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Closing schools for SARS-CoV-2: A pragmatic rapid recommendation

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Complete List of Authors:
Bekkering, Geertruida; KU Leuven Academic Center for General Practice; Center for Evidence-Based Medicine
Delvaux, Nicolas; KU Leuven Academic Center for General Practice
Vankrunkelsven, Patrik; KU Leuven Academic Center for General Practice; Center for Evidence-Based Medicine
Toelen, Jaan; UZ Leuven Pediatrics
Aertgeerts, Sigrid; Nursery Education Heverlee
Crommen, Sofie; Practice for Child Psychiatry
Debruyckere, Pedro; Artevelde University College, Teacher Training Department; University of Leiden, SCS
Devisch, Ignaas; UGent, Department of Public Health and Primary Care
Lernout, Tinne; Sciensano
Masschalck, Katrien
Milissen, Nore
Molenberghs, Geert; UHasselt BIOMED, Data Science Institute; KU Leuven, Center for Biostatistics and Statistical Bioinformation
Pascal, Annelies; Secondary school
Plomteux, Oscar
Raes, Marc; Jessa Ziekenhuis vwz, Pediatrics; Universiteit Hasselt Faculteit Geneeskunde en Levenswetenschappen
Rans, Lise
Seghers, Alexandra; Vrij CLB
Sweldens, Lode; Special Primary Education
Vandenbussche, Jeroen; Vrije Basisschool Boven-Lo
Vanham, Guido; Institute of Tropical Medicine
Wollants, Elke; Clinical and Epidemiological Virology KU Leuven; KU Leuven Rega Institute for Medical Research
Aertgeerts, Bert; KU Leuven Academic Center for General Practice

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Closing schools for SARS-CoV-2: A pragmatic rapid recommendation

Corresponding author: Geertruida E Bekkering, KU Leuven, Academic Centre for General Practice, Kapucijnenvoer 33, blok j, 3000 Leuven, Belgium

Email: trudy.bekkering@kuleuven.be

Co-authors:

- Nicolas Delvaux, Academic Centre of General Practice, KU Leuven, Belgium
- Patrik Vankrunkelsven, Academic Centre of General Practice, KU Leuven; Centre for Evidence-based Medicine, Belgium
- Jaan Toelen, Department of Pediatrics, UZ Leuven, Belgium
- Sigrid Aertgeerts, Primary school Heilig Hart, Heverlee, Belgium
- Sofie Crommen, Practice for psychiatry for children, Zutendaal, Belgium
- Pedro De Bruyckere, Teacher Training Department, Artevelde University College, Belgium; researcher, SCS, University of Leiden, Netherlands
- Ignaas Devisch, Department of Public Health and Primary Care, UGent, Gent, Belgium
- Tinne Lernout, Sciensano, Brussels, Belgium
- Katrien Masschalck, Veerle, Belgium
- Nore Milissen, Heverlee, Belgium
- Geert Molenberghs, I-BioStat, UHasselt/ KU Leuven, Belgium
- Annelies Pascal, Hotelschool Ter Groene Poorte, Brugge, Belgium
- Oscar Plomteux, Geel, Belgium
- Marc Raes, Jessa Hospital, Hasselt, Belgium
- Lise Rans, Heverlee, Belgium
- Alexandra Seghers, VCLB Leuven, Belgium
- Lode Sweldens, BLO De Olm, Herk-de-Stad, Belgium
- Jeroen Vandenbussche, Primary school Boven-Lo, Kesselo, Belgium
- Guido Vanham, Institute of Tropical Medicine and University of Antwerp, Belgium
- Elke Wollants, Clinical and Epidemiological Virology KU Leuven; REGA Institute, Leuven, Belgium
- Bert Aertgeerts, Academic Centre of General Practice, KU Leuven, Belgium

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What is known about the subject

1. In 2020, many governments closed schools temporarily as a way of controlling SARS-CoV-2 infections in their countries.
2. Although closing schools may seem like a useful way of reducing infections in theory, several harms became clear during the first lockdown.

