - Take account that the use of the mask by the teacher that may influence the children's level of understanding.
2. To adapt physical activities outdoor to maintain social activities for the well-being and mental health of children.

Prevent health or social issues

1. Keep the canteen open as much as possible to prevent poor nutrition issues for the most vulnerable groups. If it is not possible, find direct or indirect ways (municipality, local cultural associations that can collaborate in the preventives measures reinforcement against COVID-19 in public spaces, in this case in the School, etc.) for meals always to be served. Special attention should be given to students belonging to vulnerable groups to ensure that the pandemic does not further aggravate their condition of vulnerability.
2. Maintain the communication between the school director/class director and the families to recall the NPI in place in school settings.
3. Reinforce the school communication to be clear about the rules and procedures in its settings. In general, it is important to keep in touch with the teachers' team to detect psychological issues as soon as possible or learning difficulties. The involvement of teams of special education teachers and the school health team is particularly important in this topic.
4. Perform daily health check-ups (temperature and symptoms) for children, teachers and other school staff to prevent COVID-19 transmission within school settings.
5. Provide an adequate supply of masks, with appropriate sizes for adults (teachers, staff, parents) and pupils, and ensure proper use by any person learning, working or teaching in the school.

Plan for someone who becomes ill

1. Separate anyone with suspected COVID-19 in a pre-defined area, safely asking parents to transport them back to their home (or direct to a nearby hospital only if urgently and severely ill), notifying local health officials, staff, and families.
2. Close and disinfect the area presumed to be contaminated.
3. Create and maintain routines of permanent connection to the Health Authority of the School area to define procedures: What steps should be taken when a student is identified as suspected of having COVID-19? What additional restrictions should be applied in the school if there is an outbreak of COVID-19 (more than two cases)?

SCHOOL CLOSURE

1. Provide food supports via a particular programme that provide financial aids or meals to the most deprived population. Maximum attention should be paid to the identification of new cases that arise during the closure of schools.
2. Maintain regular contacts with students and their families who belong to vulnerable groups or in which parents are unemployed for the moment.
3. Guarantee pedagogic resources to respond to special needs education teaching with structured and uninterrupted teaching programs whenever the student's condition is incompatible with school interruption.
4. Provide digital support and training in digital teaching competencies to teachers with difficulties in digital teaching due to a lack of computer, internet data, and digital literacy and skills.
5. Support the training and improving digital skills and competencies of the school staff, who on average have a lower level of education than teachers, to include them in the pedagogical process and guarantee:
 - The best performance possible when at work.
 - Optimal communication with the families and children, namely because this type of school employees have a more informal communication with the students' families than the School through the traditional means of formal contact.
 - To ensure access to online pedagogic resources, identify families with inadequate computer equipment or internet connection during the school's closing time.
6. Ensure a regular follow-up of the learning acquisitions, especially if the school closure duration is high (several weeks).

ASPECTS TO TAKE INTO ACCOUNT FOR THE REOPENING OF SCHOOLS

1. Ensure conditions for the maintenance on the use of masks and improve its correct use.
2. Prepare the maintenance of physical distance in the school space.
3. Study and prepare safe forms of transportation to and from school.
4. Identify which students have aggravated their condition of vulnerability, whatever its source, and look for compensatory/corrective measures for them.
5. The same should apply to the remaining adult school community.
6. Strengthen the focus on the following measures:
 - Ensure adequate food for students and school staff.
 - Support general health conditions: objective risk of the pandemic dissemination; previous health problems that must be taken care of when the School reopens; mental health problems (previous or generated during School closures); malnutrition; vaccinations verification that should have taken place during the closing period, among others.
7. In classes with a high number of students for the assigned room space, if possible, reduce the number of attendees (dividing the class into two classes when there is a greater need for physical proximity such as laboratories, physical education, etc.); moving to larger rooms, implementing hybrid systems when it is not possible to guarantee high safety.
8. Before the reopening of the Schools, check the hygiene and safety conditions of the buildings and other school spaces, namely:
 - Ensure the clean condition of air conditioning filters for optimal use.
 - Take advantage of the arrival of warmer weather to intensify the natural ventilation of the spaces or even give classes outdoors, provided that these practices do not expose the school community to new risks (presence of insects that are vectors of infectious diseases; adverse weather; etc.).
 - Implement (if possible) alternatives to closed spaces for the alimentation of students and school staff.
 - Maintain an adequate condition, management and use of sanitary facilities.
 - Regarding previous experiences, review movement circuits within the School and respective management of access rights, namely by parents and guardians.
 - Evaluation of the spaces' conditions allocated for the administration of schools and meetings of teachers.

