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# International Horizon Scanning and Learning Report

COVID-proofing the educational environment: 4-18 years

Report 41, October 2022

Canolfan Gydwethredol Sefydliad  
Iechyd y Byd ar Fuddsoddi  
ar gyfer Iechyd a Llesiant



World Health Organization  
Collaborating Centre on Investment  
for Health and Well-being

## Overview

The International Horizon Scanning and Learning reports were initiated as part of the COVID-19 public health response, to support dynamic response and recovery measures and planning in Wales. They varied in focus and scope, depending on the evolving COVID-19 situation and public health/policy needs at that time. The reports focussed on COVID-19 international evidence, data, experience, policy and public health measures, transition and recovery approaches. Learning and intelligence was collated and synthesized to understand and explore solutions for addressing the ongoing and emerging health, well-being, social, economic and environmental impacts (potential harms and benefits) of the pandemic.

The scope of the reports was expanded in spring 2022 to cover priority public health topics, including in the areas of health improvement and promotion, health protection, and health care public health. The report topics and findings are aligned with and help inform decision-making and on-going work in Welsh Government, the NHS and Public Health Wales. They are also disseminated to wider network of (public) health professionals and partners nationally and internationally.

This is part of a wider Public Health Wales' systematic approach to intelligence gathering and evidence translation into policy and practice, supporting coherent, inclusive and evidence-informed action, which progresses implementation of the Well-being of Future Generations (Wales) Act and A Healthier Wales strategic plan towards a healthier, more equal, resilient, prosperous and globally responsible Wales.

**Disclaimer:** The reports provide a high-level summary of learning from real life experiences from selected countries, and from a variety of scientific and grey literature, including sources of information to allow further exploration. The reports are not comprehensive and are not aimed at providing detailed, robust or in-depth evidence review, analysis or quality assurance. They are meant to offer a brief snapshot or current evidence, policy and practice, sharing relevant country examples and key (reputable) international bodies' guidance and principles.

## In focus:

 **COVID-proofing the educational environment: 4-18 years**

## Contents

<b>At a glance: summary of international learning .....</b>	<b>3</b>
<b>COVID-proofing the educational environment: 4-18 years .....</b>	<b>5</b>
<b>Sustaining behaviour change .....</b>	<b>17</b>
<b>Country insights.....</b>	<b>18</b>

## At a glance: summary of international learning

*“Where children learn is as important as what they learn”  
(Michelle Wong, Independent SAGE; architectural designer)<sup>1</sup>*

### COVID-proofing the educational environment: 4-18 years

- ✚ The **continuity of education** should be at the forefront of all relevant considerations and decisions **to support children’s overall well-being and health and safety**
- ✚ The **negative physical, mental and educational impacts** of proactive school closures on children, as well as the **economic impact** on society, could **outweigh the benefit**
- ✚ **Measures should be adapted** to levels of community COVID-19 transmission as well as to the educational setting, age group, and the measures’ **impact on learning and psychosocial development**
  - All measures should be **equity-proofed**
  - **Additional support** should be provided to schools in **deprived areas** and for **children living in vulnerable situations**
  - **Children with pre-existing health conditions** should be assessed individually
- ✚ Implementing **combinations of non-pharmaceutical interventions (NPIs)** can significantly reduce the risk of COVID-19 transmission in school settings and should:
  - Provide an **optimal learning and social environment** while reducing risks
  - Be **flexible, adaptive, and appropriate** to the local context

### Mitigation measures

- ✚ **Physical distancing** measures can prevent crowding and reduce the number of contacts, while ensuring schooling can take place
- ✚ **Face masks** are recommended in **specific situations**, according to **age and underlying child’s health**, and **in combination with other measures**; implementation should consider potential harms and **the impact on learning and psychosocial development**
- ✚ **School architecture** may offer an opportunity to reduce inequalities between children, and promote health, well-being, and learning
- ✚ **Ventilation**
  - **Investing in healthy air in schools settings may reap benefits beyond the COVID-19 pandemic** through reducing the risk of other infectious diseases, and improving educational attainment
  - **CO<sub>2</sub> monitoring** is a tool to guide other mitigation measures and can be used as a proxy for ventilation effectiveness and air quality
- ✚ **Supporting children, families, and school staff** can be achieved through:
  - Recognising **children’s rights and voices** within decision making processes
  - Prioritisation of **well-being within the school curriculum**
  - **Pre-existing systemic, structural and cultural issues** as well as emerging COVID-19 specific well-being challenges should be considered
  - Young people are worried regarding **misinformation / disinformation** associated with COVID-19, especially through social media
  - **Increasing teacher recruitment**, to:

<sup>1</sup> Independent SAGE weekly briefing 5 August 2022; <https://www.independentsage.org/weekly-briefing-5th-aug-2022/>

- ✓ Provide additional support for students in need
- ✓ Ensure schools can safely continue and meet public health guidance
- ✓ Cover for teachers' absences due to COVID-19
- ✓ Support remedial programmes such as summer school

#### ✚ Vaccination

- Vaccines are being **increasingly authorised for use in children**
- **Weighing up the benefits and the risks** of vaccination is imperative
- **Vaccine acceptance** amongst parents is associated with trust in institutions
- There is variation in vaccine access for teachers and most **countries have included teachers as a priority group** to be vaccinated

#### ✚ Testing strategies should be based on **effectiveness, cost-effectiveness and feasibility**; and testing of symptomatic and asymptomatic individuals is recommended in **specific circumstances**

#### ✚ Hand and surface hygiene

- **High-touch surfaces** should be identified for priority disinfection
- Increase **access to handwashing facilities** with running water
- Encourage students to **wash hands at key times with soap and water and hand rub using an alcohol-based** hand sanitiser

### Sustaining behaviour change

Strategies to embed and sustain behaviour change around mitigation measures include:

#### ✚ Behaviours should be **Normal, Easy, Attractive, and Routine**

#### ✚ Implementation of general behaviour change principles for infection control mapped to the **Capability-Opportunity-Motivation Behaviour (COM-B)** model includes:

- Build and sustain an **understanding of infection risks** and how to mitigate these
- Ensure that **all sectors of society and organisations work together** to maximise opportunities for successful risk management
- Ensure that **people and organisations attach high value to infection control** and how this is embedded into daily lives

### Country insights

Case studies including **mapping of COVID-19 case rates against school-based mitigation measures** are presented for

- ✚ Germany
- ✚ New Zealand
- ✚ Singapore and
- ✚ Sweden

## COVID-proofing the educational environment: 4-18 years

### Introduction

- The **continuity of education should be at the forefront** of all relevant considerations and decisions **to support children’s overall well-being, health and safety**, stated by the WHO, UNESCO and UNICEF<sup>2</sup>
- The decision to **close schools** to control COVID-19 should be used as a **last resort**<sup>3</sup>
- The **negative physical, mental and educational impacts** of proactive school closures on children, as well as the **economic impact** on society more broadly, **would likely outweigh the benefits**<sup>3</sup>

This report discusses **key measures taken to reduce COVID-19 transmission and keep schools open**, both **within and external to the education system**, including:

- **Mitigation measures** in schools for children **aged between 4 - 18 years** (variation due to different educational systems in different countries)
- **Detailed country insights** from Germany, New Zealand, Sweden and Singapore

School closures and online/hybrid learning are beyond the scope of this report. Previous International Horizon Scanning reports have considered COVID-19 and education (*Table 1*).

**Table 1. Previous International Horizon Scanning reports focussing on COVID-19 and education**

Overarching Topic	Publication date
<a href="#">Key elements to consider for re-opening education</a>	21.05.2020
<a href="#">COVID-19 impact on children and young people</a>	22.09.2020
<a href="#">COVID-19 impact on universities and international students</a>	08.10.2020
<a href="#">Transmission of COVID-19 in children and young people</a>	22.10.2020
<a href="#">Loss of education due to COVID-19</a>	21.02.2021
<a href="#">COVID-19 impact on education and schooling practises</a>	01.07.2021
<a href="#">Re-opening of educational settings</a>	10.07.2021

### COVID-19 transmission in school settings

Transmission of COVID-19 in schools appears to be affected by how widespread the virus is in the broader community:<sup>4</sup>

- Reviews have suggested **low overall transmission to and from children**, particularly in the context of low overall transmission in the community<sup>5</sup>
- **Assessment including causality of COVID-19 transmission in schools is challenging**, especially when community transmission rates are high<sup>3</sup>
- Recent epidemiological trends, following the emergence of the Omicron variant, seem to suggest that **children contribute to transmission similarly to adults**,<sup>6</sup> especially in high-income countries where children often have more contact than adults<sup>7</sup>
- Most **children remain asymptomatic or develop a very mild form** of COVID-19,<sup>8</sup> which may result in less testing, and an underestimate of the true number of cases<sup>5</sup>

<sup>2</sup> [Schooling during the COVID-19. Recommendations from the European Technical Advisory Group for schooling during COVID-19 \(who.int\)](#)

<sup>3</sup> [COVID-19 in children and the role of school settings in transmission - second update \(europa.eu\)](#)

<sup>4</sup> [Questions and answers on COVID-19: Children aged 1 – 18 years and the role of school settings \(europa.eu\)](#)

<sup>5</sup> [COVID-19 disease in children and adolescents: Scientific brief, 29 September 2021 \(who.int\)](#)

<sup>6</sup> [Infection prevention and control in the context of coronavirus disease \(COVID-19\): A living guideline \(who.int\)](#)

<sup>7</sup> [CoMix study - Social contact survey in the UK | CMMID Repository](#)

<sup>8</sup> [Questions and answers on COVID-19: Children aged 1 – 18 years and the role of school settings \(europa.eu\)](#)

- There is a growing evidence base on the **role of educational staff on COVID-19 transmission** in school settings:<sup>3</sup>
  - ✓ **Staff had higher incidence** than students and **most cases linked to outbreaks were among staff members**, based on a large cross-sectional study in England<sup>9</sup>
  - ✓ **Educators may play a central role in in-school transmission** networks, based on an investigation in schools in Georgia, USA<sup>10</sup>
  - ✓ **Teachers caused four times more secondary cases than students**, based on a study from Germany<sup>11</sup>

## Mitigation measures

- **Combinations of non-pharmaceutical interventions (NPIs) to reduce transmission risk** continues to be essential to prevent transmission in school settings (*Figure 1*)<sup>12</sup>
- There is **limited spread** of COVID-19 in schools when appropriate **mitigation measures are in place**<sup>3</sup>
- Measures should be **adapted to the level of community transmission**, as well as to the **educational setting and age group**<sup>13</sup>
- **Implementation** should:
  - ✓ provide an **optimal learning and social environment** while reducing risks<sup>2 3</sup>
  - ✓ be **flexible, adaptive, and appropriate** to the local context<sup>14</sup>
- Implementing **combination of multiple physical distancing and hygiene measures can significantly reduce COVID-19 transmission** in school settings:<sup>3</sup>
  - ✓ Three **low-cost mitigation measures - daily symptom screening, mandatory masks for teachers, and cancelling extra-curricular activities**, have been associated with **significant reductions in risk**<sup>15</sup>
  - ✓ When **seven or more mitigation measures** are in place there is no significant difference in COVID-19-like illness cases between children attending school full-time and those studying at home due to school being closed
  - ✓ The WHO and UNICEF advocate a **“do it all” approach** (*Figure 2*) with **updated school guidance** published by the ECDC,<sup>13</sup> CDC,<sup>14</sup> and the WHO<sup>16</sup>
- The **effectiveness of different measures** has been assessed, concluding:<sup>2 17</sup>
  - ✓ **Evidence** for the effectiveness of mitigation measures in school settings **is sparse** and there is a lack of knowledge about consequences of measures
  - ✓ There is an **urgent need for well-designed real-world empirical studies** to investigate impacts, as most evidence currently is based on modelling studies

