

## REPORT SUMMARY

# COVID-19 in Victorian Schools

An analysis of child-care and school outbreak data and evidence-based recommendations for opening schools & keeping them open

25 September 2020



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## Report Authors

**Professor Fiona Russell**

Director of the Child and Adolescent Health PhD Program,  
Department of Paediatrics, The University of Melbourne;  
Group Leader Asia-Pacific Health Research, Murdoch Children's Research Institute

**Dr Kathleen E Ryan**

Research Fellow, Asia-Pacific Health, Murdoch Children's Research Institute

**Dr Kathryn Snow**

Research Fellow, Department of Paediatrics, Faculty of Medicine Dentistry and Health Sciences, The University of Melbourne

**Associate Professor Margie Danchin**

General and Immunisation Paediatrician, Department of General Medicine, Royal Children's Hospital  
Group Leader, Vaccine Uptake, Murdoch Children's Research Institute  
Clinician Scientist Fellow, Department of Paediatrics and School of Population and Global Health, The University of Melbourne

**Professor Kim Mulholland**

Group Leader, New Vaccines Group, Murdoch Children's Research Institute, Melbourne  
Professorial Fellow, Department of Paediatrics, The University of Melbourne  
Professor of Child Health and Vaccinology, London School of Hygiene and Tropical Medicine

**Professor Sharon Goldfeld**

Director, Centre for Community Child Health, Royal Children's Hospital  
Theme Director Population Health and Co-Group Leader Policy and Equity, Murdoch Children's Research Institute  
Professor, Department of Paediatrics, Faculty of Medicine Dentistry and Health Sciences, The University of Melbourne

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# Report Summary

## COVID-19 in Victorian Schools

An analysis of ECEC and school outbreak data and evidence-based recommendations for re-opening schools and keeping schools open

### Aims

The Murdoch Children's Research Institute (MCRI) undertook an analysis of the global literature and available Early Childhood Education and Care (ECEC) and school outbreak data, 25 January 2020 - 31 August 2020, from the Department of Health and Human Services (DHHS) to explore 5 key questions:

1. What is known about the direct and indirect effects of COVID-19 on children and adolescents?
2. What is known globally about the role of ECEC and schools in transmission of SARS-CoV-2 (the virus)?
3. What are other countries doing to enable children and teachers to go back to school safely: which mitigation measures are being proposed?
4. What do the Victorian data tell us about transmission of the virus in our educational settings?
5. What evidence-based recommendations could enable ECEC and schools to open up safely?

### 1. What do we know about the direct and indirect effects of the virus in children?

COVID-19 in children is generally mild or has no symptoms at all, and is rarely life threatening. However, it is the indirect effects of the pandemic on children and adolescents that cause the most concern including the negative effects of school closures:

**Impact on communities:** lack of social contact, reduced access to health care, dependence on technology for access to health care and education<sup>1,2,3,4,5</sup>

**Impact on families:** poorer parent mental health, competing demands and increased stress, job losses and reduced income, impacts on perinatal and mental health<sup>6,7,8</sup>

**Impact on children:** poorer mental health and increasing behavioural and developmental concerns, lack of access of adequate play and social opportunities, increased isolation, academic impacts, child abuse and neglect<sup>9,10,11,12,13</sup>

<sup>1</sup> Ye, Jiancheng. "Pediatric Mental and Behavioral Health in the Period of Quarantine and Social Distancing with Covid-19." *JMIR Pediatr Parent* 3, no. 2 (2020/7/28 2020): e19867. <https://dx.doi.org/10.2196/19867>.

<sup>2</sup> Galea, Sandro, Raina M. Merchant, and Nicole Lurie. "The Mental Health Consequences of Covid-19 and Physical Distancing: The Need for Prevention and Early Intervention." *JAMA Internal Medicine* 180, no. 6 (2020): 817-18. Accessed 9/23/2020. <https://dx.doi.org/10.1001/jamainternmed.2020.1562>.