What this study adds

1. We made an evidence-based recommendation on the effects of closing schools for COVID.
2. We compared benefits and harms in a structured way together with a large panel of stakeholders.
3. Our panel concluded that closing schools should be prevented as long as possible because we are much more certain of the harms than of the benefits.

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Abstract

Background In Belgium schools closed during the first lockdown in March 2020, with a partial re-opening in May. They fully re-opened in September. During the summer, infections started to increase in the general population, speeding up in September. Some measures were taken to limit social contacts but those were insufficient to mitigate the exponential rise of infections in October. Children were still receiving all lessons at school at that time and it was questioned whether this position was tenable. We systematically compared the benefits and harms of closing primary and secondary schools and developed a recommendation.

Methods A multidisciplinary panel, including school pupils and teachers, educational experts, clinicians and researchers produced this recommendation in compliance with the standards for trustworthy rapid guidelines. The recommendation is based on data collected through national surveillance or studies from Belgium, and supported by a rapid literature review.

Results Closing schools during the first lockdown probably resulted in a large learning delay and possibly led to more cases of child abuse. We are uncertain about the effect on the infection rate, hospitalisations, transmission rates, mental health of children, teachers, and parents. The panel concluded that the balance of benefits and harms of closing schools clearly shifts against closing schools. Detrimental effects are even worse for vulnerable children. This recommendation is affected by the local virus circulation.

Conclusion The guideline panel issues a strong recommendation against closing schools when the virus circulation is low to moderate, and a weak recommendation against closing schools when the virus circulation is high. It does not apply when the school system cannot function due to lack of teachers, too many children who are at home, or a shortage of support services. As the results of international studies are consistent with Belgian study results, this recommendation may also be relevant internationally.

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Introduction

Many governments closed schools as a means of containing the spread of the virus during the first wave of the SARS-CoV-2 pandemic. The reasoning for this was based mainly on influenza outbreaks, where transmission of the virus is predominantly driven by children. It is unclear if school closures are effective in coronavirus outbreaks, where transmission dynamics appear to be different.[1]

Belgium started its lockdown on 18 March 2020, when schools, shops, sports activities, restaurants and cafés were ordered to close. The measures were eased from 18 May onward, when schools partially re-opened. Face masks were required from 18 May at schools (pupils above 12 years of age, teachers, and other personnel involved) and from 7 July in places where people could not observe a distance of 1.5 metres. In March 2020, testing for SARS-Cov-2 was available but limited to hospitalised patients and symptomatic healthcare personnel. From 4 May onward symptomatic persons in the general population were also tested. Testing of high-risk contacts started on 12 June 2020.

Besides limiting the contacts between children at school, the closures force parents to work at home and thus indirectly reduce parental work-related contacts. However, early on in the COVID pandemic the adverse effects of school closures were reported.[2] An evidence-based approach to these data is now needed. We aimed to develop a recommendation for schools weighing up the benefits and harms based on data from Belgium, supported by international literature.

Methodology

The guideline panel consisted of a multidisciplinary team, including pupils, teachers, school management boards, educational experts, parents, clinicians, researchers, and guideline methodologists (Appendix 3). The panel met twice via web conferences.

The panel followed the BMJ Rapid Recommendations procedure for creating trustworthy recommendations,[3] using the GRADE approach.[4] GRADE provides a systematic and transparent framework to develop evidence-based recommendations. It is based on a PICO (population, intervention, comparator and outcome)-structured research question with relevant outcomes, a systematic summary of the evidence, and criteria for moving from evidence to recommendation or decision.[5] Our aim was to assess whether we could use this for questions related to the COVID pandemic.