<sup>9</sup> SARS-CoV-2 infection and transmission in educational settings: a prospective, cross-sectional analysis of infection clusters and outbreaks in England - ScienceDirect

<sup>10</sup> Clusters of SARS-CoV-2 Infection Among Elementary School Educators and Students in One School District — Georgia, 2020–2021 | MMWR (cdc.gov)

<sup>11</sup> COVID-19 transmission in educational institutions August to December 2020, Rhineland-Palatinate, Germany: a study of index cases and close contact cohorts

<sup>12</sup> <https://www.sciencedirect.com/science/article/pii/S014067362100622X?via%3Dihub>

<sup>13</sup> Questions and answers on COVID-19: Children aged 1 – 18 years and the role of school settings (europa.eu)

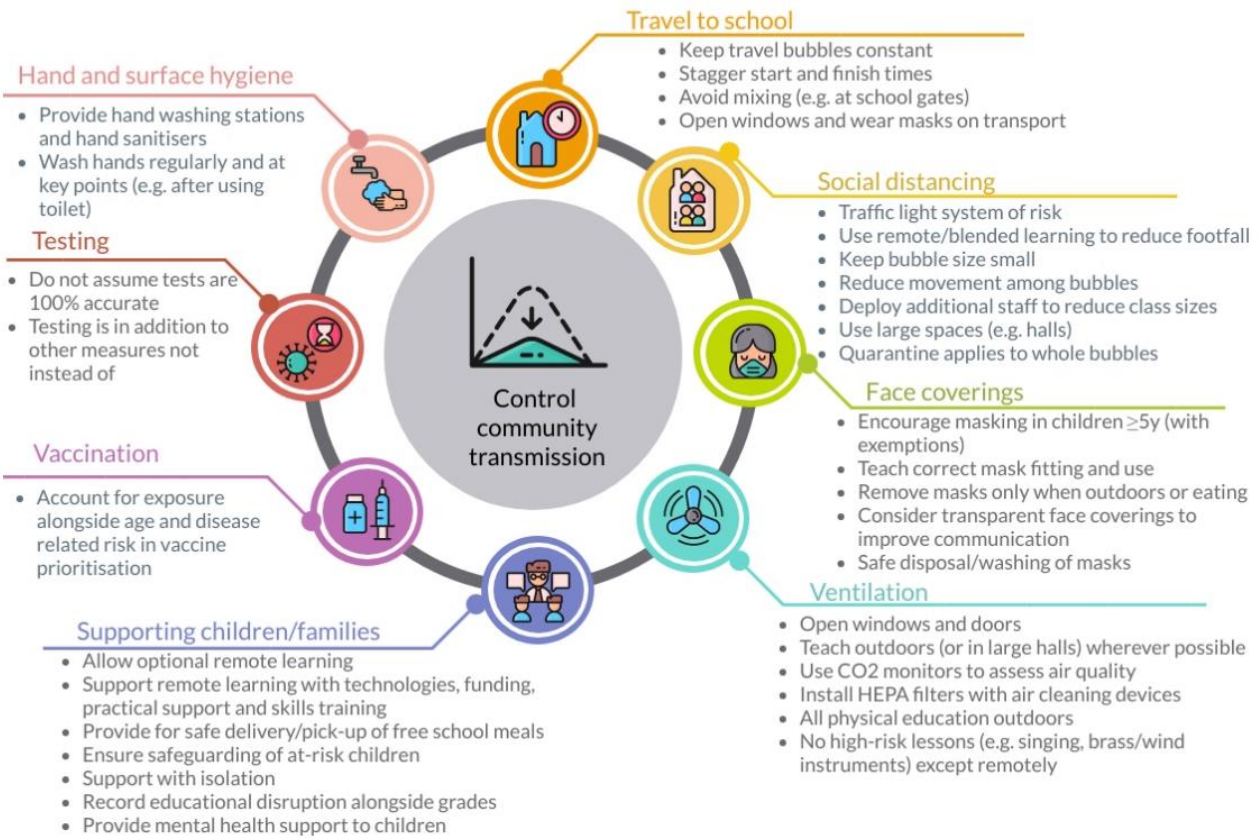
<sup>14</sup> Schools and Childcare Programs | COVID-19 | CDC

<sup>15</sup> <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8168618>

<sup>16</sup> COVID-19: safe schools (who.int)

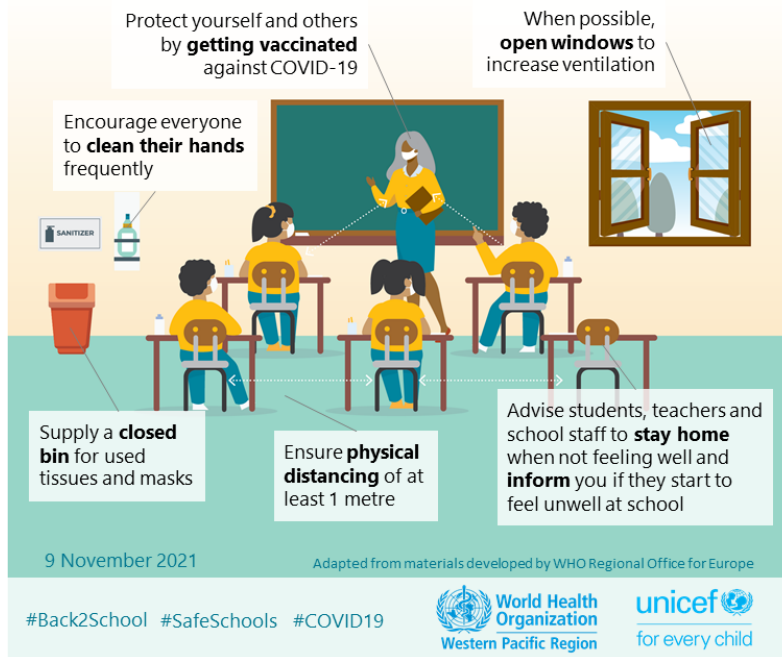
<sup>17</sup> [https://www.cochrane.org/CD015029/PUBHLTH\\_measures-implemented-school-setting-contain-covid-19-pandemic](https://www.cochrane.org/CD015029/PUBHLTH_measures-implemented-school-setting-contain-covid-19-pandemic)

**Figure 1: Mitigation measures for safer schools (The Lancet<sup>12</sup>)**



**Figure 2. Reducing COVID-19 risk in schools (WHO<sup>16</sup>)**

## Reducing COVID-19 risks in schools



## Children in vulnerable situations

All measures should be equity-proofed and harmful measures or those with no benefit should be discontinued:<sup>18</sup>

- Vulnerable groups of children should be identified to **target support and plan for minimising harm** for future COVID-19 waves
- Countries should **promote and facilitate collaboration of communities and the health, education and social sectors**
- **Additional support** should be provided to schools in **deprived areas** and for **children living in vulnerable situations**
- Schools should implement additional measures to further protect children in socially vulnerable situations, including direct outreach to those at risk of dropping out of school
- **Children with pre-existing health conditions should be assessed individually** for their specific risk
- The CDC acknowledges the importance that **schools play in promoting equity in learning and health**, particularly for groups disproportionately affected by COVID-19<sup>19</sup>

A comparative analysis of European countries showed that decisions to close primary schools, or not, were based on **two alternative discourses on schooling**:<sup>20</sup>

- As a preventive measure underlined by **discourses of schools as places for infection**
- Keeping schools open, underlined by a **discourse in which schools were considered a place for social supportive measures and caring**

## Physical (social) distancing

Physical distancing measures can **prevent crowding and decrease the number of contacts** in confined/closed spaces while ensuring **schooling can take place**, through, for example:<sup>3</sup>

- Cohorting of classes and groups; staggering arrival, meal, and break times
- Ensuring physical distance in the classroom, e.g. separating tables/chairs
- Reducing class sizes
- Holding classes outdoors
- Cancelling, where necessary, indoor extracurricular activities

Evidence suggests **limited literature on and limited incorporation of school practices** to promote social distancing in United States government guidance documents.<sup>21</sup>

## Face masks

National policies should be guided by the primary principle: '**Do no harm: the best interest, health and well-being of the child should be prioritised**':<sup>22</sup>

- Overall, there is **limited evidence on children and mask use** and children's role in COVID-19 transmission
- Using masks should be implemented taking into consideration **the age and impact on learning and psychosocial development**<sup>3</sup> (*Table 2*)

<sup>18</sup> <https://apps.who.int/iris/bitstream/handle/10665/342075/WHO-EURO-2021-2151-41906-59077-eng.pdf>

<sup>19</sup> [Schools and Childcare Programs | COVID-19 | CDC](https://www.cdc.gov/schools/COVID-19/)

<sup>20</sup> <https://journals.sagepub.com/doi/10.1177/14749041211041237>

<sup>21</sup> [School practices to promote social distancing in K-12 schools: review of influenza pandemic policies and practices | BMC Public Health | Full Text \(biomedcentral.com\)](https://pubs.bmc.com/pubitem.do?item=1&journal=10764&page=1)

<sup>22</sup> [Advice on the use of masks for children in the community in the context of COVID-19 \(who.int\)](https://www.who.int/news-room/fact-sheets/detail/masks-for-face-protection)



- Evidence shows that **mask use is successful for COVID-19 prevention when used in combination with other NPIs**, such as physical distancing to prevent crowding, keeping places ventilated and frequent hygiene measures to minimise transmissions.<sup>3 23 24 25</sup>
- Evidence also highlights the **possible harms** associated with facemask use amongst children, **including disruptions to holistic development,<sup>26</sup> cognitive performance,<sup>27</sup> and the ability to recognise emotion.<sup>28 29</sup>**

**Table 2. Recommendations for children to wear face masks in schools, according to age group and situation (WHO and ECDC)**