<sup>3</sup> Viner, Russell M, Simon J Russell, Helen Croker, Jessica Packer, Joseph Ward, Claire Stansfield, Oliver Mytton, Chris Bonell, and Robert Booy. "School Closure and Management Practices During Coronavirus Outbreaks Including Covid-19: A Rapid Systematic Review." *The Lancet Child & Adolescent Health* 4 (2020): 397-404. [https://dx.doi.org/https://doi.org/10.1016/S2352-4642\(20\)30095-X](https://dx.doi.org/https://doi.org/10.1016/S2352-4642(20)30095-X).

<sup>4</sup> Chanchlani, Neil, Francine Buchanan, and Peter J. Gill. "Addressing the Indirect Effects of Covid-19 on the Health of Children and Young People." *Canadian Medical Association Journal* 192, no. 32 (2020): E921. <https://dx.doi.org/10.1503/cmaj.201008>.

<sup>5</sup> Goldschmidt, Karen. "The Covid-19 Pandemic: Technology Use to Support the Wellbeing of Children." *Journal of pediatric nursing* 53 (Jul-Aug 2020): 88-90. <https://dx.doi.org/10.1016/j.pedn.2020.04.013>.

<sup>6</sup> Drane, Catherine, Lynette Vernon, and Sarah O'Shea. The Impact of 'Learning at Home' on the Educational Outcomes of Vulnerable Children in Australia During the Covid-19 Pandemic. National Centre for Student Equity in Higher Education, Curtin University, 2020.

<sup>7</sup> Yoshikawa, Hirokazu, Alice J Wuermli, Pia Rebello Britto, Benard Dreyer, James F Leckman, Stephen J Lye, Liliana Angelica Ponguta, Linda M Richter, and Alan Stein. "Effects of the Global Covid-19 Pandemic on Early Childhood Development: Short-and Long-Term Risks and Mitigating Program and Policy Actions." *The Journal of pediatrics* (2020).

<sup>8</sup> Ceulemans, Michael, Titia Hompes, and Veerle Foulon. "Mental Health Status of Pregnant and Breastfeeding Women During the Covid-19 Pandemic: A Call for Action." *International Journal of Gynecology & Obstetrics* 151, no. 1 (2020/10/01 2020): 146-47. Accessed 2020/09/23. <https://dx.doi.org/10.1002/ijgo.13295>.

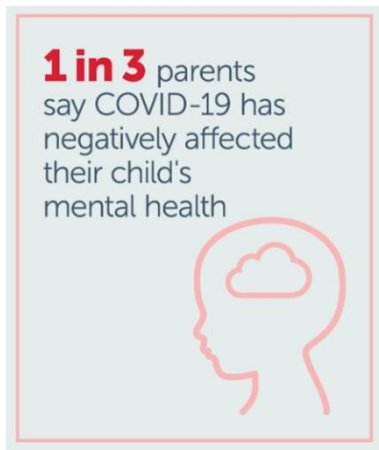
<sup>9</sup> Loades, Maria Elizabeth, Eleanor Chatburn, Nina Higson-Sweeney, Shirley Reynolds, Roz Shafran, Amberly Brigden, Catherine Linney, Megan Niamh McManus, Catherine Borwick, and Esther Crawley. "Rapid Systematic Review: The Impact of Social Isolation and Loneliness on the Mental Health of Children and Adolescents in the Context of Covid-19." *Journal of the American Academy of Child & Adolescent Psychiatry* (2020/06/03/ 2020). <https://dx.doi.org/https://doi.org/10.1016/j.jaac.2020.05.009>.

<sup>10</sup> Xie, Xinyan, Qi Xue, Yu Zhou, Kaiheng Zhu, Qi Liu, Jiajia Zhang, and Ranran Song. "Mental Health Status among Children in Home Confinement During the Coronavirus Disease 2019 Outbreak in Hubei Province, China." *JAMA Pediatrics* 174, no. 9 (2020): 898-900. Accessed 9/23/2020. <https://dx.doi.org/10.1001/jamapediatrics.2020.1619>.

<sup>11</sup> Zhang, Jinsong, Lan Shuai, Hui Yu, Zhouye Wang, Meihui Qiu, Lu Lu, Xuan Cao, Weipin Xia, Yuanyuan Wang, and Runsen Chen. "Acute Stress, Behavioural Symptoms and Mood States among School-Age Children with Attention-Deficit/Hyperactive Disorder During the Covid-19 Outbreak." *Asian journal of psychiatry* 51 (2020): 102077-77. <https://dx.doi.org/10.1016/j.ajp.2020.102077>.