Public involvement

Eight individuals (three pupils, one parent, two teachers and two school managers) were full panel members and involved in all steps of our recommendation developmental process. These panel members identified important outcomes, and led the discussion on values and preferences of schoolchildren, practical issues and feasibility. All participated in the teleconferences and met all authorship criteria.

Importance of outcomes

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The scope of the recommendation was discussed with the panel members. Subsequently, the importance of potentially relevant outcomes was individually rated by each panel member on a scale from 1 to 9 (7–9 critical, 4–6 important, 1–3 of limited importance), as recommended by the GRADE approach.[6] For each outcome, the mean scores were calculated and outcomes that scored ≥7 were eligible to be selected for the recommendation. To ensure the outcome was considered important by several parties, we selected outcomes that were rated as important (score ≥7) by at least 50% of the panel (Table 1).

Summary of evidence

For each outcome we searched for reliable data from Belgium, with a focus on Flanders, as many important factors are specific to a particular country, such as school system and implemented COVID measures. We searched for data on the above-mentioned outcome measures during two time periods that were comparable in the best possible way. We considered other parallel COVID measures, such as the closure of shops, restaurants, cafés, sports facilities, but also the testing strategy and wearing of face masks. Finally, we decided to compare data from the second half of May (when schools had been fully closed for 6 weeks) and the second half of September (when schools had been re-opened fully since 1 September).

Data sources

We used national surveillance data for the number of COVID cases and hospital admissions.[7,8] The number of infections among grandparents was estimated using the number of cases among those aged 55 to 75 years. The centre that provides educational, medical and psychological support to schools and schoolchildren in Flanders (CLB –'centre for schoolchild support'), provided the number of infections among teachers.[9]
Learning delay was assessed based on the result for a standardised test in the 6th grade (last year) of primary schools in Belgium over a six-year period (2015 to 2020).[10] These tests evaluated several subjects: mathematics, Dutch, science, social science and French. The mental health of children was assessed using the largest survey on COVID performed by several Belgian universities.[11] We used the percentage of children reporting feeling well and the percentage of children that scored lower than 3 on the General Health Questionnaire-12 (GHQ12, lower scores reflect better mental health). In addition, we examined data on chats with the CLB (CLBch@t), an online helpline for school children.[12] The number of chats about anxiety, depression or suicidal thoughts were used as indicators of poor mental health.
Child abuse was estimated based on the number of reports via three separate sources: Child focus,[13,14] and two different helplines[15,16] We compared data from March to August 2020 with the same months in 2019, and also the last 2 weeks in May and September in 2020. Finally, we used the number of interventions for neglect at the centre for schoolchild support.[14] We did not find data sources for other outcomes. See Appendix 2 for more details.

Literature

We performed a rapid literature review and searched for reviews on the effect of school closure on our selected outcomes. We searched PubMed, the Cochrane Database of Systematic Reviews and websites of organisations that collated COVID evidence (COVID-19 Scientific Advisory Group, WHO, ECDC, Sciensano).

From evidence to recommendations

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The panel discussed the evidence and formulated specific recommendations. They considered the balance of benefits, harms and practical issues relating to either closing schools or keeping them open (the intervention and control), the quality of evidence, values and preferences of schoolchildren, feasibility, and acceptability, based on personal perception of participation, all with a different background and expertise. Formal methods were used to reach a consensus. Recommendations can be either strong or weak and in favour of or against a certain course of action.

Results

Benefits

Comparing the number of COVID-19 cases (teachers, schoolchildren, adults, grandparents alike) and hospital admissions, all numbers were higher in September compared to May (Table 2).

Certainty of evidence for these results was rated as very low (see Appendix 2); results were based on surveillance data, which were downgraded because of indirectness (the results are likely affected by the fact that in May additional corona measures were implemented and because the dynamic of the epidemic curve as well as the test strategy differed between the two time periods).