WHO recommendations <sup>30</sup>	ECDC recommendations <sup>31</sup>
<b>Masks are not required:</b> <ul style="list-style-type: none"> <li>- Children 5 years of age and under</li> <li>- Children with cognitive or respiratory impairments, developmental disorders and disabilities</li> </ul>	<b>Wearing face masks in Primary schools:</b> <ul style="list-style-type: none"> <li>- <b>Recommended for teachers and other adults</b> when physical distancing cannot be guaranteed</li> <li>- <b>Not recommended for students</b> due to younger children's lower tolerance to wearing masks for extended periods of time</li> </ul>
<b>Masks are recommended:</b> <ul style="list-style-type: none"> <li>- In indoor settings with poor ventilation in areas with known/suspected community transmission for children aged 6-11 years</li> <li>- Adolescents 12 years or older should follow advice as per adults</li> </ul>	<b>Wearing face masks in Secondary schools:</b> <ul style="list-style-type: none"> <li>- <b>Recommended for pupils aged over 12 years and adults</b> living in areas with community transmission of COVID-19</li> </ul>
<b>Medical masks are recommended:</b> <ul style="list-style-type: none"> <li>- Children with a higher risk of severe complications from COVID-19, in consultation with the child's medical provider</li> </ul>	

**Mitigation measures, including mask wearing in schools, should be adaptable and change** in response to local epidemiological situations (recommended by CDC):<sup>32</sup>

- **At a high COVID-19 community level:** universal indoor masking in schools and early childhood education programs is recommended
- **At a medium and high COVID-19 community level,** immunocompromised or those at risk for getting very sick should wear a mask or respirator that provides greater protection
- **At all times:**
  - ✓ Masking advised in healthcare settings including **school nurses' offices**
  - ✓ People **exposed to COVID-19** should wear a well-fitting mask or respirator around others for 10 days from their last exposure
- Schools may **require face masks to protect students with health conditions** increasing their risk of COVID-19 illness

<sup>23</sup> <https://www.scielo.br/j/rpp/a/RXFXDPvImfSjPwLRD44D8R/?format=pdf&lang=en>

<sup>24</sup> [Modelling the potential impact of mask use in schools and society on COVID-19 control in the UK | Scientific Reports \(nature.com\)](#)

<sup>25</sup> [Frontiers | Impact of Changes in Infection Control Measures on the Dynamics of COVID-19 Infections in Schools and Pre-schools \(frontiersin.org\)](#)

<sup>26</sup> [Face masks disrupt holistic processing and face perception in school-age children \(springeropen.com\)](#)

<sup>27</sup> [Children | Free Full-Text | To Mask or Not to Mask&mdash;Evaluation of Cognitive Performance in Children Wearing Face Masks during School Lessons \(MaskKids\) | HTML \(mdpi.com\)](#)

<sup>28</sup> [The Role of Face Masks in the Recognition of Emotions by Preschool Children | Pediatrics | JAMA Pediatrics | JAMA Network](#)

<sup>29</sup> [Children's emotion inferences from masked faces: Implications for social interactions during COVID-19 - PubMed \(nih.gov\)](#)

<sup>30</sup> [Infection prevention and control in the context of coronavirus disease \(COVID-19\): A living guideline \(magicapp.org\)](#)

<sup>31</sup> [Questions and answers on COVID-19: Children aged 1 – 18 years and the role of school settings \(europa.eu\)](#)

<sup>32</sup> [Operational Guidance for K-12 Schools and Early Care and Education Programs to Support Safe In-Person Learning | CDC](#)

## Architecture and ventilation

### Architecture

The **impact of the built environment and COVID-19 has been inequitable:**

- **Urban schools** in England have less outdoor space per pupil compared to rural schools<sup>33</sup>
  - ✓ Schools with less outdoor space have had less provision for outdoor learning
  - ✓ Playground zoning for COVID-19 restrictions may have had a further negative impact
- **Socially responsive and locally driven architecture and urban planning** may contribute to **bridging the gap**,<sup>34</sup> through:
  - ✓ A **multidisciplinary approach** using public health vocabulary in planning and design
  - ✓ **Classroom layout, lighting and ventilation, interior decoration and colour** are effective in creating interest and motivation for students to learn, and can reduce stress and anxiety<sup>35</sup> when exploring ergonomics for children's cognition during COVID-19
- **School settings can positively address children's vulnerabilities related to the built environment**, such as ambient and indoor air pollution and physical inactivity<sup>36</sup>
- It is recommended to plan child-responsive urban settings through **co-production and coalition building with children**<sup>36</sup>

A specially designed '**pandemic-proof**' school in Peru incorporates:<sup>37</sup>

- Natural air cross ventilation: 100% fresh air without recirculation
- Flexible and moveable components including walls
- A future-focus through nearly zero-energy and net zero carbon footprint; local reused / recycled materials; and natural sustainable materials

### Ventilation

Ventilation is a **key environmental health constraint**:<sup>38</sup>

- There is a **paucity of quantitative evidence on the quality and effectiveness** of ventilation in buildings in the UK
- **Public and business understanding of ventilation as a COVID-19 mitigation is lower** than measures such as cleaning and hand hygiene
- Ventilation strategies should be implemented together with:
  - ✓ Education on the importance of ventilation
  - ✓ Incentives to improve ventilation in an energy efficient manner
  - ✓ Industry training to ensure competence in assessment of ventilation systems
- **Ventilation alone is not effective at reducing close range (<2 m) infection** via aerosols, droplets, or fomites, hence, **ventilation should be combined with additional measures**, such as physical distancing, face masks, and good hygiene<sup>39</sup>
- Evidence shows that investing in **healthy air in school settings may reap benefits beyond the COVID-19 pandemic through reducing the risk of other infectious diseases and improving educational attainment and performance**,<sup>40</sup> for example:

<sup>33</sup> [Adaptive school grounds design in response to COVID-19: Findings from six primary schools in South East England - ScienceDirect](#)

<sup>34</sup> [Full article: Physical distancing, children and urban health \(tandfonline.com\)](#)

<sup>35</sup> [Ergonomics factors influencing school education during the COVID-19 pandemic: A literature review - IOS Press](#)

<sup>36</sup> [UNICEF\\_Shaping\\_urbanization\\_for\\_children\\_handbook\\_2018.pdf](#)

<sup>37</sup> [Rosan Bosch | New School Gives Direction for Flexible Learning During Pandemics](#)

<sup>38</sup> [S1256\\_EMG\\_SPI-B\\_Application\\_of\\_CO2\\_monitoring\\_as\\_an\\_approach\\_to\\_managing\\_ventilation\\_to\\_mitigate\\_SARS-CoV-2\\_transmission.pdf \(publishing.service.gov.uk\)](#)

<sup>39</sup> [gov.ie - Expert Group on the Role of Ventilation in Reducing Transmission of COVID-19 \(www.gov.ie\)](#)

<sup>40</sup> [School Ventilation: A Vital Tool to Reduce COVID-19 Spread \(centerforhealthsecurity.org\)](#)

- ✓ There is an association between poor ventilation / high CO<sub>2</sub> levels and decreased student performance
- ✓ Statistically significant improvements in academic performance and student absenteeism are observed with higher ventilation rates / lower CO<sub>2</sub> levels

Ventilation can be **natural, mechanical, or hybrid, and air filtration** (Table 3)

**Table 3. Overview of ventilation types**

<p><b>Natural ventilation</b><sup>41 42</sup> Describes ventilation due to wind and temperature; achieved through opening windows, trickle ventilators on windows, ventilation openings</p>	<ul style="list-style-type: none"> <li>– Dependent on operator, local climate and building design</li> <li>– High rates of ventilation can be achieved when good design and operation</li> <li>– Change rates of natural ventilation can be difficult to assess</li> </ul>
<p><b>Mechanical ventilation</b><sup>43 44 45</sup> Describes the use of fans and other control systems; using either clean outdoor air, or incorporating air conditioning within a heating, ventilation, and air conditioning (HVAC) systems</p>	<ul style="list-style-type: none"> <li>– Buildings are often air tight to conserve energy, and therefore reliant on mechanical ventilation</li> <li>– Local airflow patterns are important in cough droplet dispersion and consequent exposure - not only air change rate should be considered, but the relative locations of cough source and susceptible person</li> <li>– Mechanical ventilation of 10-14 litres/second per student can reduce the likelihood of infection by 80%, compared to classrooms with natural ventilation only, when investigating transmission in 10,441 classrooms, of which 316 with mechanical ventilation, in Italy</li> </ul>
<p><b>Hybrid ventilation</b><sup>42</sup> Describes use of both natural and mechanical ventilation</p>	<ul style="list-style-type: none"> <li>– Can achieve higher ventilation rates, lower CO<sub>2</sub> levels, and improve academic performance compared to natural ventilation alone</li> </ul>
<p><b>Air filtration</b><sup>43</sup> High efficiency particulate air (HEPA) filters or other high grades (e.g. MERV 13 or higher) are effective at removing respiratory particles of the size range which carry COVID-19</p>	<ul style="list-style-type: none"> <li>– It is accepted that such filters are effective at removing airborne COVID-19, there is no direct evidence that they can reduce transmission</li> <li>– The WHO, ECDC, and CDC all recognise that HEPA filters may be useful in spaces with insufficient ventilation</li> </ul>
<p><b>Ultraviolet disinfection</b><sup>43</sup> Inactivates viruses and bacteria; and is expected to be effective against SARS-CoV-2, however, there are no in vivo studies</p>	<ul style="list-style-type: none"> <li>– The ECDC and CDC recognise the potential of the supplementary role UV-C disinfection may play within HVAC systems</li> </ul>

## CO<sub>2</sub> monitoring

**CO<sub>2</sub> monitoring is a tool to guide other mitigation measures** (it is not a measure in itself) and can be used as a proxy for ventilation effectiveness and air quality:<sup>43 46</sup>

- CO<sub>2</sub> monitoring cannot indicate COVID-19 transmission risk
- It should be used as a guide rather than for identifying “safe” thresholds (Figure 3)
- Must be accompanied by opportunities to improve ventilation alongside information and support for users, including how to take effective action when a high reading is identified<sup>46</sup>
- Guidance is available on sustaining use of CO<sub>2</sub> monitoring to improve ventilation<sup>46</sup>

<sup>41</sup> <https://www.sciencedirect.com/science/article/abs/pii/S0360132309001887?via%3Dihub>

<sup>42</sup> [https://pure.tudelft.nl/ws/portalfiles/portal/94604015/PAP261Ding\\_HB2021.pdf](https://pure.tudelft.nl/ws/portalfiles/portal/94604015/PAP261Ding_HB2021.pdf)


<sup>43</sup> [gov.uk - Expert Group on the Role of Ventilation in Reducing Transmission of COVID-19 \(www.gov.uk\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/82447/gov-uk-expert-group-on-the-role-of-ventilation-in-reducing-transmission-of-covid-19)

<sup>44</sup> <https://www.tandfonline.com/doi/abs/10.1080/10789669.2013.842447>

<sup>45</sup> <https://arxiv.org/abs/2207.02678>

<sup>46</sup> [S1256 EMG SPI-B Application of CO<sub>2</sub> monitoring as an approach to managing ventilation to mitigate SARS-CoV-2 transmission.pdf \(publishing.service.gov.uk\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/82447/S1256_EMG_SPI-B_Application_of_CO2_monitoring_as_an_approach_to_managing_ventilation_to_mitigate_SARS-CoV-2_transmission.pdf)

**Figure 3. CO<sub>2</sub> levels and recommended actions, ppm – parts per million (CoSchools<sup>47</sup>)**

CO <sub>2</sub> level	Description	Actions	Outcomes 
> 1500 ppm.	Indicative of inadequate ventilation.	Keep checking ventilation provision (e.g. windows and doors are open) and the CO <sub>2</sub> levels. If consistent, notify school leadership.	There are quite high levels of shared/rebreathed air in your classroom which, if maintained, might lead to poorer learning and health outcomes.
800 ppm to 1500 ppm.	Potential for stuffy/stale air and lethargic learners.	Open windows and/or doors – higher-level openings first and then lower-level openings.	Potential to improve ventilation in your classroom should be considered for better health and learning outcomes.
< 800 ppm.	Indicative of good ventilation.	If CO <sub>2</sub> levels are not rising, and if the classroom is cold then you can consider slightly closing your window opening extents. Do so slowly and steadily.	Ventilation should be acting to help reduce the risk of airborne transmission but only as part of a fuller range of mitigation measures ( <a href="https://www.gov.uk/government/collections/guidance-for-schools-coronavirus-covid-19">https://www.gov.uk/government/collections/guidance-for-schools-coronavirus-covid-19</a> ).
Close to, or just above, 400 ppm.	Typical outdoor reading.	No actions required, but if your classroom is cold then the windows can be slightly closed.	Your classroom might be overventilated – this might not be of direct concern, but if your classroom is cold then you might be wasting energy and affect the learning experience.