V. CONSEQUENCES FOR TEACHERS AND NON-TEACHING SCHOOL STAFF

Teachers and non-teaching school staff are responding to a great disruption to education systems. They have faced significant stressors concerning their work. Due to the pandemic, the teachers and non-teaching school staff have to shift suddenly to remote learning to ensure continuity of teaching and learning. In many education systems, they had to teach online and manage with the online contact with students; they are not all prepared for that according to their age (youngest versus oldest), their level of education, the academic discipline taught (quantitative versus qualitative) and the workplace. In addition, similarly to every adult, teachers and education professionals are faced with the health consequences of the pandemic.

a) Determinants of the use of the information and communications technology

The Teaching and Learning International Survey (TALIS) [46], established in 2008, has collected information in 2018 on reasons why some teachers may be more likely than others to undertake professional development activities, including information and communications technology (ICT) skills for teaching. While the survey has been conducted before the pandemic, it constitutes a good starting point for assessing how education professionals were prepared for a school interruption and how easy they could change their teaching modalities. The study found various determinants favouring the TIC use as the initial training of the teachers themselves and the school environments that could play an important role in promoting innovative teaching practices. A recent study summarised [47] the main findings about the determinants of the readiness for online teaching and learning (OTL) in higher education. They identified in previous research in OTL that gender, academic disciplines, previous OTL experiences and perception of institutional support constitute potential sources of individual differences. They also revealed that cultural and innovation differences across countries are positively associated with new teaching methods at a contextual level. In addition, this study investigated the existence of profiles of higher education teachers 'readiness for online teaching and learning (OTL) at the time of the COVID-19 pandemic. Their results suggest that teachers in high education do not constitute a homogeneous group regarding their readiness for OTL. They identified three profiles of teachers: (1) low, (2) inconsistent and (3) high readiness for OTL. Unlike profiles 1 and 2, the teachers in profile 3 have reported prior online teaching experience and reported good support from their institutions in general and at the time of the COVID-19 pandemic. In Europe [48], teacher competence related to ICT challenges was already described in the European Digital Competence Framework for Educators. As stated in this framework: "Teaching strategies need to change and so do the competences teachers need to develop so as to empower 21st-century learners". In the federal state of North Rhine-Westphalia, in Germany [49], schools, teachers, and universities are expected to adopt this framework for ICT integration into the curriculum that pushes the transformation of learning;

systematic implementation is in progress. A Survey of early career teachers conducted in Germany in May and June 2020 confirmed that information and communication technologies (ICT) tools, particularly digital teacher competence and teacher education opportunities to learn digital competence, are key factors in adapting to online teaching during COVID-19 school closures.