We found no Belgian data on transmission from teachers or schoolchildren to their families. Literature reviews concluded that the effect of school closure on number of infections was inconsistent [1,17]

Harms

A learning delay was found in students in the last year of primary school (Table 2). This evidence was rated of moderate certainty; it was based on observational research but was upgraded. The study was performed well and sensitivity analyses confirmed that the results were robust. In addition, the observed effect was large considering that these children (last year) could go back to school before other years, i.e. on the 18th of May 2020. It is therefore to be expected that the effects for other students may even be larger as they returned to schools later. This is called residual confounding.

Scores on well-being were higher in September compared to May. In addition, the number of chats about depression, anxiety and suicidal ideation were higher in May. The certainty of these results was downgraded because of indirectness (multiple corona interventions).

Data from several sources illustrated higher numbers of reports of child abuse in May compared to September and higher numbers in 2020 compared to 2019. The certainty of evidence was rated low, because data were based on observational studies. Results were not downgraded because the effect was consistent in multiple data sources.

No data was found on the mental health of teachers and parents and long-term consequences of learning delay.

Results of reviews and studies showed that the closure of schools was associated with a learning loss, and that the lockdown increased violence and levels of stress among children and an increased use of health lines.[18-22]

Values and preferences of schoolchildren

The panel judged that variability amongst schoolchildren probably exists. First, there are age differences between children in primary and secondary schools. Their age affects how they

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learn and the role of contact with peers. Second, the panel expects that there are differences in preferred learning environment between (secondary school) children; some prefer to study at home, while others prefer studying in a classroom setting. Some children function well with online schooling while others learn better in a physical schooling environment.

Practical issues

The closure of schools means that schools need to provide online education. It is unclear if this type of education is developed to the best of the schools' ability. Closed schools also mean that children need to be cared for at home. This creates stress for parents, even more so when they have to work from home.

Keeping schools open requires that all basic COVID measures are implemented in the school environment, such as the wearing of face masks, keeping distance (including during lunch breaks and also for teachers), and washing hands. Schools make people cluster, and mixing clusters must be prevented as much as possible (in their class/year, before and after school, traveling to and from school, during breaks).

Feasibility/acceptability

School management reported that they increasingly have to deal with many teachers and children that are absent due to sickness or quarantine. Therefore, this recommendation does not apply when the school system can no longer function due to an excessive number of people being sick or in quarantine.

Panel members noted polarisation between people being afraid of becoming infected or infecting relatives and those that wanted to carry on as usual. Polarisation occurred among schoolchildren, teachers, parents, and between these groups. For example, some parents may be afraid to send their children to school.

Recommendation

The panel recommends against closing schools as long as possible (see Appendix 1 Infographic). The recommendation is strong because the certainty of evidence of harms outweighs the certainty of evidence for the advantages. This means that the panel expects that keeping schools open is beneficial for almost all students, and even more so for disadvantaged or vulnerable children.

However, in the event of a major spread of the virus, and an increased risk that clusters of cases spread in schools, the recommendation becomes weak and schools may close, locally, partially, and/or for a limited amount of time. The recommendation does not apply when the school system can no longer function due to a lack of personnel or schoolchildren as a result of illness or quarantine.

Discussion

Evidence from Belgian studies suggests that the closure of schools has a negative impact on children. School closure in the spring of 2020 probably resulted in a learning delay of about 6 months across students.[10] Learning delay is serious as it may have long-term consequences, such as significant loss of future income.[23] The panel also argued that learning delay disproportionately affects disadvantaged children. This was confirmed in the study of Maldonado & De Witte[10] showing that inequality within, but also between, schools

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increased substantially. In addition, school closure may lead to increased child abuse. For children at risk of violence, school may be a safe haven.
Because schools are a crucial part of children's lives, the decision to close schools should not be taken lightly. The recommendation is strong because the certainty of evidence about the possible harms outweighs the certainty of evidence about the benefits. Although our panel decided to make a weak recommendation in case of high virus spread, there is currently no consensus on any threshold for this decision.