## Supporting children, families, and school staff

### Children’s involvement in decision making

**Children’s and adolescents’ rights should be recognised;** and weight must be given to their voices in relation to education and COVID-19-related interventions<sup>48 49</sup>

- **Youth organisations** should be involved in the development of children’s health and education policies
- There are **strong concerns** that children are not being consulted or provided information regarding the pandemic
- Few European countries have used **children’s rights impact assessments** or similar decision making measures
- A global study has found that **only 20% of children feel they have been involved** in decision-making
  - ✓ In Wales, 24,000 children were consulted in May 2020 through an online survey (repeated in 2021 with 20,000 children). Survey findings were used by Welsh Government in key decision-making
  - ✓ In Scotland, a member of the Scottish Youth Parliament was included in Scottish Government’s main advisory group, the COVID-19 Education Recovery Group

### Student well-being

- **A ‘Curriculum for Wellbeing’ is prioritised by** the British Educational Research Association (BERA) noting that:<sup>50</sup>
  - ✓ Schools are impacted by both pre-existing systemic, structural and cultural issues as well as emerging COVID-19 specific well-being challenges

<sup>47</sup> <https://coschools.org.uk/>

<sup>48</sup> <https://apps.who.int/iris/bitstream/handle/10665/342075/WHO-EURO-2021-2151-41906-59077-eng.pdf>

<sup>49</sup> <https://www.who.int/europe/publications/item/WHO-EURO-2021-3169-42927-59948>

<sup>50</sup> [A curriculum for wellbeing: Improving all aspects of wellbeing in curricula & schools | BERA](#)

- ✓ Education in all its forms has had to “adapt, re-adapt and adapt again to meet the needs of pupils, staff and policy in challenging times”
- **Hotlines for children and adolescents seeking psychological support** are recommended by the European Technical Advisory Group for schooling<sup>51</sup>

### Addressing misinformation / disinformation

**Young people are worried** regarding misinformation and disinformation associated with COVID-19, which **threatens compliance and therefore effectiveness** of COVID-19 mitigation measures:<sup>52 53</sup>

- **Social media is a key source of misinformation / disinformation** and is a common news source amongst young people
- Over half of 15 year olds in OECD countries report **receiving teaching** on identifying misinformation / disinformation
- Students from **more deprived socio-economic backgrounds are less likely to recognise** the credibility of information<sup>54</sup>

### Supporting teachers

- **Key recommendations for schooling** during COVID-19 include:<sup>51</sup>
  - ✓ **Affordable access to equipment** for online teaching/learning, regardless of whether schools are closed or open
  - ✓ Ensure students and teachers have **sufficient digital skills**
  - ✓ **Teachers are adequately supported** to address learning losses
- **Temporary staff** is being recruited to ensure schools can safely continue, adhere to public health guidance and provide additional support to students in need,<sup>55</sup> for example:
  - ✓ 1/3 (33%) of OECD countries in 2019/20, and nearly half (48%) in 2020/21, recruited in at least one educational level
  - ✓ France: 5,000 temporary teachers hired in April 2021 to cover for teachers absent due to COVID-19
  - ✓ Luxembourg: temporary staff hired to support teachers with administrative tasks, and support students in remedial programmes (including summer school)
  - ✓ In Belgium, France and Israel, additional staff were recruited for remedial teaching outside of normal school hours
- Few countries implemented **incentives to encourage existing teachers to increase their hours** to support remedial school programmes in 2020/21,<sup>55</sup> including Belgium, the Czech Republic, France, Israel and Poland

## Vaccination

### Vaccination for children and adolescents

- **An increasing number of vaccines is being authorised for use in children**, including:<sup>56</sup>  
57 58

<sup>51</sup> <https://apps.who.int/iris/bitstream/handle/10665/342075/WHO-EURO-2021-2151-41906-59077-eng.pdf>

<sup>52</sup> [Delivering for youth: How governments can put young people at the centre of the recovery \(oecd.org\)](#)

<sup>53</sup> <https://www.oecd.org/coronavirus/policy-responses/transparency-communication-and-trust-the-role-of-public-communication-in-responding-to-the-wave-of-disinformation-about-the-new-coronavirus-bef7ad6e/#section-d1e37>

<sup>54</sup> <https://www.oecd.org/education/are-15-year-olds-prepared-to-deal-with-fake-news-and-misinformation-6ad5395e-en.htm>

<sup>55</sup> [OECD COVID Survey\\_EAG.indd \(oecd-ilibrary.org\)](#)

<sup>56</sup> [The Moderna COVID-19 \(mRNA-1273\) vaccine: what you need to know \(who.int\)](#)

<sup>57</sup> [The Pfizer BioNTech \(BNT162b2\) COVID-19 vaccine: What you need to know \(who.int\)](#)

<sup>58</sup> [Interim statement on COVID-19 vaccination for children \(who.int\)](#)

- ✓ The Moderna and Pfizer vaccines are classed as safe and effective for individuals aged 6 months and above
- ✓ Chinese authorities have approved the Sinovac-CoronaVac and the BBIBP-CorV vaccines for those aged 3 to 17 years
- ✓ In India, Covaxin has been approved for use for those aged 12-17; but it has not yet received WHO Emergency Use Listing (EUL) for this age group
- **Weighing up the benefits and the risks** of vaccination is imperative, including.<sup>59 60 61 62</sup>
  - ✓ Decisions to vaccinate children should be based upon the **protection of the individual child** rather than the community as COVID-19 vaccines reduce but do not prevent transmission
  - ✓ WHO recommends vaccination for **children aged 5+ with comorbidities** that put them at severe risk of COVID-19
  - ✓ Children aged **5-11 are at a relatively low risk** of severe outcomes of COVID-19 infection, irrespective of their vaccination status; and they appear to be at lower risk of “long COVID”
  - ✓ Healthy children and adolescences remain a “lowest priority-use group” and should only be vaccinated when high vaccine coverage is achieved in all higher priority-use groups
  - ✓ Indirect benefits of vaccinating children include minimising disruption to education
- **Growing evidence** suggests:
  - ✓ The lower dose of vaccine administered to children (10 mg vs 30 mg) may offer less protection than seen in older age groups<sup>63</sup>
  - ✓ A systematic review of post-vaccination myopericarditis reports in children aged 5-18 years has found that the benefits of COVID-19 vaccination outweigh the risk of developing post-vaccination myopericarditis<sup>64</sup>
  - ✓ Extending vaccination coverage in students, complemented by regular testing with good adherence, are essential steps to keep schools open when highly transmissible variants are circulating<sup>65</sup>
- **Vaccine acceptance** amongst children and parents has been reported, for example:
  - ✓ Vaccine acceptance has been associated with fear of contracting COVID-19 and trust in institutions in France<sup>66</sup>
  - ✓ Low vaccination intention was associated with children not receiving the influenza vaccine, and parents’ low intention to vaccinate themselves in Canada<sup>67</sup>

### Vaccinating school staff

- The prioritisation of teachers’ vaccination vary across countries globally (*Figure 4*).<sup>68 69</sup>
  - ✓ **72% of countries had included teachers in a priority group** to be vaccinated in national vaccine rollout plans
  - ✓ Teachers were allocated to the first priority group with frontline workers in nearly 10% of countries

<sup>59</sup> WHO SAGE Roadmap for prioritizing uses of COVID-19 vaccines: An approach to optimize the global impact of COVID-19 vaccines, based on public health goals, global and national equity, and vaccine access and coverage scenarios

<sup>60</sup> Coronavirus disease (COVID-19): Vaccines (who.int)

<sup>61</sup> Interim statement on COVID-19 vaccination for children (who.int)

<sup>62</sup> COVID-19 vaccination for children aged 5–11 years - The Lancet

<sup>63</sup> NEJMoa2116298.pdf (nih.gov)

<sup>64</sup> COVID-19 review shows that benefits of vaccinating children and adolescents appear to outweigh risks of post-vaccination myopericarditis (wiley.com)

<sup>65</sup> Screening and vaccination against COVID-19 to minimise school closure: a modelling study | Elsevier Enhanced Reader

<sup>66</sup> Acceptance of childhood and adolescent vaccination against COVID-19 in France: a national cross-sect (tandfonline.com)

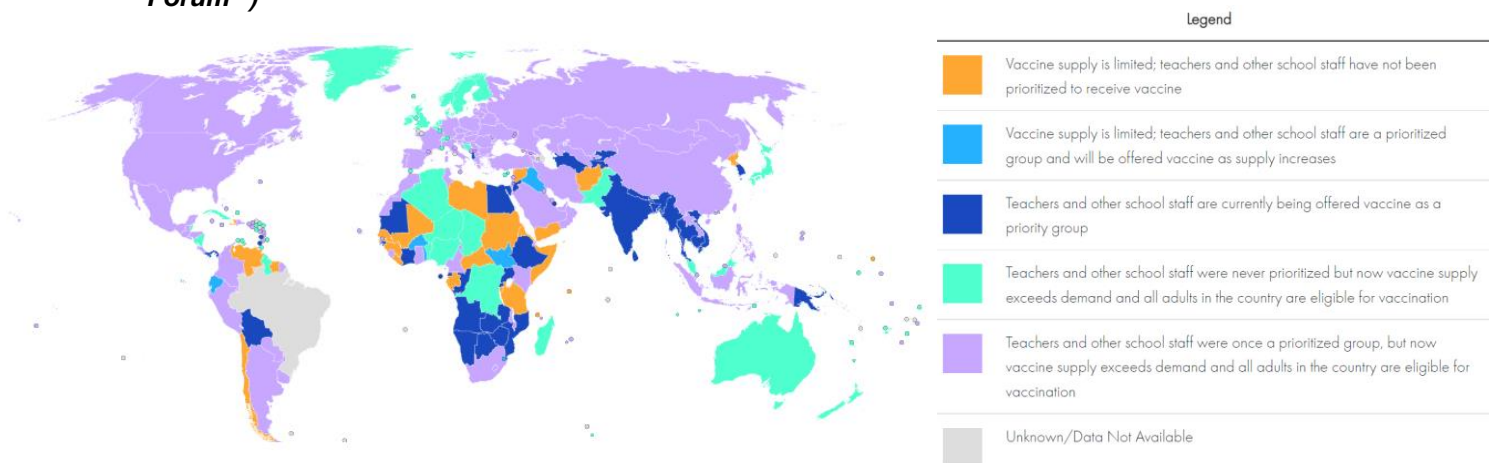
<sup>67</sup> Canadian parents’ perceptions of COVID-19 vaccination and intention to vaccinate their children: Results from a cross-sectional national survey | Elsevier Enhanced Reader