<sup>12</sup> Sonnemann, Julie, and Peter Goss. "Covid Catch-Up: Helping Disadvantaged Students Close the Equity Gap." Last modified 14 June, 2020. <https://grattan.edu.au/report/covid-catch-up/>.

<sup>13</sup> Greeley, Christopher Spencer. "Child Maltreatment Prevention in the Era of Coronavirus Disease 2019." *JAMA Pediatrics* (2020): e202776-e76. Accessed 9/23/2020. <https://dx.doi.org/10.1001/jamapediatrics.2020.2776>.



In all of these aspects, disadvantaged families seem to be disproportionately affected.

### Mental health

There is emerging evidence from Australia and from Victoria of the mental health impacts on children. In the recent RCH National Child Health Poll, 1 in 3 parents reported that the COVID-19 pandemic had negatively affected their child's mental health-and that was before the recent Stage 4 lockdown in Victoria (Figure 1).<sup>14</sup> At a similar time, the Victorian Commission for Children and Young People reported negative impacts on mental health and wellbeing, describing experiences of loneliness and isolation, disruption to routines and coping mechanisms, worry for loved ones and increased stress associated with remote learning.<sup>15</sup>

Figure 1. RCH Poll.

### The importance of ECEC and schools

ECEC and schools are an essential part of society and children's lives. They provide safe, supportive learning environments for students, employ teachers and other staff, and enable parents and guardians to work. They also provide social, physical, behavioural, and mental health benefits and services. School closures disrupt the delivery of these services, and place additional economic and psychological stress on families, which can increase the risk for family conflict and violence.<sup>16</sup>

**ECEC and schools play a critical role enabling students to receive both academic instruction and provide critical mental health and social support, especially for the most vulnerable of students, making them a priority for opening and remaining open.**

## 2. What is known globally about the role of ECEC and schools in transmission of the virus

### Children and transmission

The latest scientific evidence shows that children do not play a more significant role than adults in transmission. Children more than 10 years old probably transmit the virus at a similar rate to adults; while younger children may transmit less.<sup>17</sup> As infected children often have no symptoms (asymptomatic) or develop only mild symptoms, it is harder to detect infection in this age group. At present, it is unclear whether asymptomatic children are infectious.<sup>18</sup>

<sup>14</sup> The Royal Children's Hospital Child Health Poll. *Covid-19 Pandemic: Effects on the Lives of Australian Children and Families*. Vol. Poll Number 18. The Royal Children's Hospital Melbourne, Parkville, Victoria, 2020. <https://www.rchpoll.org.au/wp-content/uploads/2020/07/nchp-poll18-report-covid.pdf>.

<sup>15</sup> Commission for Children and Young People. *Impact of Covid-19 on Children and Young People: Mental Health*. Victoria, 2020. <https://ccvp.vic.gov.au/assets/COVID-Engagement/CCYP-Mental-Health-Snapshot-web.pdf>.

<sup>16</sup> Substance Abuse and Mental Health Services Administration. *Intimate Partner Violence and Child Abuse Considerations During Covid-19*. Maryland: Substance Abuse and Mental Health Services Administration, 2020. Accessed 14 Sept. <https://www.samhsa.gov/sites/default/files/social-distancing-domestic-violence.pdf>.

<sup>17</sup> Park, Young Joon, Young June Choe, Ok Park, et al., "Contact Tracing During Coronavirus Disease Outbreak, South Korea, 2020." *Emerging Infectious Disease journal* 26, no. 10 (2020). <https://dx.doi.org/10.3201/eid2610.201315>.

<sup>18</sup> Han, Mi Seon, Eun Hwa Choi, Sung Hee Chang, Byoung-Lo Jin, Eun Joo Lee, Baek Nam Kim, Min Kyoung Kim, Kihyun Doo, Ju-Hee Seo, Yae-Jean Kim, Yeo Jin Kim, Ji Young Park, Sun Bok Suh, Hyunju Lee, Eun Young Cho, Dong Hyun Kim, Jong Min Kim, Hye Young Kim, Su Eun Park, Joon Kee Lee, Dae Sun Jo, Seung-Man Cho, Jae Hong Choi, Kyo Jin Jo, Young June Choe, Ki Hwan Kim, and Jong-Hyun Kim. "Clinical Characteristics and Viral Rna Detection in Children with Coronavirus Disease 2019 in the Republic of Korea." *JAMA Pediatrics* (2020). <https://dx.doi.org/10.1001/jamapediatrics.2020.3988>.

