



## School Management in Response to Coronavirus Disease 2019

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### Abstract

The coronavirus disease 2019 (COVID-19) outbreak emerged in Thailand in January 2020 with the situation worsening during March-April 2020. The government decided to lockdown most public places, including schools and daycare nurseries even though the proportion of cases in under 15-year-old was small (about 2.8%). Evidence at the global level did not reach consensus on how to manage school openings properly. The Department of Health of the Ministry of Public Health has delivered school guidelines for the prevention and control of COVID-19. The modelling team of the Department of Disease Control demonstrated that the risk of an infective presenting with a long incubation period (more than seven days) was approximately 12%. This figure reduced to only 1% if a fourteen-day cutoff was applied. The infectivity risk did not depend on the incubation period alone, but greatly relied on the ability of a school to detect a case. With a timely and comprehensive detection rate (close to 100%), a seven-day closure policy yielded almost the same infectivity risk as a fourteen-day closure policy. Policy makers should bring the issues of health, education, and the social impact of children to the table and identify the most appropriate measures to control COVID-19 while ensuring the best quality of life of a child.

**Keywords:** Coronavirus, COVID-19, school, model

### School Closure - a Dilemma during COVID-19 Era: International Evidence

Coronavirus disease 2019 (COVID-19) has created a substantial impact on almost all aspects of society. Thailand was the first country outside China to face COVID-19 during March-May 2020. Important clusters of cases at that time emerged mostly from boxing stadiums and nightlife entertainment areas comprising pubs, bars and nightclubs<sup>1</sup>; meaning that the majority of infected cases were in middle adulthood. The Thai Government then endorsed massive lockdown policies intending to curb the epidemic. The policies mostly related to the restrictions of inter-provincial travel, the prohibition of all social gathering events, and the closure of all 'risk' areas and business facilities, including entertainment venues, daycare nurseries, and schools.<sup>2</sup>

Though these policies, *inter alia*, mitigated the epidemic severity, there existed a thorny debate in society about whether 'school closure' is like 'Using a

sledgehammer to crack a nut'. This is because, in terms of case volume, children do not account for the lion's share of total cases. Evidence shows that as of 24 Jan 2021, of 13,500 COVID-19 cases in Thailand, the proportion of cases in under 15 year-olds is just 2.8% (379/13,500).<sup>3</sup>

So far, knowledge on the impact of COVID-19 and children has not reached a consensus. A systematic review by Bhuiyan et al demonstrates that nearly half of young COVID-19 cases were asymptomatic and half were in infants.<sup>4</sup> Though it is widely accepted that children and adolescents are less likely to experience severe clinical symptoms than their elders, the fact that most young COVID-19 cases are asymptomatic prompts a concern that children are not risk-free in contracting and transmitting the disease.<sup>5</sup> This notion is coupled with the problem that imposing strict hygienic measures (such as mask-wearing and hand washing) on children is too difficult.<sup>6</sup> Major outbreaks of 260 cases from school settings were observed in Israel, only 10 days following school reopening.<sup>7</sup> A similar situation

occurred in Chile where 52 cases from school clusters were reported within a couple of weeks after notification of the first case in the country.<sup>8</sup>

However, there are contradictory pieces of evidence. Another systematic review by Xu et al suggests that there is limited high-quality evidence available to quantify the extent of COVID-19 transmission in schools, compared with the transmission in community settings.<sup>9</sup> Otte im Kampe et al reveal that outbreaks in schools are always small in terms of the magnitude and severity of the infectees.<sup>10</sup> Lessons from Severe Acute Respiratory Syndrome (SARS) in China, Hong Kong, and Singapore elaborate that school closures contributed to only a trivial effect on COVID-19 mitigation.<sup>11</sup> Besides, the 'collateral damage' from school closure can be enormous. This includes increasing family poverty, food insecurity, child abuse, child neglect, mental health, and enhancing education disparity among disadvantaged children.<sup>12,13</sup> Attention to school lessons and competing daily activities at home are extremely challenging, not only for children but also the parents. The infrastructure supporting home-schooling or distance learning technology is not always available for families in remote areas.<sup>14</sup>

## Policies on School Closure and Reopening in Thailand

From these collective pieces of evidence, the decision for school closure or re-opening needs to carefully balance the disease-containment objectives and children's quality of life. The Department of Health has announced preventive measures for school-re-opening since May 2020. Child-care facilities and nurseries are always the first venues for education reopening.