<sup>68</sup> Vaccine access for teachers and school staff - COVID-19 Global Education Recovery Tracker (covideducationrecovery.global)

<sup>69</sup> Monitoring teacher vaccination against COVID-19 | UNESCO

- **Country examples** for prioritising school staff include:<sup>70</sup>
  - ✓ In Germany and Portugal, teachers in pre-primary and primary education were prioritised over secondary teachers
  - ✓ In Canada, some provinces and territories prioritised teachers in areas where incidence rates of COVID-19 were high
  - ✓ In some cases, prioritisation of teachers was based on specific criteria - the Czech Republic and France both prioritised teachers according to their age
  - ✓ In Israel, there was no need to prioritise teachers due to the speed at which the general population was vaccinated
- **Vaccine mandates** were introduced in some countries, such as Italy and New Zealand, for specific occupations:<sup>71</sup>
  - ✓ Mandates required full vaccination in order to continue working within schools
  - ✓ In some cases, this mandate extended to anyone working in the education setting

**Figure 4. Vaccine access for teachers and school staff as of 11/02/22 (Global Education Forum<sup>68</sup>)**



## Testing

- **Testing strategies** (PCR and rapid diagnostic antigen tests) in school settings should be **evaluated based on effectiveness, cost-effectiveness and feasibility**<sup>72</sup>
- **Regular routine school-based testing** for students, parents/guardians, and school staff to help identify the virus before further spread, identify asymptomatic cases, and reduce the risk of an outbreak is recommended by the CDC<sup>73</sup>
- **Applying rapid tests in educational settings** is recommended by the ECDC:<sup>74</sup>
  - ✓ For contact tracing, rapid diagnostic tests are effective in detecting cases up to five days after the onset of symptoms
  - ✓ For asymptomatic contacts of cases, tests should be performed as soon as possible after the contact has been traced
  - ✓ If more than seven days have passed since exposure, the risk of false negative results increase and a PCR test should be completed as soon as possible

<sup>70</sup> [OECD COVID Survey\\_EAG.indd \(oecd-ilibrary.org\)](#)

<sup>71</sup> [Vaccine mandates | The Institute for Government](#)

<sup>72</sup> <https://apps.who.int/iris/bitstream/handle/10665/342075/WHO-EURO-2021-2151-41906-59077-eng.pdf>

<sup>73</sup> [What to Know About COVID-19 Testing in Schools | CDC](#)

<sup>74</sup> [COVID-19 in children and the role of school settings in transmission - second update \(europa.eu\)](#)

- **Routine temperature/symptom checking in schools should be avoided** due to no evidence available to support their use<sup>75</sup>

## Hand and surface hygiene

**Disinfection practices are important** to reduce the potential for COVID-19 virus contamination in schools:<sup>76</sup>

- **High-touch surfaces** should be identified for priority disinfection, including door and window handles, food preparation areas, bathroom surfaces, toilets and taps, touchscreen personal devices, personal computer keyboards
- Surfaces must be **cleaned with water and soap or a detergent first** to remove dirt
- Cleaning should always start from the cleanest area to the dirtiest areas
- In non-health care settings, **sodium hypochlorite (bleach / chlorine)** at a concentration of 0.1% or 1000 ppm; and **alcohol** at 70-90% can be used for surface disinfection
- All disinfectant solutions should be stored in opaque containers, in a well-ventilated covered area, not exposed to direct sunlight and ideally should be freshly prepared daily
- Indoors, apply disinfectant via a cloth soaked in the disinfectant and refrain from spraying

A WHO **risk management guidance** when using disinfectants recommends:<sup>77</sup>

- **Avoid combining disinfectants**, such as bleach and ammonia, as mixtures can cause respiratory irritation and release potentially fatal gases
- **Open windows and use fans to ventilate**
- The minimum recommended personal protective equipment when disinfecting in non-health care settings is **rubber gloves, waterproof aprons and closed shoes; eye protection and medical masks** may also be needed
- Where cleaning and disinfection are not possible on a regular basis due to resource limitations, **frequent hand washing and avoiding touching the face** is advised

A back-to-school guidance, including **promoting hand hygiene**, recommends:<sup>78</sup>

- Students to **wash hands at key times with soap and water** for at least 40 seconds or **hand rub using an alcohol-based** hand sanitiser (60% to 80%) for at least 20 seconds
- **Increase access to handwashing facilities with running water** and facilities such as sinks, portable handwashing stations, and hand rub dispensers
- Ensure **access to hand rub** if soap and water not readily available (e.g. classrooms and gyms) and near frequently touched surfaces (e.g. doors and shared equipment such as musical instruments, sports equipment)

<sup>75</sup> <https://apps.who.int/iris/bitstream/handle/10665/342075/WHO-EURO-2021-2151-41906-59077-eng.pdf>

<sup>76</sup> Science Brief: SARS-CoV-2 and Surface (Fomite) Transmission for Indoor Community Environments | CDC

<sup>77</sup> <https://www.who.int/news-room/questions-and-answers/item/coronavirus-disease-covid-19-cleaning-and-disinfecting-surfaces-in-non-health-care-settings>

<sup>78</sup> [schooling-COVID-19-resource-pack.pdf \(who.int\)](https://www.who.int/news-room/questions-and-answers/item/coronavirus-disease-covid-19-schooling-covid-19-resource-pack)



## Sustaining behaviour change

Strategies have been put forward to **embed and sustain behaviour change around mitigation measures**:

- **Behaviours should be NEAR: Normal, Easy, Attractive, and Routine**
- Strategies are mapped to the “**Capability-Opportunity-Motivation Behaviour**” (COM-B) model of behaviour (Table 4)

**Table 4. Strategies directed to make desired infection control behaviours Normal, Easy, Attractive, and Routine (NEAR), structured by the COM-B model of behaviour change (adapted from: UK Government, SPI-B: Sustaining behaviours to reduce SARS-CoV-2 transmission<sup>79</sup>)**

	<b>Implementation of general behaviour change principles for infection control</b>
<b>Capability</b>	<p>Build and sustain an <b>understanding of infection risks and how to mitigate</b> these through:</p> <ul style="list-style-type: none"> <li>– Multichannel information and communications campaigns, including in schools, to explain why e.g. outdoors vs indoors or face coverings can reduce transmission</li> <li>– Education on infection risk management right across educational settings</li> <li>– Providing resources that are easily accessible and usable by all members of the community</li> </ul>
<b>Opportunity</b>	<p>Ensure that <b>all sectors of society and organisations work together</b> to maximise opportunities for successful risk management by:</p> <ul style="list-style-type: none"> <li>– Providing practical, regulatory, and financial support for the creation of home, work, leisure and transport environments that enable adequate physical distancing, ventilation and wearing of face coverings when the need arises</li> <li>– Ensure people have sufficient and sustained financial and other resources, including employment protection, to be able to behave in ways that mitigate risks</li> <li>– Building strong norms ... around infection control behaviours such as physical distancing and mask wearing</li> </ul>
<b>Motivation</b>	<p>Ensure that people and organisations attach <b>high value to infection control and how this is embedded into daily lives</b> by:</p> <ul style="list-style-type: none"> <li>– Using all available communication channels to strengthen self-identities, values, and emotional responses around infection prevention and mitigation, and a sense of personal control</li> <li>– Specific community engagement initiatives with minorities and marginalised social groups</li> <li>– Providing training and resources to build habits and routines into people’s lives, for example taking a face covering with you when leaving the home or opening a window when someone visits</li> </ul>

<sup>79</sup> [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/999175/S1215\\_SPI-B\\_Sustaining\\_behaviours\\_to\\_reduce\\_SARS-CoV-2\\_transmission.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/999175/S1215_SPI-B_Sustaining_behaviours_to_reduce_SARS-CoV-2_transmission.pdf)

## Country insights

### Germany

*Note: primary school is for children aged 6-10 years followed by secondary school for another four or nine years depending on the educational track chosen*

#### National context

- From 1 October 2022, guidance and rules within German schools is the **responsibility of the 16 federal states**, which may result in variations of measures implemented<sup>80</sup>
- **Masks are only mandatory in schools from Grade 5 onwards when in-person teaching is at risk and/or the emergence of a new variant** which is more contagious and dangerous according to the new German Infection Protection Act<sup>81</sup>
  - ✓ The state recommends wearing masks in enclosed settings
  - ✓ For publicly accessible/financed transportation such as transport to school, wearing masks remains compulsory<sup>82</sup>
- The German Federal Government has **launched a programme for education 2021-2022** with **financial resources for each federal state** to offer **additional learning and leisure sports and recreational offers** for students to catch-up on previously missed education due to the ongoing pandemic, including the following areas: <sup>83 84</sup>
  - ✓ Reduction of learning deficits
  - ✓ Promotion of early childhood education
  - ✓ Holiday camps and extracurricular activities
  - ✓ Support for children and young people on everyday life and school
- Actions in **two states are described below** to illustrate regional differences in approaches
- A timeline of school measures implemented during the COVID-19 pandemic in relation to the epidemiological context is presented on *Figure 5, page 24*

#### Federal state: North Rhine Westphalia

##### Principles for the school year 2022/23:<sup>82</sup>

- **Individual responsibility:** school hygiene plans including regular hand washing have proven effective, however, voluntary mask wearing is recommended, as well as regular airing of building and occasional tests at home
- **Testing for COVID-19:** no mandatory home testing is currently required
  - ✓ Regular tests recommended for students who are contacts of a case of COVID-19
  - ✓ Tests are recommended prior to entering educational premises for individuals with mild cold-like symptoms
- **Wearing face masks** no legal obligation to wear a mask in schools  
Due to the constantly evolving epidemiological situation, it is recommended that all students and staff wear a medical mask or an FFP2 mask; for children and adolescents, this recommendation is limited to wearing a medical mask.
- **Distance/online learning:** the federal state recognises that face-to-face teaching is particularly important for the development of psychosocial skills<sup>85</sup>

<sup>80</sup> [Corona: Was ab Oktober gilt | Bundesregierung](#)

<sup>81</sup> [Corona und Schule: Kommt die Maskenpflicht im neuen Schuljahr zurück? - Das Deutsche Schulportal \(deutsches-schulportal.de\)](#)

[Chronik zum Coronavirus SARS-CoV-2 | Maßnahmen - Bundesgesundheitsministerium](#)