### Transmission in ECEC and schools

There is consistent evidence globally that transmission of the virus within the school setting is low, however this is based on a small number of studies, and the evidence is considered to be weak. So far, studies have found that schools are not at greater risk of infection than other public places, and are unlikely to drive transmission, if proper and consistent mitigation measures are in place.

Internationally it appears that infections in schools are directly associated with rising case numbers in the broader community. **Importantly, data from a number of countries in the European Union (EU), the United Kingdom (UK), Taiwan, Hong Kong and South Korea suggest that reopening schools in the context of school mitigation measures, has not been associated with increases in community transmission.** In England, only 0.01 percent of open schools had an outbreak.<sup>19</sup>

#### Sweden vs Finland

Rates of infection in ECEC and school children were no different between Finland (which closed schools) versus Sweden (which did not, except for children >16 years who schooled remotely). **Primary school closure and reopening in Finland did not have any significant impact on infection rates in primary school aged children.**

Additionally, there was no increased risk of infection in Swedish teachers and child care workers compared to other professions.<sup>7</sup>

While very few significant outbreaks have been reported in international schools, they do occur, and this has often been associated with high rates of community transmission and lack of adherence to mitigation measures in the school setting. Investigations of cases identified in schools suggest that child-to-child transmission in schools is uncommon and not the primary cause of infection in children. Household transmission has been consistently found to be one of the commonest sources of infection for children.<sup>21</sup>

### 3. What are other countries doing to enable children and teachers to go back to school safely: which mitigation measures are being proposed?

The single best policy to support school reopening prior to the development of a vaccine or treatment is the suppression of COVID-19 to near zero case incidence in the broader community.<sup>22</sup> This can be achieved via universal mask wearing, social distancing, reduction or elimination of indoor gatherings, staying home when sick, and rigorous and timely Testing, Tracing and Isolation within 48 hours of a notification.

The Harvard Global Health Institute's "The Path to Zero and Schools: Achieving Pandemic Resilient Teaching and Learning Spaces"<sup>23</sup> recommends that schools open up based on a traffic light system according to community level of the incidence of the virus (see Recommendations). In South Korea, each school determines which level of mitigation will be in place based on the number of students and local transmission rates. Child infection rates there have remained stable.

<sup>19</sup> Ismail, Sharif, Vanessa Saliba, Jamie Lopez Bernal, Mary Ramsay, and Shamez Ladhani. "Sars-Cov-2 Infection and Transmission in Educational Settings: Cross-Sectional Analysis of Clusters and Outbreaks in England." *medRxiv* (2020). <https://dx.doi.org/https://doi.org/10.1101/2020.08.21.20178574>.

<sup>20</sup> Public Health Agency of Sweden, and Finnish Institute for Health and Welfare. *Covid-19 in Schoolchildren - a Comparison between Finland and Sweden*. Sweden, 2020. <https://www.folkhalsomyndigheten.se/publicerat-material/publikationsarkiv/c/covid-19-in-schoolchildren/>.

<sup>21</sup> Ismail, Sharif, Vanessa Saliba, Jamie Lopez Bernal, Mary Ramsay, and Shamez Ladhani. "Sars-Cov-2 Infection and Transmission in Educational Settings: Cross-Sectional Analysis of Clusters and Outbreaks in England." *medRxiv* (2020). <https://dx.doi.org/https://doi.org/10.1101/2020.08.21.20178574>.

<sup>22</sup> Harvard Global Health Institute. *The Path to Zero and Schools: Achieving Pandemic Resilient Teaching and Learning Spaces*. Massachusetts: Harvard Global Health Institute, 2020. [https://globalepidemics.org/wp-content/uploads/2020/07/pandemic\\_resilient\\_schools\\_briefing\\_72020.pdf](https://globalepidemics.org/wp-content/uploads/2020/07/pandemic_resilient_schools_briefing_72020.pdf).