Additionally, the discussion should not be confined to whether the school is allowed to reopen. To manage the disease effectively, all education institutes need to account for behavioral modification amongst all involved parties. Face-masks, temperature scans, and hand-hygiene measures should be stringently implemented. All schools need to restructure the infrastructure and re-orientate classroom design (providing adequate ventilation, reducing the number of students per class and session, avoiding contact activity if necessary, having an acute respiratory section in the school infirmary, and frequent communication on COVID-19 to improve health literacy).<sup>15</sup> Table 1 presents a summary of reorientation measures for schools to respond to COVID-19, recommended by the Department of Health.<sup>15</sup>

**Table 1. COVID-19 prevention measures in school**

Dimension	Main measures	Supportive measures
<b>Disease prevention and containment</b>	<ol style="list-style-type: none"> <li>1. Temperature and history screening</li> <li>2. Students, staffs, and visitors must wear a face mask when being in schools</li> <li>3. Provide hand washing area and alcohol gel</li> <li>4. Keep 1-2 meters of physical distancing in class</li> <li>5. Maintain adequate air ventilation</li> <li>6. Reduce the number of students in the class to prevent the crowded situation</li> </ol>	<ol style="list-style-type: none"> <li>1. Clean public space surface frequently</li> <li>2. Keep 1-2 meters of physical distancing in the activity space</li> <li>3. Encourage the students to use personal utensils</li> <li>4. Provide isolated nursing room for respiratory disease patients</li> <li>5. Provide COVID-19 mitigation measure of awareness and knowledge</li> <li>6. Ensure disease prevention measures in school bus</li> </ol>
<b>Social protection</b>	<ol style="list-style-type: none"> <li>1. Prepare the study plan for students in quarantine or during the school closure period</li> <li>2. Prepare guidelines to reduce social stigma</li> <li>3. Provide guidelines to reduce staff stress and anxiety</li> <li>4. Revalidate risk history of students and staff</li> <li>5. Disclaim abstinence days of students and staff at risk of COVID-19 infection</li> </ol>	<ol style="list-style-type: none"> <li>1. Communicate with related school members to prevent social stigma</li> <li>2. In case of COVID-19 infection, students and staffs may be absent without punishment or it being counted as sick leave</li> <li>3. Quarantine must be applied in contact cases</li> </ol>

## What does a Modeling Study Suggest on the School Closure Duration?

A recent modeling study conducted by a joint research team of the Division of Epidemiology, Department of Disease Control, and the International Health Policy Program of the Ministry of Public Health demonstrates that a long period of school closure (14 days) may yield similar benefits as a short closing period (7 days) conditional on a 100%-detection rate. In other words, policymakers need to contemplate the ability to detect a suspected case (detection rate) in tandem with the school closure period. The findings were reported to the Strategic and Technical Advisory Group (STAG) under the Emergency Operations Center (EOC) of the

Department of Disease Control in June 2020 to aid decision-making.

The study applies the concept of compartmental and system-dynamics models, as demonstrated in Figure 1. Several assumptions are employed: (i) number of susceptible students at the inception=99; (ii) number of infective students at the inception=1 (total students=100); (iii) reproduction number of COVID-19 =2.2;<sup>16</sup> (iv) infectious duration of COVID-19=4.6 days;<sup>17</sup> (v) all children have homogenous random contact with each other; (vi) incubation period follows gamma distribution with mean of 5 days and standard deviation of 3 days;<sup>18</sup> and (vii) the school would be closed (for 7 or 14 days) once a case is detected.