<sup>82</sup> [Aktuelles zum Schulbetrieb und Corona | Bildungsportal NRW \(schulministerium.nrw\)](#)

<sup>83</sup> [Corona-Aufholprogramm: Aufholprogramm an Schulen überzeugt Verbände bislang nicht | ZEIT ONLINE](#)

<sup>84</sup> [Aktionsprogramm Aufholen nach Corona für Kinder und Jugendliche \(bundesregierung.de\)](#)

<sup>85</sup> [Distanzunterricht | Bildungsportal NRW \(schulministerium.nrw\)](#)

- ✓ Cooperation with other schools is recommended in the case of teacher absence, in order to provide face-to-face teaching
- ✓ Schools should be prepared for sudden changes in the epidemiological situation requiring distance learning, such as having the right equipment
- ✓ The Educational Online Library for NRW “Bildungsmediathek NRW” offers selected educational media and links to teaching materials supporting distance learning

### Federal state: Bavaria

National rules apply in Bavaria, with no additional rules at present. This may change if the epidemiological situation changes.<sup>86</sup>

### Principles for the school year 2022/23:<sup>87</sup>

- “*Anyone sick stays at home*” regardless of whether there is a suspicion of COVID-19
- **Ventilation:** classrooms should be ventilated by fully opening windows at least every 45 minutes (ideally every 20 minutes for several minutes)
- **Hand washing:** Regular hand washing with soap for at least 20 seconds
- **Cough and sneeze etiquette:** Coughing or sneezing into the crook of the arm or into a handkerchief
- **Social distancing:** a minimum distance of 1.5 meters should be maintained in school buildings wherever possible
- **Mask wearing** recommended:
  - ✓ Especially in meeting areas of the school, e.g. corridors, stairwells, cafeteria
  - ✓ After a confirmed case of infection in the class for five school days

## New Zealand

*Note: primary education begins from age 5 until age 12, whilst secondary education begins from age 13 until age 17. The state primary and secondary schools also encompass “kura”, schools that focus teaching upon the Māori language, culture and values.*

### Current guidance

#### Face masks

- Schools can use masks where indicated by their risk assessment, if it is unlikely to detrimentally affect teaching and learning<sup>88</sup>
- Not required on public or school transport
- **Specific advice for students who are deaf or hard of hearing** who often rely on lip reading has been provided by the Ministry of Education:<sup>89</sup>
  - ✓ Removal of face masks when possible
  - ✓ Increased use of speech-to-text technology
  - ✓ Increased awareness of the possibility of isolation for these students

#### Ventilation

- Schools advised to **maximise ventilation capabilities** as much as possible while **maintaining comfortable indoor temperatures**<sup>90</sup>

<sup>86</sup> [Coronavirus in Bayern – Bayerisches Landesportal](#)

<sup>87</sup> [Hygieneempfehlungen für die bayerischen Schulen \(Schuljahr 2022/2023\) \(bavern.de\)](#)

<sup>88</sup> [COVID-19 health and safety response | Te Mahau](#)

<sup>89</sup> [Additional tips on face masks | Te Mahau](#)

<sup>90</sup> [Ventilation in schools | Te Mahau](#)

- ✓ In colder temperatures, rooms should be heated prior to lessons to allow for windows to be open<sup>91</sup>
- ✓ High efficacy of ventilation during the winter months in New Zealand, due to buoyancy driven air flow<sup>92</sup>
- Schools should aim to refresh the room air at least 4 times a day by fully opening doors and windows whilst everyone exits the room<sup>91</sup>
- CO<sub>2</sub> monitors and portable air cleaners were provided to schools by the government free of charge to continuously monitor air quality and assess when increased ventilation may be necessary<sup>93</sup>

### Vaccination

- Vaccination is encouraged and provided free of charge for all citizens aged 5 and over
- Children aged 5-11 will receive a lower dose of the Pfizer vaccine<sup>94</sup>
- Schools and kura cannot require students to be vaccinated to access education, including parents, caregivers and whānau (extended family) supporting learning<sup>95</sup>
- Government vaccine mandates for school staff will end in September 2022<sup>96</sup>

### Testing

- Free rapid antigen tests are being sent to state, state-integrated schools, and kura<sup>97</sup>
  - ✓ Testing should be offered to students or staff members with COVID-19 symptoms
  - ✓ Test kits will be distributed to enable **twice weekly voluntary asymptomatic testing for staff over winter**<sup>97</sup>

### Cleaning and hygiene measures

- The **continuation of basic hygiene measures** is encouraged by the Ministry of Education, including cleaning and disinfecting surfaces, washing your hands, coughing or sneezing into your elbow and avoid touching your face<sup>95</sup>
  - ✓ It is recommended to use an **antiviral disinfectant to clean surfaces regularly**, including frequently touched items like door handles, light switches and phones<sup>98</sup>

A timeline of school measures implemented during the COVID-19 pandemic in relation to the epidemiological context is presented on *Figure 6, page 25*.

## Singapore

*Note: primary school is for children aged 6 to 12 years; followed by secondary school for children and adolescents aged 13 to 18 years.*

Singapore has had **experience in managing pandemics**, including SARS in 2003, H1N1 in 2009 and Zika in 2016,<sup>99</sup> resulting in a **pandemic preparedness taskforce and a rapid whole-of-government response**.

Primary and secondary school students usually attend school for 200 days per year.

- Due to “circuit breaker” measures, students physically attended approximately 150 days of school in 2020. The rest of the days of schooling were completed through home-based or blended-learning model<sup>100</sup>

<sup>91</sup> [Ventilation in schools | Te Mahau](#)

<sup>92</sup> [District Report \(temahau-live-storagestack-py-assetstorages3bucket-4pgakoc5n3r5\\_s3.amazonaws.com\)](#)

<sup>93</sup> [Device support | Te Mahau](#)

<sup>94</sup> [Vaccination for children aged 5 to 11 | Unite against COVID-19 \(covid19.govt.nz\)](#)

<sup>95</sup> [COVID-19 health and safety response | Te Mahau](#)

<sup>96</sup> [Next phase of our COVID-19 response | Unite against COVID-19 \(covid19.govt.nz\)](#)

<sup>97</sup> [Rapid Antigen Tests | Te Mahau](#)

<sup>98</sup> [Keep up healthy habits | Unite against COVID-19 \(covid19.govt.nz\)](#)

<sup>99</sup> [Singapore's Pandemic Preparedness: An Overview of the First Wave of COVID-19 - PMC \(nih.gov\)](#)

<sup>100</sup> [Singapore's school management policy during COVID-19 | ORF \(orfonline.org\)](#)

- To reduce the additional pressures of home based learning, the **school holidays were brought forward**, and at the end of the first wave, the **blended learning approach was resumed**<sup>101</sup>
- A timeline of school measures implemented during the COVID-19 pandemic in relation to the epidemiological context is presented on *Figure 7, page 26*

### Preventative measures<sup>102</sup>

Schools closed fully for a short period from 7 April to 1 June 2020. A range of preventative measures put in place to ensure successful and continued re-opening of schools, such as:

#### Screening

- School staff to conduct daily general screening of students' well-being
- Unwell students and staff with flu-like symptoms are required to stay away from school

#### Hygiene

- Frequent cleaning of high-touch surfaces in school premises
- Frequent hand-washing and wipe down of surfaces / shared equipment

#### Mask wearing

- Not mandatory for both indoor and outdoor settings, except on public transportation and in healthcare settings

In line with national guidance for the **easing of measures** in community settings:

- No group size or distancing requirements for school activities including break times
- All students will be able to participate in activities regardless of their vaccination status
- TraceTogether-only SafeEntry check-ins in schools are no longer required

Challenges of mitigation measures and recommendations to overcome these are described in *Table 5*.

**Table 5. Summary of Singapore's experience – challenges and advances**<sup>103</sup>

Mitigation measure	Challenge	Mitigation of the challenges
<b>Mask-wearing</b>	Difficulty hearing teachers and teachers straining their voices to be heard	Teachers used portable microphones or the classroom audio system, so they could be heard without raising their voices
	Students were not used to wearing masks for prolonged periods of time and had difficulty reading facial expressions	To encourage mask-wearing, some schools got additional masks from the school uniform vendor and allowed the children to decorate these themselves
<b>Social distancing</b>	'Pandemic fatigue' A survey saw that 44 percent of 1,000 respondents said that they were tired of adhering to safety measures (mask-wearing, social distancing, contact tracing)	Relaxation of measures
<b>Cleaning</b>	Increased pressure on teachers to clean classrooms after each lesson	

<sup>101</sup> [Singapore's school management policy during COVID-19 | ORF \(orfonline.org\)](#)

<sup>102</sup> [FAQs: COVID-19 related matters | MOE](#)

<sup>103</sup> [1.-Thesis-Kefalaki-M.-Rudolph-J.-Tan-S.-amp -Diamantidaki-F.-2021.pdf \(ucl.ac.uk\)](#)

## Vaccination<sup>104 105</sup>

The Ministry of Health recommended all **children aged 5-11 years to receive a booster dose of the COVID-19 vaccine** administered 5 months after the primary vaccine dose.

- The Pfizer-BioNTech/Comirnaty booster vaccine has been shown to increase antibody levels to more than twice the levels achieved after two primary doses
- Children 5-11 years old are given a smaller dose of the vaccine compared to adolescents and adults
- Parents and members of the public attending concerts held in schools involving more than 500 people need to be vaccinated or be medically ineligible for COVID-19 vaccinations

## Sweden

*Note: Primary school is for children aged 7-15 years, followed by secondary school for a further three or four years<sup>106</sup>*

### Policy background

The Swedish public health response to COVID-19 had the following aims:<sup>107 108</sup>

- **Minimise transmission** through prevention measures, such as quarantine, minimizing contacts among people, physical distancing, enhanced hygiene routines, and personal protective equipment, in combination with testing regimes and contact tracing
- Identify **risk groups and risk areas**, and **tailor measures** for these settings
- **Safeguard other determinants of health**, e.g., through keeping schools open
- Maintain health and care resources and ongoing societal function
- Provide rationale for all measures taken; address public concerns
- Implement ‘the right’ measures at the ‘right time’ that can be **sustained over time**

**No general lockdown was implemented** and recommendations were mostly voluntary<sup>108</sup>

- Many general restrictions were lifted including social distancing, vaccination certificates, and wearing of face masks on public transport in February 2022; with remaining restrictions lifted in April 2022
- Recommendations for vaccination and isolation if experiences symptoms of illness remain<sup>109</sup>

School children have received the same recommendations as the general public:<sup>107 110</sup>

- **Avoid crowded places**
- Uphold stringent **hand hygiene**
- **Stay at home if symptomatic** (even if COVID-19 test negative)
- People 12 years and older should receive a **COVID-19 vaccine** (since July 2021)

### Children and COVID-19 risk of transmission

Schools have been open for healthy children under 16 years; with the rationale that:<sup>107 111</sup>

- Children were not believed to be significant drivers of the pandemic
- Closing schools has negative health consequences
- Children rarely get seriously ill from COVID-19<sup>107 108 111</sup>