b) Risk of severe COVID-19

By multiplying the number of contacts, the teachers and other education staff are seen as a potential group at higher COVID-19 risk than other occupations. A population-based nested case-control study has been conducted in Scotland [50] to compare the risk of hospitalisation with COVID-19 and severe COVID-19 among teachers and their household members with healthcare workers and the general working-age population. Adjusted on age, sex, general practice, deprivation, underlying conditions and number of adults in the household, the relative risk in teachers of hospitalisation with severe COVID-19 is lower than the general population. After the schools re-opening, the analysis by the teaching sector revealed a lower risk of hospitalisation in the category of the primary teacher than in secondary and other teachers (even if the large confidence intervals did not allow to conclude to significant results). Conducted [51] in the US, a survey of child-care providers did not reveal a significant association between exposure to child care and risk of COVID-19 after adjustment on age, sex, race, access to personal protective equipment, household income and community rates of infection. In the UK, the Office for National Statistics examined deaths from COVID-19 from the 9th of March to the 28th of December 2020. They found that teaching and educational staff had lower age-standardised mortality than “all residents of England and Wales aged 20 to 64 years old”.

c) School staff stress, burnout and mental health

Professional stress results from the interaction combinations of personal characteristics and the reading that makes the “stressful situation” a condition that is very easy to generate during a pandemic. Burnout (exhaustion) is the most aggressive form of stress with a professional origin and has varying degrees of severity. Among predominant determinant factors (among others) are the existence of a threat and the capacity for autonomy to contain that threat.

Working in a school is an element of significant stress and burnout, recognised for a long time in the literature [52;53], which points out in meta-analysis work those in secondary education as the most affected [54]. Before the pandemic, there were levels of burnout among teachers, from 7.5% [55] to 30% [56], expressed by three main characteristics [57]: exhaustion, depersonalisation and loss of accomplishment. The remaining school workers are still essentially to be studied.

In the COVID-19 pandemic, the threat is by definition global and expressed in millions of infection cases and deaths. Control capacity is reduced, essentially linked to non-pharmaceutical measures [58-60] and more recently to vaccination. A tool was developed to carry out the evaluation [61] induced by COVID-19.

The levels of stress and burnout increased through the generation of anxiogenic sources in the various dimensions of the teachers' work [62] and their inability to respond appropriately as they would like to the difficulties and new challenges they are exposed to [63].

The lack of resources to deal with the situation is also a source of professional stress for teachers [64] and school leaders [65], to the point of admitting risks of school disruption if there are successive pandemic waves [64;65].

The dynamics that created stress and burnout, firstly generated by school closures and its replacement by digital teaching, promotes "digital monologues" [66] and implies the loss of visual contact (students' webcams disconnected), physical interaction, loss of the emotional relationship [67], among other aspects. Another new phenomenon is the sensation of loss of private space, represented by the issuance of classes from the teacher's home [67]. Work is almost always done using personal digital media. For example, in a study carried out in Brazil, only 11.4% of teachers had received financial support to equip themselves to teach classes [68], in addition to the lack of preparation in digital teaching techniques and digital skills mainly affecting older teachers.

Studies show that most teachers experience burnout at light levels but have not lost functional capacity and commitment to the School [69], with the feeling that they receive support from their school leaders and school administration being fundamental [69]. Variables such as gender (more intense stress in women than in men), age (higher stress in older individuals than in younger ones), professional stability (higher stress in those with instability), among others, impact as predictors of the degree of stress and burnout [70].

The studies found on this subject in bibliographic research are always about either teachers or school leaders. No study was found in the last ten years, where stress and burnout are studied in any other profession of the school staff.

d) Non-teaching School Staff

School staff who are not teachers or school leaders are diverse and with few studies being available in the literature about them. This group encompasses cleaning employees, assistants in educational activities, canteen staff such as cooks, waitresses, guards, administrative staff and others to a lesser extent such as computer workers, maintenance of facilities, nurses, psychologists, special teaching therapists, among others. Each of these professions corresponds to a school degree determined by the laws of the countries and regions and a specific degree of professional preparation ranging from zero specific professional preparation for teaching (e.g., maintenance of facilities, cook, etc.) to high preparation (e.g., school administration).

The rule is the almost absence of studies that characterise and integrate school staff in their intervening role in Health in the school community and necessary adaptations to the COVID-19 context. However, due to school staff functions, individuals from this segment have potentially greater risk exposure due to physical proximity, such as employees who physically deal with students with Special Teaching Needs, employees who now clean more frequently and with more demanding chemicals, among others.