<sup>23</sup> Harvard Global Health Institute. *The Path to Zero and Schools: Achieving Pandemic Resilient Teaching and Learning Spaces*.

## 4. What do the Victorian data tell us about transmission of the virus in our educational settings?

We analysed all Victorian school and ECEC events that recorded at least one person who attended an ECEC or school while infectious. This includes events with a single case and events with 2 or more cases (an outbreak).

The Victorian findings are consistent with the international literature.

### School transmission reflects community transmission

There were very few cases in ECECs and schools when community transmission was low from March to May. Infections linked to ECECs and schools peaked at the time when community transmission was highest during July and then declined in August, suggesting that infections in ECECs and schools are driven primarily by transmission in the broader community (Figure 2).

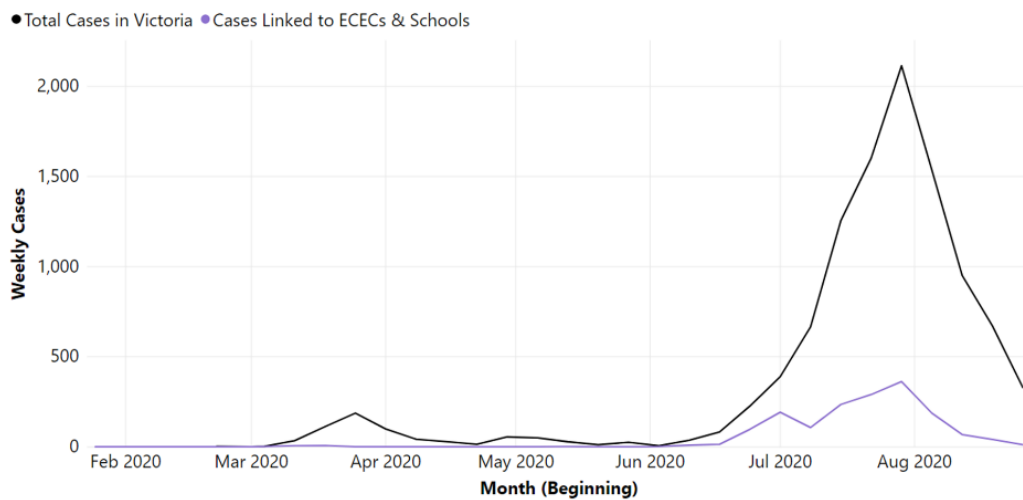


Figure 2. Epidemiological curve of known SARS-CoV-2 infections in children and adults associated with ECECs and schools, in comparison to total cases diagnosed in Victoria.

This is further supported by the geographic distribution of cases linked to ECEC and schools at a local government area (LGA) level, which was highly consistent with the broader epidemic (Figure 3).

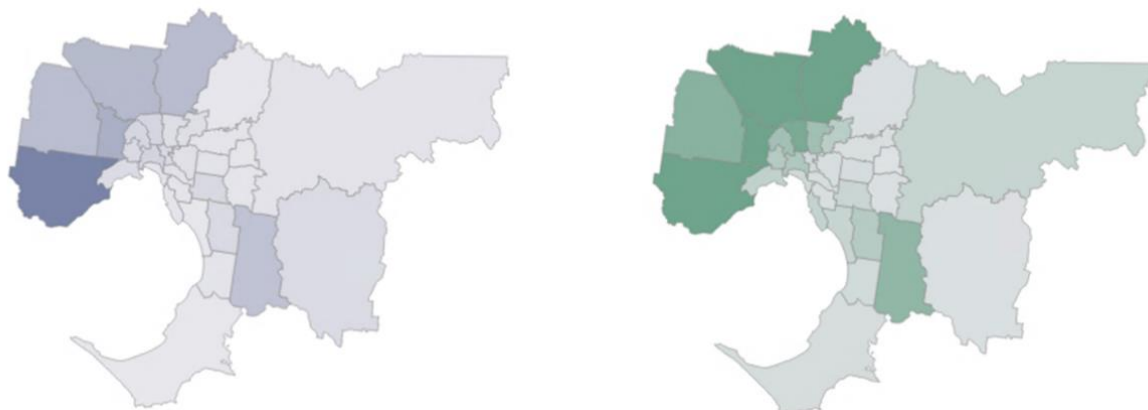


Figure 3. Geographic distribution of SARS-CoV-2 infections associated with events in ECECs and schools (left), and not associated with ECECs and schools (right). Density of shading represents number of cases in the LGA, darker shading = more cases