<sup>104</sup> [MOH | Child Vaccination](#)

<sup>105</sup> [MOH | COVID-19 Vaccination](#)

<sup>106</sup> <https://www.folkhalsomyndigheten.se/contentassets/c1b78bfbfde4a7899eb0d8ffdb57b09/covid-19-school-aged-children.pdf>

<sup>107</sup> <https://onlinelibrary.wiley.com/doi/full/10.1111/apm.13112>

<sup>108</sup> <https://onlinelibrary.wiley.com/doi/full/10.1111/apa.15582>

<sup>109</sup> <https://www.government.se/articles/2022/02/majority-of-covid-19-restrictions-to-be-removed-on-9-february-2022/>

<sup>110</sup> <https://www.folkhalsomyndigheten.se/the-public-health-agency-of-sweden/communicable-disease-control/covid-19/how-to-protect-yourself-and-others-covid-19-recommendations/>

<sup>111</sup> <https://www.folkhalsomyndigheten.se/the-public-health-agency-of-sweden/communicable-disease-control/covid-19/covid-19-more-information/the-public-health-agency-of-swedens-work-with-covid-19/>

Data suggested **children were not increasing the risk** of infection:

- The relative risk of COVID-19 was 1.1 (95% CI 0.9–1.3) for 105,000 primary school teachers compared to all employed adults (with the exception of healthcare workers)<sup>112</sup>
- The relative risk of COVID-19 infection for 30,357 high school teachers who worked from home was 0.7 (95% CI 0.5–1.0)
- However, another Swedish study using the same time period suggested increased COVID-19 infection risk among parents exposed to open rather than closed schools (OR 1.17; CI95 1.03–1.32)<sup>113</sup>

### Socio-political influences

- The **principle of equity** underlined the decision to keep childcare and schools for children aged 1-15 years open throughout<sup>114</sup>
- The Communicable Diseases Act (2004) emphasises **personal responsibility** in terms of reducing the risk of spreading disease, in line with the strong traditions of public health in Sweden: “*everyone has a responsibility for preventing the spread of COVID-19*”<sup>115</sup>

### Non-COVID-19 impacts

Although research on impacts of the Swedish approach is ongoing, initial findings include:

- **Mental health:** An online survey of 774 Swedish children aged 6-14 years identified they generally experienced **low levels of anxiety**. Life was mostly experienced as normal, largely because schools remained open<sup>116</sup>
- **Learning maintained:** Reading assessment data from 97,073 Swedish children aged 7-10 showed that word decoding and reading comprehension scores were not lower during the pandemic compared to before the pandemic, and that students from low socio-economic backgrounds were not especially affected<sup>117</sup>
- **Health literacy:** Swedish children aged 7-12 were well informed of COVID-19, with school being the main information source (compared to other countries, where parents were the most important source)<sup>118 119</sup>

A timeline of school measures implemented during the COVID-19 pandemic in relation to the epidemiological context is presented on *Figure 8, page 27*.

<sup>112</sup> <https://www.folkhalsomyndigheten.se/contentassets/c1b78bfbfde4a7899eb0d8ffdb57b09/covid-19-school-aged-children.pdf>

<sup>113</sup> <https://www.pnas.org/doi/full/10.1073/pnas.2020834118>

<sup>114</sup> <https://onlinelibrary.wiley.com/doi/full/10.1111/apa.15582>

<sup>115</sup> <https://www.folkhalsomyndigheten.se/the-public-health-agency-of-sweden/communicable-disease-control/covid-19/covid-19-more-information/the-public-health-agency-of-swedens-work-with-covid-19/>

<sup>116</sup> <https://pubmed.ncbi.nlm.nih.gov/35799462/>

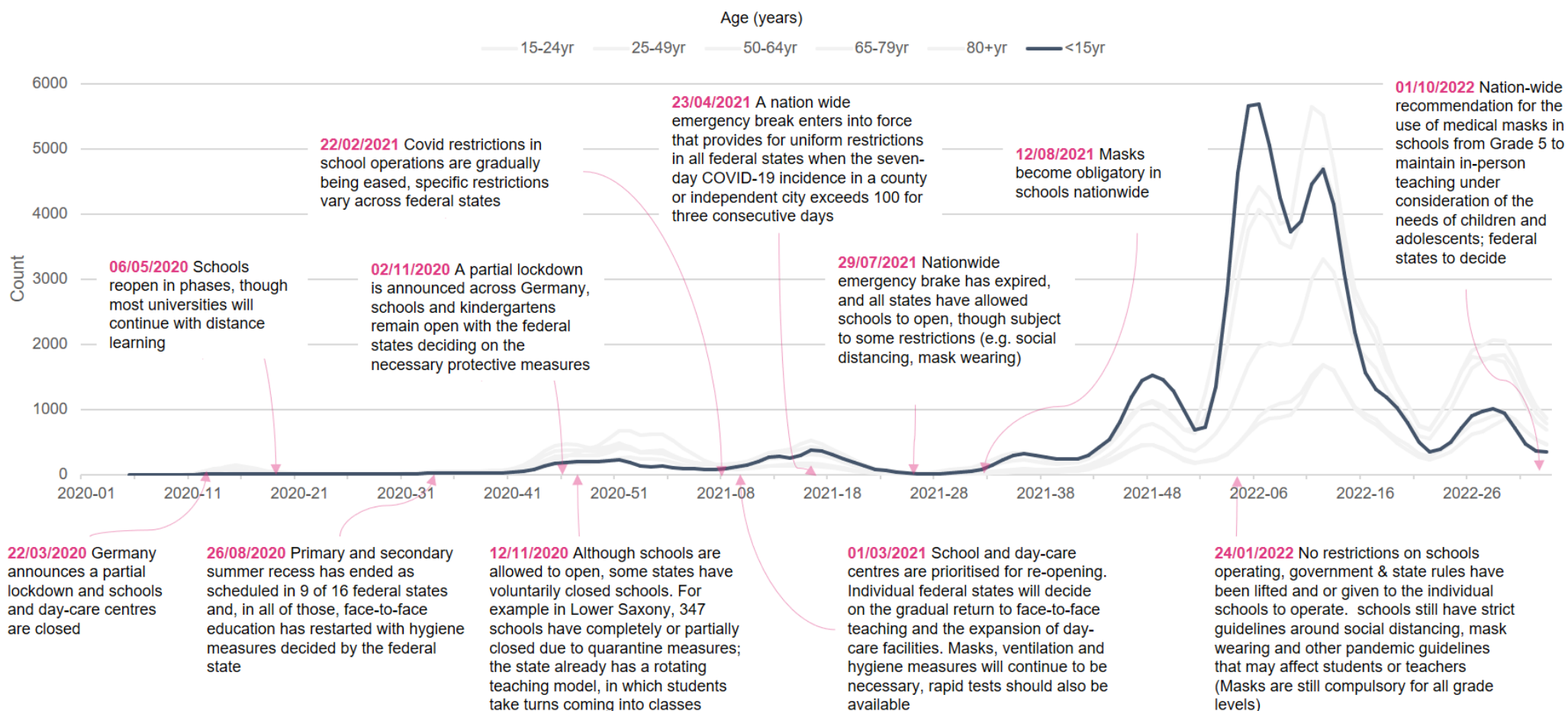
<sup>117</sup> <https://pubmed.ncbi.nlm.nih.gov/35677729/>

<sup>118</sup> <https://journals.sagepub.com/doi/10.1177/14034948211051884>

<sup>119</sup> <https://pubmed.ncbi.nlm.nih.gov/33566813/>

**Figure 5. COVID-19 cases by age group and public health measures, Germany, January 2020 to August 2022**

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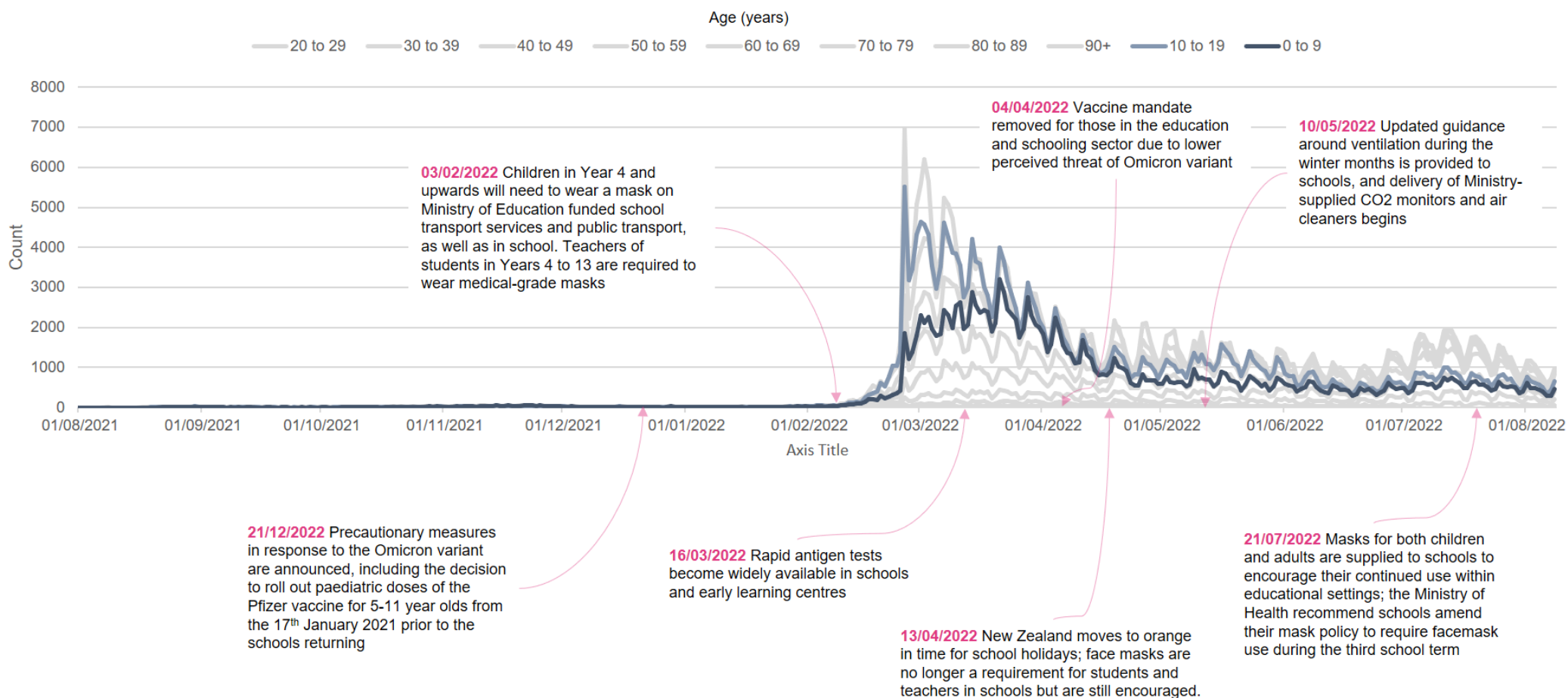


**Sources:** Case data sourced from European Centre for Disease Prevention and Control (<https://www.ecdc.europa.eu/en/publications-data/covid-19-data-14-day-age-notification-rate-new-cases>)  
 Public health measures sourced from WHO Tracking Public Health and Social Measures global dataset (<https://www.who.int/emergencies/diseases/novel-coronavirus-2019/phsm>)  
 and German Ministry of Health.