Most of the employees mentioned above have much lower salaries (sometimes also with lesser job stability, although this depends on countries) than teachers, which exposes them to more social vulnerabilities, such as the risk of unemployment in school closures, poverty, digital exclusion, vulnerabilities associated with migration, just to name the most frequent and common to the realities of the various European countries.

The relationship of these professionals with COVID-19 is essentially unknown. However, there are some facts to keep in mind, even if they are only epiphenomena verified in studies applied to specific contexts. For example, in a study carried out in New York [71], school staff had a higher incidence of COVID-19 than the community to which they belonged, but it was not demonstrated that transmission was produced in a school context. In another study conducted in the UK [72], the presence of SARS-CoV-2 antigens among the staff ranged from 12.6% to 15.7% and among the students was between 0.94-0.99% in primary schools and 1.22-1.64% in secondary schools. In both studies, the staff encompassed both employees and teachers, so it was not possible to isolate only non-teaching staff. In another study carried out in the USA [73], it was found that 42-51% of school employees fit the CDC classification of risk of contracting severe COVID-19.

We express our concern about the lack of scientific research on this vast social group and call for a strong investigation into the specific risks that arise from the particularities and diversity that coexist in it.

❖ **Ten measures to prevent stress and burnout for School Teachers and School Leaders**

1. Ensure that all teachers have IT material when there is a total or partial school break.
2. Provide training in digital pedagogy and didactics.
3. The School must structure the teaching, pedagogy and didactics to integrate school closure periods, mixed digital-classroom and classroom teaching.
4. Ensure that the teacher is not obliged to be available 24/7, providing moments to cut off activities related to the School.
5. Reinforce moments of interactive emotional contact with students, colleagues and school leaders, even during pedagogical practices and digital activities.
6. Instruct teachers to, as far as possible, protect their private space, namely family members, from contact with students and colleagues.
7. There is clear evidence of school management support for teachers.
8. The same applies to School Administrations and other Hierarchical Organs.
9. Mental Health support should be made available to teachers proactively to prevent or contain Burnout in a subclinical condition.
10. Cases of teachers' belonging to vulnerable groups should be identified so that these conditions are not themselves triggering states of high stress or burnout.

Considering the lack of theoretical foundation on professions in the school community other than teachers and school leaders, making recommendations for this broad school community is difficult. However, it is possible to make generic recommendations of those usually applied for most professions related to Services.

❖ **Three generic measures to prevent stress and burnout for professions in the school community**

1. Provide mental health support in the school community or on helplines.
2. Create programmes by school leaders to proactively detect situations where professional stress or burnout is taking place.
3. Act organizationally to reduce sources of stress.

❖ **Safety measures for non-teaching school staff:**

1. All categories of non-teaching school staff must be provided particular rules in the School's Pandemic Contingency Plan, specifying the safety rules that should apply to the different professional practices.
2. All categories of non-teaching school staff will benefit from all measures preventing stress and burnout previously list.

3. Without exhausting the diversity of professions that exist and that each School/Region/Country may have, the most frequent non-teaching school staff are:

- *School cleaning staff:*

- Guarantee masks, gloves, aprons and other materials to ensure the staff safety in cleaning the school facilities and handling cleaning products, being available in sufficient quality and quantity for its use to be renewed throughout the day.
- Shift their work time to minimise the number of contacts

- *Secretariat:*

- Ensure that masks are available in sufficient quality and quantity for its use to be renewed throughout the day.
- Set the rules for customer service, including the use of acrylic divisions.
- Provide access to a secure workspace for in-person work with safe physical distancing and propose telework as much as possible.

- *Guards:*

- Ensure that masks are available in sufficient quality and quantity for its use to be renewed throughout the day and to fulfil the professional functions adequately.
- Correctly manage the circulation of individuals in the school spaces and be able to assess urgent or exception situations for which entrance in the school may be allowed.