Results of other studies/reviews

The results of our rapid review were consistent with the results of our primary data: there is no strong evidence that the closure of schools reduces the number of infections. Although some studies reported significant declines in both incidence and mortality when schools closed,[24] it is difficult to disentangle the effects of closing schools with other corona measures. A prospective cohort study in Australia reported that children and teachers did not contribute significantly to COVID-19 transmission via attendance in educational settings, where effective case-contact testing and epidemic control strategies exist for the population.[25] The importance of stringent COVID measures is supported by two studies on youth camps: one showing that outbreaks may be completely prevented by adhering to clear measures[26] versus increased infections when these measures were less strict/not adhered to.[27] French guidelines therefore also conclude that the educational and social benefits of school far outweigh the risk of possible infections.[28]

The susceptibility and role of children in the transmission of SARS-CoV-2 has been widely discussed in the literature. There is a consensus that transmission of SARS-CoV-2 is plausible, but based on the published reports to date from both prior to COVID-19 lockdown and following re-opening, the risk of transmission from children to children and children to adults in primary school and day-care settings appears low, particularly when infection control measures are in place.[1,17,29,30]

Strengths and limitations of this recommendation

Although the methodology for this recommendation was originally developed for the field of medicine[3], it appeared to be useful for this COVID question as well. There was also added value in having a broad panel, as a large number of different views were considered.
Using stringent methods, we rated the certainty of evidence for the effect of closing schools. This provides the reader with insight into how certain we are that the effects from the studies reflect the effect in the real world. This strict methodology illustrates that it is difficult to examine the effects of school closure and it also contributes to the transparency of the guideline process.

Certainty of evidence for benefits underpinning this recommendation is very low for the following reasons. First, SARS-Cov-2 is a new virus, and evidence is changing regarding its characteristics and impact on society. Second, the data collected is based on observational studies, and because multiple COVID measures were implemented at the same time we could not separate out the effect of closing schools. Third, we compared two periods that had a different dynamic of virus transmission (decreasing in May and rising in September). Finally, the testing strategy slightly evolved between the two periods, with increased testing of asymptomatic people (all high-risk contacts and travellers returning from high-risk areas) in September. In the field of medicine, many guidelines are based on low-quality evidence.[31]

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Pandemics such as COVID force governments to make choices, as keeping schools open comes at a cost for other domains (health, economy). Governments should communicate their priorities, and they should do so in a way that allays any concerns from parents, teachers and children about not closing schools.[32] The whole community needs to make responsible choices about their social contacts to keep the virus circulation as low as possible in order for our children to benefit from lessons at school.

Further research

This study shows that there are still many questions to be answered. Most importantly, we need high-quality prospective studies evaluating where children become infected and the degree of risk of secondary infections in school settings, when all COVID measures are correctly implemented.

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Table 1. PICO-structured question for our recommendation.

Population: All those directly and indirectly involved in primary or secondary schools and anyone who can be infected with COVID

Intervention: school closure (full or partial) with online lessons

Control: Keeping schools open – all children take lessons at school

Outcomes: number of COVID infections (teachers, children ages 0-5, 6 to 12, 13 to 19, adults, elderly, grandparents); risk of transmitting virus to family; learning loss (short and long term); mental well-being of children, teachers and parents; child abuse and child neglect.

Table 2. Summary of benefits and harms of closing schools. Results from Belgian studies and rapid review.