**Figure 6. COVID-19 cases by age group and public health measures, New Zealand, 01 August 2021 to 01 August 2022**

Produced by WHO CC on Investment for Health and Well-being

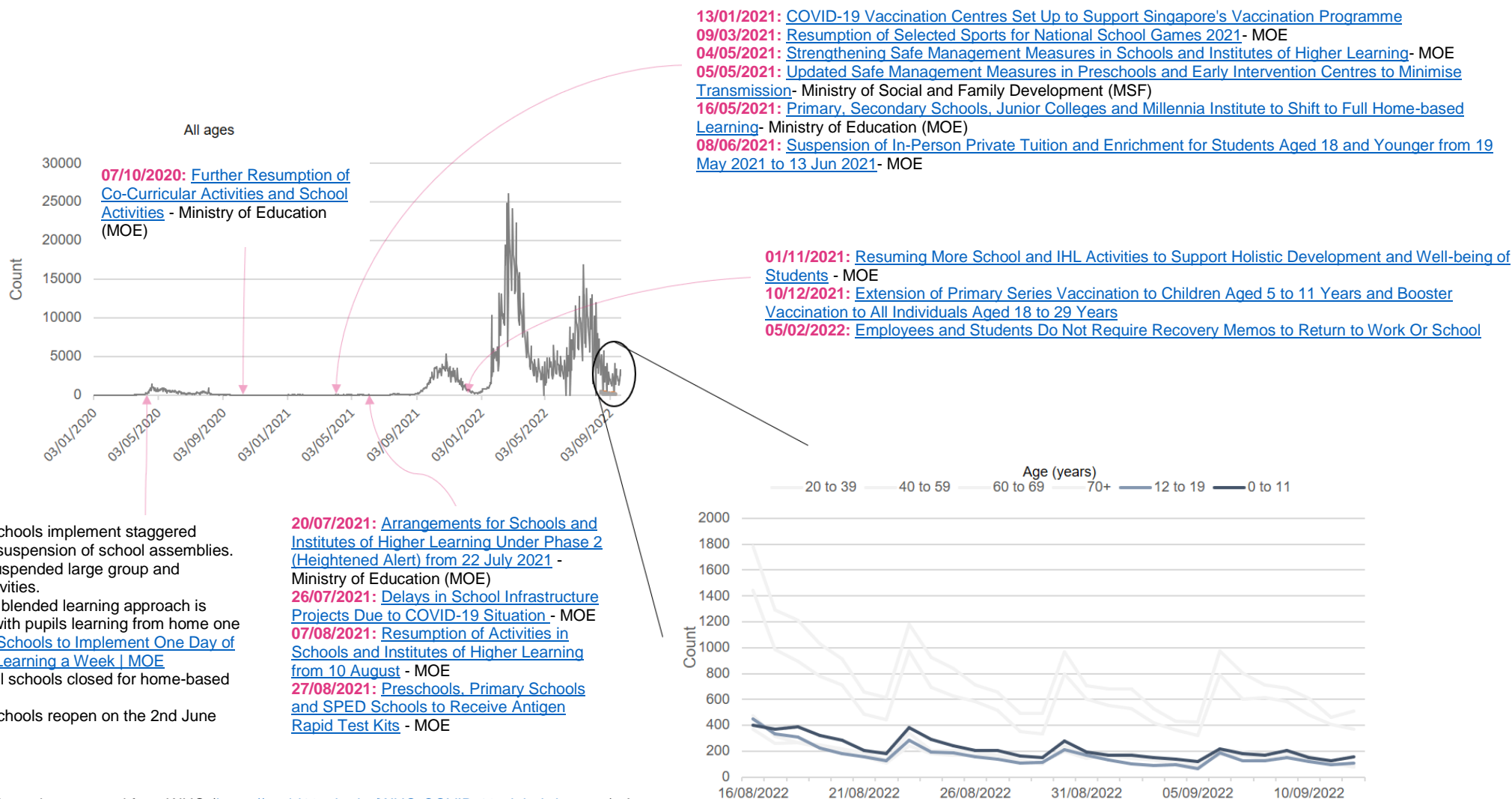


**Sources:** Case data sourced from New Zealand Ministry of Health (<https://github.com/minhealthnz/nz-covid-data>)

Public health measures sourced from WHO Tracking Public Health and Social Measures global dataset (<https://www.who.int/emergencies/diseases/novel-coronavirus-2019/phsm>) and New Zealand governmental websites

**Figure 7. COVID-19 cases by age group, Singapore, January 2020 to September 2022**

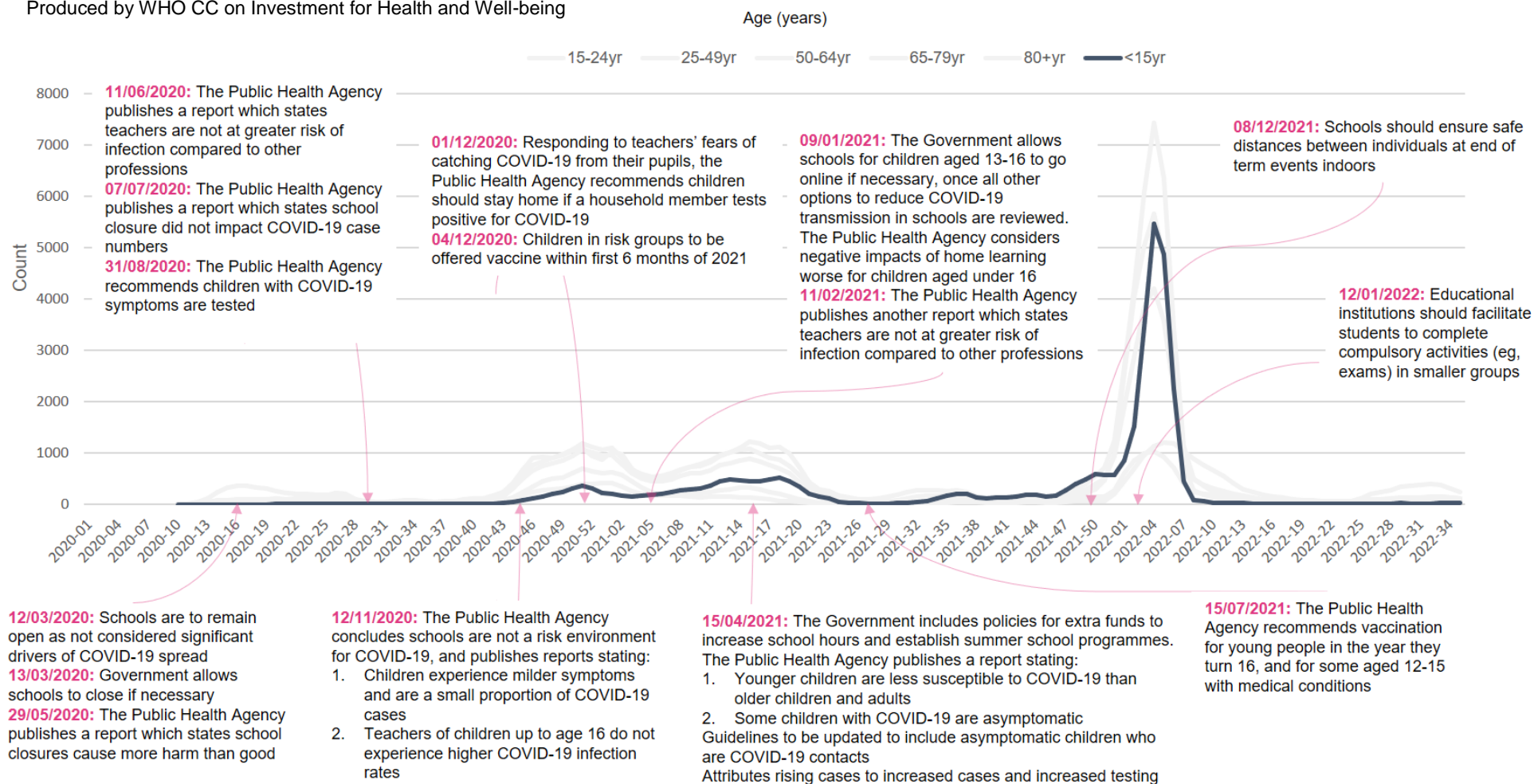
Produced by WHO CC on Investment for Health and Well-being



**Sources:** Case data sourced from WHO (<https://covid19.who.int/WHO-COVID-19-global-data.csv>). Age-specific case data sourced from Singapore Ministry of Health ([https://data.gov.sg/dataset/covid-19-case-numbers?resource\\_id=6c14814b-09b7-408e-80c4-db3d393c7c15](https://data.gov.sg/dataset/covid-19-case-numbers?resource_id=6c14814b-09b7-408e-80c4-db3d393c7c15))  
Public health measured sourced from WHO Tracking Public Health and Social Measures global dataset (<https://www.who.int/emergencies/diseases/novel-coronavirus-2019/phsm>) and Singapore Ministry of Health

**Figure 8. COVID-19 cases by age group, Sweden, March 2020 to August 2022**

Produced by WHO CC on Investment for Health and Well-being



**Sources:** Case data sourced from European Centre for Disease Prevention and Control (<https://www.ecdc.europa.eu/en/publications-data/covid-19-data-14-day-age-notification-rate-new-cases>). Public health measures sourced from WHO Tracking Public Health and Social Measures global dataset (<https://www.who.int/emergencies/diseases/novel-coronavirus-2019/phsm>); Public Health Agency of Sweden ([The Public Health Agency of Sweden's work with COVID-19 - The Public Health Agency of Sweden \(folkhalsomyndigheten.se\)](https://www.folkhalsomyndigheten.se)); Swedish Ministry of Health and Social Affairs ([Ministry of Health and Social Affairs - Government.se](https://www.government.se)); Olofsson T, Vilhelmsson A. Dataset: COVID-19 epidemic policy and events timeline (Sweden). Data Brief. 2022 Feb;40:107698. doi: 10.1016/j.dib.2021.107698.

The International Horizon Scanning and Learning reports are developed by the International Health Team / the International Health Coordination Centre (IHCC) at the WHO Collaborating Centre on Investment for Health and Well-being (WHO CC), Public Health Wales.

Executive lead and WHO CC Director: Mark A Bellis

International health lead and WHO CC Deputy Director: Mariana Dyakova

Authors and contributors: Anna Stielke, Abigail Malcolm, James Allen, Lauren Couzens, Emily Clark, Mariana Dyakova

Contacts: [Emily.Clark4@wales.nhs.uk](mailto:Emily.Clark4@wales.nhs.uk); [Mariana.Dyakova@wales.nhs.uk](mailto:Mariana.Dyakova@wales.nhs.uk)

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