- *Canteen Staff:*

- Ensure that masks, visors, gloves are available in sufficient quality and quantity for its use to be renewed throughout the day and adequately fulfil the professional functions.
- Assess the need for reinforcing the personnel board in the case of an increase in services.
- Implement the staff rotation if needed.
- Verify the possibility to work outside the school periods, such as during holidays or school breaks.
- Ensure articulation of tertiary food services with the school for securing all the procedure.

- *Maintenance Staff:*

- Articulate tertiary maintenance services with the school to ensure safety in all procedures aligned with the school measures. For example, air conditioning maintenance technicians must ensure that their work is conducted with a full application of the safety measures indicated by health authorities when handling materials of high infection risk, such as air filters.

- *Psychologists, Therapists and similar* who work inside the School and where great physical proximity is required, possibly without the use of a mask:

- o Ensure that if the mask cannot be used, sufficient physical distance can be maintained.
- o Maintain the availability of hand sanitisers, gloves, and masks in sufficient quality and quantity when there is a need to handle the student's body.
- o Pay attention that the very likely relocation of therapeutic practices to other locations does not affect the discretion and dignity of the student.

4. Use the pandemic moment to reinforce each profession's dignity among the students, showing them that all professions are important to have a socially valid and quality School. For this:
 - Each non-teaching employee must become (or reinforce if existent) an educational agent capable of disseminating knowledge of security and social inclusion.
 - Professional training is provided on the use of new materials and procedures related to the COVID-19 pandemic.
 - Valuing people with more humble professions in the eyes of students eventually providing professional empowerment to these workers. This seeks to create mechanisms to increase the resilience of the School as a social community with a life of its own, mutual interdependence and reinforcement of social ties, a critical element for the good maintenance of mental health, resistance to professional stress and burnout.
5. Use the moment of the pandemic to reinforce the digital skills of less qualified professional groups.
6. In almost all schools, the digitisation-going processes, the need to continue the usual activities, the increase in sanitisations and other procedures lead to a huge increase in teachers and non-teachers workload. Schools must be able to adapt their staff to the increased needs, particularly among non-teaching staff.

VI. IMPLEMENTATION OF FOOD PROGRAMS

Children are known to be a vulnerable population to many environmental stressors and living conditions, including nutrition's services. Schools play an important role in the feeding of children [74]. Indeed, not only do schools offer education, but they also provide social protection, nutrition, health and emotional support for children [75]. This corresponds to the four pillars of education proposed by a declaration of UNESCO [76] learning to know, learning to do, learning to live together and learning to be. The restriction COVID-19 related that led to the school's closure and the canteen impact obviously the feeding of children, more specifically those living in the most deprived family [77].

Worldwide, UNICEF [77] estimated that in 2019, there were 144 million stunted growth children under five years. In addition, UNICEF has estimated that about 39 billion in-school meals were missed during

school closures last year. Food insecurity among children is known for a long time to have dramatic consequences for children health. In 2020, the European Commission [78] estimated that the development and growth of 75 million children in 2019 were impaired due to food insecurity. School and nutrition are highly related as a virtual circle. When food is provided to children, the opportunity should be used to improve the quality of their daily nutrition and train them about nutritional quality, as when children eat food with adequate nutritional quality they will be healthier and also improve learning. Inversely, when children receive a quality education, they are less likely to be sick. This inter-relationship between learning, nutrition and health calls for a more integrated approach and coordinated policies, programmes and actions to optimise benefits towards children.