Benefits	**Schools closed**	**Schools open**	**Certainty of evidence (GRADE)**	**Conclusions of reviews**
	Per 100,000 for 14 days			
Number of infections among teachers	6	174	Very low	Typically only single or few (<5) infections among staff in schools.[1]
Number of infections among 0-5 yrs 6-12 yrs 13-18 yrs 19-65 yrs 65+ yrs	 7 5 9 24 38	 22 158 331 223 83	Very low	Opening/closing schools has inconsistent results on community transmission levels. Re-opening schools does not seem to be associated with increased infections in community. [17] Risk of infections in secondary schools is higher compared to primary schools.[30]
Number of infections among grandparents	20	111	Very low	
	Totals			
Number of hospitalisations due to COVID infections	453	804	Very low	
Risk of transmission from child or teacher to household	No Belgian data			The risk of transmission from children (to household or community) is inconclusive.[1]
Harms				
Learning delay (short and long term)	Loss of 6 months		Moderate	Dutch children had a learning loss of one fifth of a school year.[18] A learning delay may cause long-term consequences, estimated on the basis

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				of a study that evaluated long-term effects of a school strike in 1990 in Wallonia.[19]
Mental health of children % children feeling well % children <3 GHQ12 Mean number of chats about anxiety, depression, suicidal thoughts	May 57% 45%	Sept 82% 55% - 43%	Very low	During the lockdown increased levels of distress, worry and anxiety in children and young people were reported. [20]
Child abuse (Mean number of reports) 2020 vs 2019 (Mar-Aug) May vs Sept 2020	 + 80% + 54%		Low	The pandemic seems to increase the number of contacts to helplines significantly. The number of contacts related to violence is inconsistent. [21] The lockdown seems to increase the number of incidents of violence against women, children and adolescents.[22]
Neglect Number of interventions due to neglect 2020 vs 2019	 -32%		Very low	
Mental health of parents	No Belgian data			
Mental health of teachers	No Belgian data			

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Closure of schools during COVID-19: Rapid Recommendation

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Population

Individuals in school environment (nursery, primary, secondary, boarding)

- Schoolchildren
- Teaching staff and personnel
- Individuals partially at, or in contact with, schools (interns, CLB, bus drivers, cleaning staff, ...)

Members of society

- Family members of directly concerned, grandparents
- Everyone who can be infected by COVID-19

Comparison

Schools closed ✗ or ✓ Schools open

Recommendation

Closed		Open	
Strong	Weak	Weak	Strong

Strong recommendation to keep schools open if there is a low or moderate infection level among pupils

Strong	Weak	Weak	Strong

Weak recommendation to keep schools open if there is a high infection level among pupils.

This recommendation applies:

To primary schools, nursery schools and secondary schools, but not technical colleges or universities.

This recommendation does not apply:

If the school system can no longer function (e.g. because of a shortage of teachers)

If the vast majority of the pupils cannot follow regular lessons at school

If there are problems with support services (such as CLB, technical staff, childcare, etc...)

Comparison of benefits en harms

Balance of favourable versus unfavourable effects

We are uncertain whether the closure of schools has a favourable effect on the number of infections among direct (teachers and children) and indirect contacts. There are other factors at play that have a significant influence on the infection numbers (total lockdown, phase of epidemic, etc...).

The closure of schools probably leads to a major learning delay and possibly to an increase in child abuse.

We are uncertain about the effect on the mental well-being of children and the risk of neglect.

There are no Belgian data about the effect on the risk of transmitting the virus to the home situation and the mental well-being of teachers and parents.

Values/preferences of schoolchildren

There is a great difference between schoolchildren in nursery, primary and secondary education. Each age group has its own way of learning and its own needs in relation to social contacts. There are also differences between children themselves; How well can they study, how do they prefer studying (alone or in a classroom), what is the home situation like?

Within secondary education there is a huge diversity between the different study trajectories (e.g. between theoretical or more practical subjects). A small minority of schoolchildren prefer to follow lessons at home. Others really prefer to stay at home out of apathy (e.g. extra sleep, more gaming, more smartphone use).