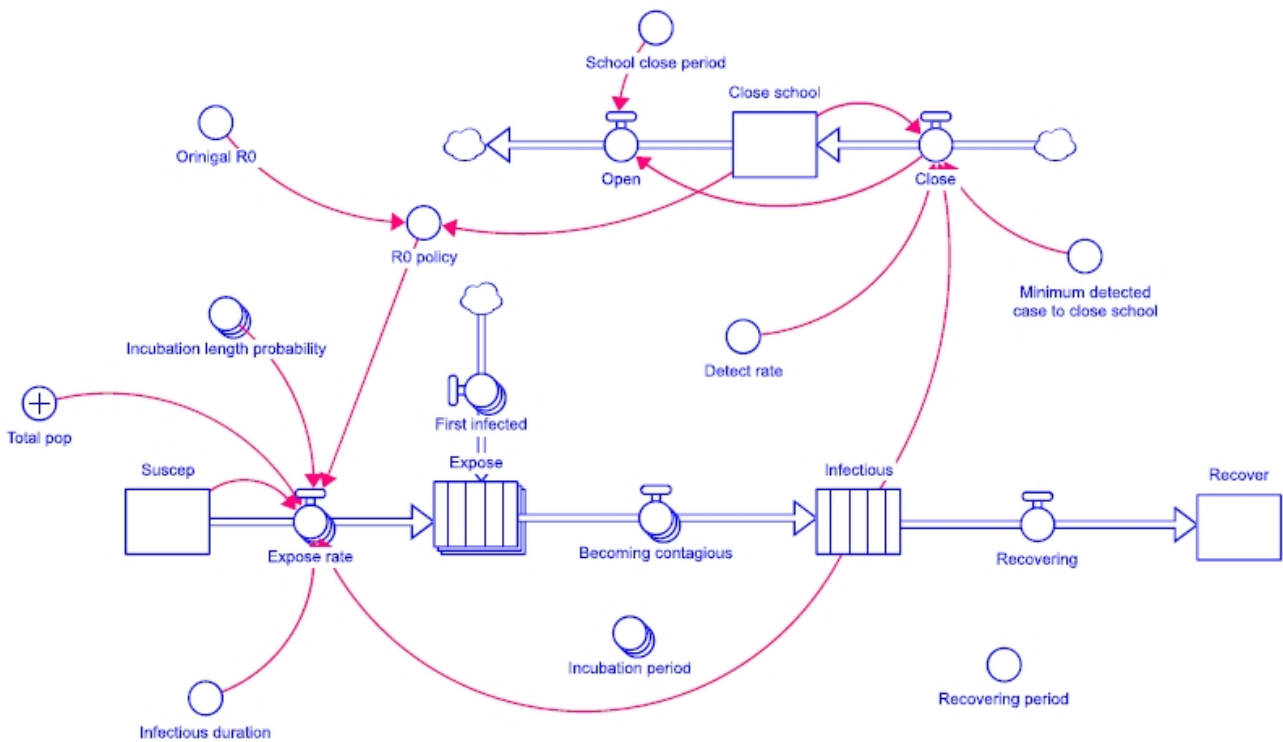


Figure 1. Model framework

The infectivity risk can be estimated from the gamma-distribution characteristic of the incubation period. About 88% of cases have an incubation period of shorter than 7 days while only 1% experience very long incubation periods of 14 days or more. The rest 11% lie between 7 and 14 days.

This means the seven-day closure policy may face a risk of letting the infectives with a higher-end spectrum of incubation period (about 12%) make contact with susceptible students. The fourteen-day closure policy is considered safer in terms of preventing a second wave of cases (with a peak of three cases by approximately day 40) when detection rates are compromised.

From another angle, as mentioned earlier, this situation is not too worrisome if the detection rate is

‘sensitive’ enough to capture the infectives and seclude them from other students. In this regard, the term ‘sensitive’ in this case means the extent to which the school officials (or teachers) are able to detect a single infected student. For instance, a 25%-detection rate means that at the time when a single case is detected, there will be (at least) four cases existing in a classroom. This assumption explains why the school closing date differs in different detection scenarios. The findings also point to the case detection measure (such as temperature screening or verbal screening on students with a history of close contacts with other infectives) must not be relaxed. Note that the model focuses only on infection amongst students. The impact on other family members is yet to be explored. Figure 2-3 displays the findings of the model based on the assumption above.