## Overall transmission was low in ECEC and schools

Children less than 10 years old seem to transmit less than adolescents & adults. If the first case was a young child, an outbreak (2 or more cases) was very uncommon.

- There were 1,635 infections linked with ECECs and schools, out of a total of 19,901 cases in Victoria
- 66 percent involved a single infection in a staff member or student
- 91 percent involved fewer than 10 cases (total)
- Of 1 million students enrolled, only 337 may have acquired COVID via outbreaks at schools
- Of 139 staff & 373 students who may have acquired infection via outbreaks at ECEC or schools, 8 (4 staff and 4 students) were admitted to hospital and all recovered
- Infections in ECEC and schools were rarely linked to infections in the most vulnerable population, the elderly

Many cases associated with ECECs and schools are in households - we were unable to determine direction of transmission (Figure 4).

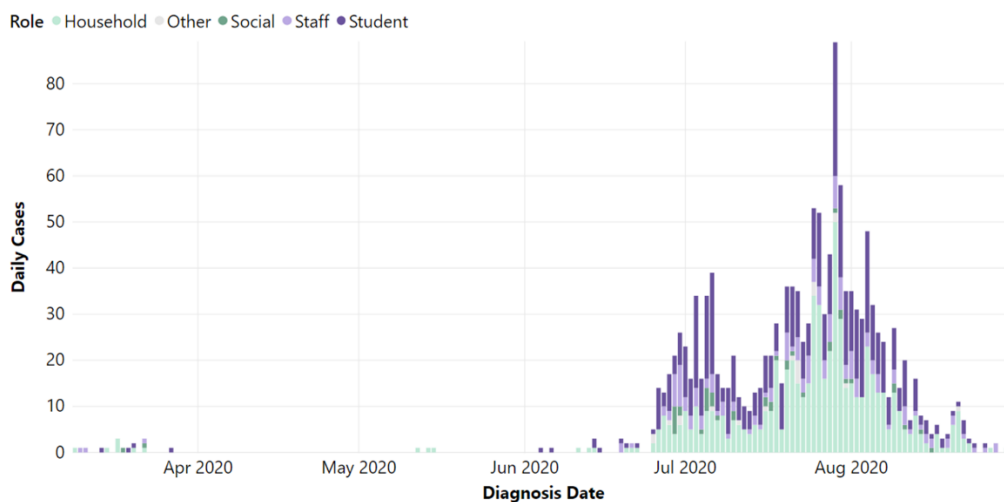


Figure 4. Confirmed SARS-CoV-2 cases linked to ECEC and schools according to the relationship to the ECEC or school.

## The ECEC and school outbreak response was effective overall

The average time between confirmation of the first case in an ECEC or school event and facility closure was 2 days. On average ECECs and schools were closed for 9 days. These measures were effective, as the majority (66 percent) of ECEC and school events were limited to a single case and did not progress to an outbreak (2 or more cases). Where there were large outbreaks (10 or more cases), the average number of contacts were far greater (229 vs 41) and the ECEC or school remained closed for longer (average closure 18 days vs 9 days).

This analysis of Victorian data show that when risk reduction strategies are in place schools and ECECs are controlled environments, with no greater risk of infection than other places. Infections in schools and ECECs were well contained with existing controls and rapid closure, contact tracing and cleaning. When infections did occur, serious infections were rare in both students and staff, and very rarely involved the elderly.

Schools and ECECs are unlikely to drive transmission.

## 5. What evidence-based recommendations could enable ECEC and schools to open up safely?

### Recommendations

1. ECEC and schools should be prioritised for reopening and staying open to guarantee equitable learning environments and lessen social and educational effects of school closure.
2. Closing schools should be a last resort, especially for ECEC and primary schools as children in these age groups are less likely to transmit and be associated with an outbreak.
3. There should be a staged mitigation approach to opening up and staying open.
4. Gathering data and evidence in term 4 is recommended to inform future education and health policy.
5. Testing, tracing and isolation within 48 hours of a notification is the most important strategy to prevent an outbreak.