In this context of the pandemic, the World Food Programme (WFP) and UNICEF [79] joined a response to the COVID-19 crisis. Instead of school meals, governments and WFP are now recommended to provide take-home rations, vouchers or cash transfers to children; this has been implemented in 68 countries worldwide. Here below, several examples of initiatives. For instance, in France, Paris announced in April 2020 that "exceptional aid" will be granted to families with the lowest canteen fees. In Meurthe et Moselle (France), a local authority has chosen to help low-income families by providing meals at home to schoolchildren who usually benefit from the lowest canteen rate as well as their brothers and sisters. In UK [80], a National initiative has been implemented; it concerns all the children who usually are eligible for free school meals. They received a weekly voucher allowing them to continue to access meals whilst staying at home; they may spend them at any supermarkets while schools are closed due to coronavirus. In Ireland [81], about 250,000 children and teens are concerned by free meals at school. For many of them, the meal at school is seen as a vital source of nutrition per day. Therefore, from the beginning of April 2020, the Government announced that schools might replace the meals children receive in school with weekly food packages. In Lisbon, assembly lines for food kits were created in school canteens for take-away for students belonging to families with economic difficulties. These lines worked even during the school closing periods. The increase in unemployment and the cessation of economic activities forced the coverage of about 4000 more students than usual [82].

However, even if one has to recognise the benefit of this program in the short term, UNICEF [77] explained that priority should be given to reopening schools safely; these are not long-term solutions. They also argued that evidence exists of the positive impact of school feeding programmes on increasing enrollment and attendance, especially among the most vulnerable children, most specifically the girl and the disadvantaged children.

In sum, the pandemic has highlighted the central point of the school meals in the daily children life worldwide and Europe. The reason is not only to prevent child hunger but equally important to ensure that families have access to healthy food. Emergency measures implemented during the pandemic that strengthen and improve school meals programs must continue and should be extended even after the crisis to ensure that all children have enough nutritious food.

❖ **Recommendations**

1. To guarantee, in an adapted way to the local culture and better resource efficiency, that all students continue to receive at least one daily meal, which corresponds to the use of the School.
2. Proactively seek out students' precarious food situations, especially knowing that out of modesty, many families tend to hide the situation, especially if they are not usually treated as low-income families.
3. Find ways of distributing food that guarantee the best coverage of the target population. This may indicate the need to develop multiplatform systems, even if the installed production system is of very good quality: production at the School, Vouchers, Networking with other food providers for vulnerable groups, among others.
4. Develop food supply systems with levels of redundancy that can be activated if and when necessary (logistical problems, accidents, curfews, etc.) since there should be no failures in the daily supply of meals.
5. Link the school meal supply program with other local food supply programs so that children and young people also have adequate food on weekends, holidays and school vacation times.

VII. PROMOTE NEW AND BETTER PUBLIC POLICIES

The current pandemic constitutes an unprecedented opportunity to rethink Public Health Policies (PHP), redesign prevention programs, and better promote health and well-being for all. It has also highlighted how critical it is to prioritise children's and adolescent health and well-being and build stronger foundations to prepare the next generation.

The pandemic revealed how unequal we are previously and the consequences to deal with the current crisis. It is a call for a long-term PHP reform to ensure that health and well-being programs and PHP prioritise health for all and social equity to reduce disparities; the main goal is to create healthier childcare setting, schools and communities to guarantee that all children can thrive in the future.

Health in All Policies (HiAP), a matrix approach that crosses Public Health Policies with all the other Public Policies, namely those related to children and adolescents, defined by WHO in its 8Th Global

Conference of Health Promotion in 2013⁶, could constitute the overall framework to consider children's and adolescents health and well-being issue into decision-making across sectors and policy areas including school and educational policies. Recently was proposed a broader view of HiAP, but narrowing the spectrum of a Place-based approach, Health in All Places (HiAPI) [83], already accepted in ASPHER COVID Task Force documents [84].

Therefore, children's HiaP/HiaPI should:

- (1) Document why the children's health issue is important by describing the risk factors and the causes;
- (2) Quantify the magnitude of the children's health vulnerability;
- (3) Identify policy efforts/opportunities that could be implemented to improve children's health and well-being;
- (4) Identify promising evidence-informed policy solutions to improve the home, school and community environments
- (5) Assess the potential impacts/benefits of the PHP solutions.

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