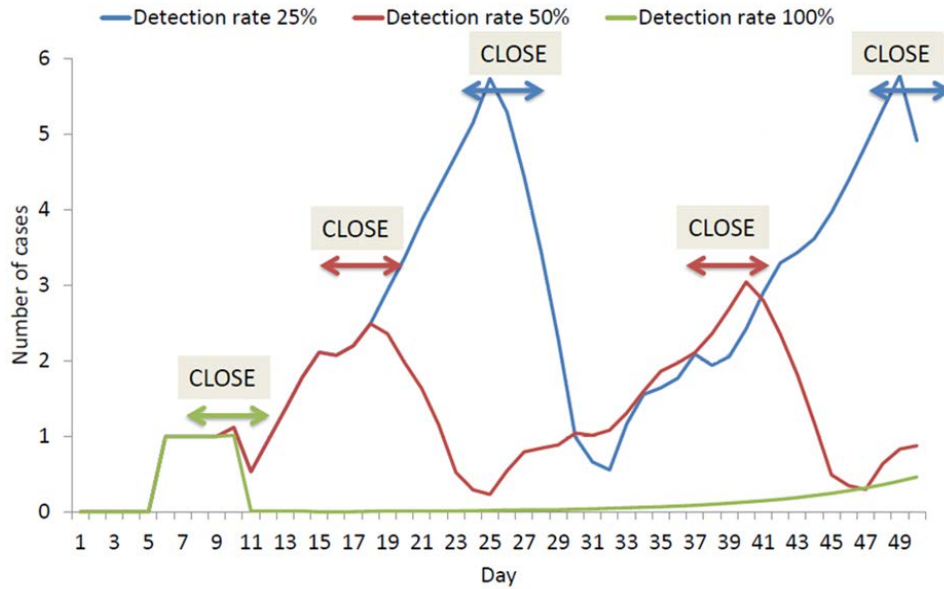


Figure 2. Number of COVID-19 cases based on 7-day school closure policy

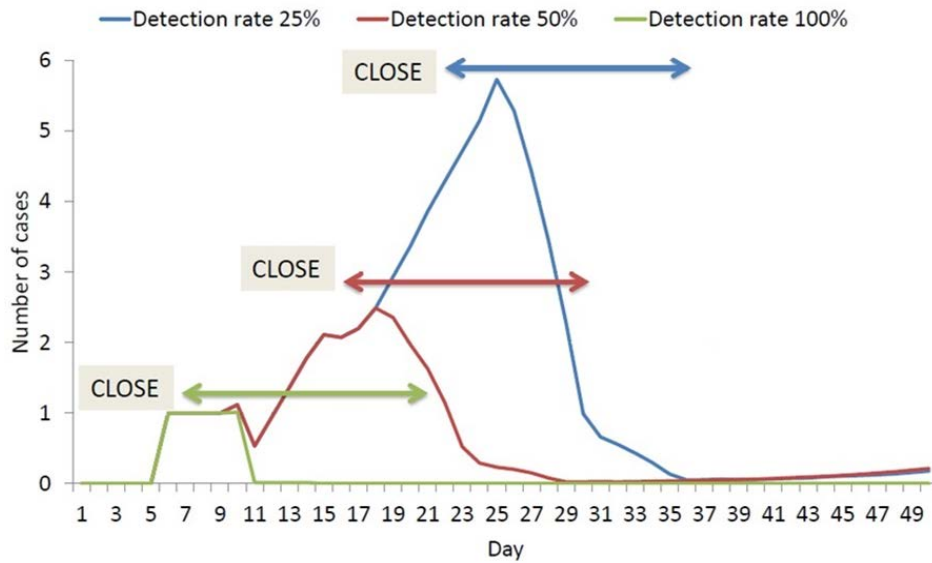


Figure 3. Number of COVID-19 cases based on 14-day school closure policy

The impact on children themselves was mostly related to a higher perception of family stress and instability during the home-school period.<sup>19</sup> The competing responsibilities of parents was also reported as a challenging factor on top of the challenges concerning education access, study motivation, and longer learning outcomes.<sup>20</sup> A survey of 4,342 primary and secondary school children in China revealed a high percentage of anxiety, depression, and stress (24.9%, 19.7%, and 15.2%, respectively). The majority of the children who frequently had discussions with their parents were satisfied with their life.

### The Way Forward on School Responses to COVID-19

The COVID-19 pandemic has resulted in unprecedented changes to almost all aspects of human lives, including the well-being of children. Many countries around the world endorse a

temporary nationwide and extensive closure of educational institutions in an attempt to contain the spread of the pandemic, while several countries have implemented more localised closures. However, school closure is far from the heart of all measures against COVID-19. The closure policy, which gives priority to ‘health’, must be balanced with other supporting mechanisms to minimize the detrimental effect on other aspects of the well-being of the children. To find a sound balance of school responses to COVID-19, the government should involve all related parties in the decision-making process. These include not only epidemiological experts and public health specialists but also, educationists, representatives of parent groups, school leaders, and civic groups. While controlling the epidemic is the primary goal of the measures, continuous monitoring of the academic performance and well-being of the students should also be in place.

## Suggested Citation

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