### ECEC and school mitigation strategy

Schools across Victoria could be opened up safely and stay open to protect the health, safety, and wellbeing of students, teachers, and ECEC staff.

This should be based on the incidence of community transmission and as this varies by geographical location (e.g. LGA - hypothetical only Figure 5). Different colour-coded strategies to reduce risk are proposed which could be eased or progressed depending on Victoria's Coronavirus Road to Recovery Step level and proportionate to the incidence of infection in each geographic area (Table 1 and 2).

Proposed mitigation strategies have been suggested that augment existing Department of Education and Training policy and align with the Harvard Healthy Building Programs which focuses on Healthy buildings, classrooms, policies, schedules and activities.<sup>24</sup>

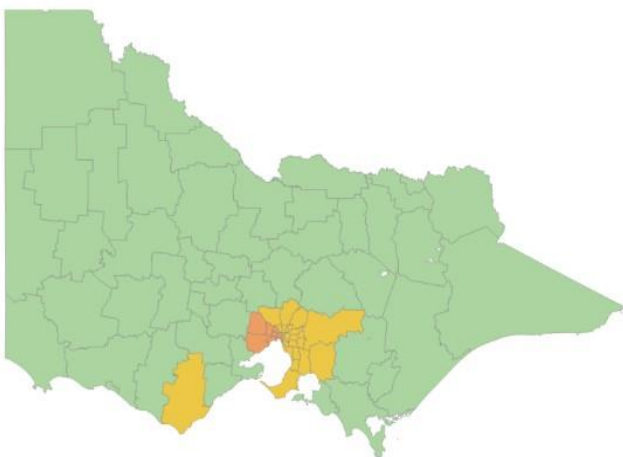


Figure 5. Hypothetical example of proposed mitigation strategies by region, Victoria.

<sup>24</sup> Harvard Global Health Institute. The Path to Zero and Schools: Achieving Pandemic Resilient Teaching and Learning Spaces. Massachusetts: Harvard Global Health Institute, 2020. [https://globalepidemics.org/wp-content/uploads/2020/07/pandemic\\_resilient\\_schools\\_briefing\\_72020.pdf](https://globalepidemics.org/wp-content/uploads/2020/07/pandemic_resilient_schools_briefing_72020.pdf).



**Table 1.** Summary of colour-coded strategies for ECEC and schools.

Colour	Strategies
Green	Standard precautions (hand hygiene, physical distancing, enhanced cleaning)
Yellow	+ Masks (teachers/staff + secondary students) + Enhanced physical distancing (especially staff) + No singing, no indoor sports, no wind instruments
Orange	+ 50% attendance for Years 7-10
Red	Consider closure

**Table 2.** An example of opening up ECECs and schools safely according to the Victorian Coronavirus Road to Recovery, by colour-code and geographical area.

Road to recovery step	Metro Melbourne	Regional/LGA
Second	Yellow: all ECEC, primary, special schools & VCE	Yellow
	Orange: Years 7-10 only	
Third	Yellow	Green
Last	Green	Green
COVID-19 Normal	Green	Green

LGA: Local Government Area. ECEC: Early Childhood Education and Care. VCE: Victorian Certificate of Education.

## Gather data and evidence in term 4 to inform future education and health policy

There are a number of gaps in our knowledge such as transmission in asymptomatic children, the direction of transmission and how best to inform school closures based on balancing safety against the associated potential academic and wellbeing impacts. To address these gaps, we need to monitor and investigate transmission together with wellbeing and mental health impacts in ECEC and schools to inform medium term policy decisions. Therefore, further research should be undertaken.

We propose the following approach:

- Undertake enhanced surveillance and investigation in ECEC and schools as part of a school outbreak to determine viral transmission & associated mental health impacts
- Collect regular data from a sample of Victorian school children to understand the psychosocial impacts on children, teachers & parents from home-based learning, returning to school over time and the pandemic itself.