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Benefits (outcomes)

Schools closed | Schools open

	Per 100 000 in14 days		Certainty of evidence
Teachers with COVID	6	174	★☆☆☆ Very low
Number of people with COVID			
0-5 yr	7	22	★☆☆☆ Very low
6-12 yr	5	158	
13-18 yr	9	331	
19-65 yr	24	223	
65+	38	83	
Grandparents with COVID	20	111	★☆☆☆ Very low
Infection risk child-family	-	-	No Belgian data
Infection risk teacher-family	-	-	No Belgian data
	Totals		
Hospitalisations for COVID	453	804	★☆☆☆ Very low

Harms (outcomes)

Schools closed | Schools open

			Certainty of evidence
Learning delay	+/- 6 months schooling		★★★☆ Moderate
Mental health children	2nd half May	2nd half Sept	
% that feel good	57%	82%	★☆☆☆ Very low
% with good mental well-being	45%	55%	
Average number chats about fear/ depression/suicide		-43%	★☆☆☆ Very low
Child abuse (reported)			
Mar-Aug 2020 vs 2019	+80%		★☆☆☆ Very low
May 2020 vs Sept 2020	+54%		
Neglect (reported) Mar-Aug 2020 vs 2019	-32%		★☆☆☆ Very low
Mental health parents	-	-	No Belgian data
Mental health teachers	-	-	No Belgian data
Learning delay (long term)	-	-	No Belgian data

The figures:

These figures date from 2nd half May and 2nd half September 2020.

They provide no insight into the precise effect of closing schools because other factors also play an important role (see previous page).

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Practical issues

Schools closed

Digital education has not yet been perfected in all its aspects:

- How do you maintain contact with pupils?
- How do you differentiate (age and level)?
- Are all teachers sufficiently familiar with the the technical aspects and methods?
- How do you give practicals and lessons in arts subjects?
- Does every child have internet access, a computer, and a quiet space at home?

Concern and stress among parents:

- How is it possible to combine childcare and working at home? This is much more of a burden for primary school children but also for children with (behavioural) problems.

Schools open

Concern and stress among parents:

- "My kids are not guinea pigs"

Fear among children/teachers of infecting others or becoming ill themselves

Sufficient focus on carrying out all basic measures at school (see box below), also during breaks (canteen, staffroom) and the journey to/from school (adequate public transport).

This means mandatory face mask for teachers and secondary school children. Some find this difficult.

Open schools mean clustering of people and this increases the risk of infection

- Clustering of(grand)parents when picking up (grand)children
- Clustering of children on way to school on the bus or train
- During breaks, children cluster in the playground or canteen

The safety measures adhered to by educational institutions, education personnel and pupils, ensure that the virus can spread much less easily.

This is how we prevent transmission:

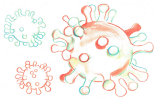
*** Stay at home if you are ill. ***

*** Wash your hands. This removes any virus particles on your skin. ***

*** When you practise physical distancing, the droplets fall on the ground.***

By wearing face masks, you prevent droplets and micro-droplets from spreading.
Ventilation dilutes and evaporates any possible micro-droplets.

Source: Onderwijs Vlaanderen



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Other considerations

General

Corona has had an enormous impact on all of us, and for the time being we will have to live with it.
This recommendation has been drawn up on the basis of current knowledge that is very inadequate.
We are still learning about this epidemic and the consequences of certain choices.

This continuous learning process is also taking place within education.
The recommendation concerns the impact of a total closure. On the basis of current insights, alternative measures are more likely, with the aim of minimising the learning delay and offering a safe place to those children that need it.
Examples include half-capacity classes, lessons just for certain children, re-arranging timetables.

These meetings took place during an upsurge of the virus.
This influences the current recommendation. Experiencing first hand the serious effects of the virus can also change the arguments.

The number of children suffering abuse has risen despite schools being partially closed and therefore fewer opportunities for teachers to alert the CLB. These figures could therefore be an underestimation

Children can also transmit Covid-19, although the current scientific research shows that they transmit the virus less than adults. Everyone needs to continue respecting the basic guidelines as regards contact with children.

As a society, we have to make choices. Do you take measures that curb the economy or do you close the schools? What takes priority? The decision to close schools should not be taken too lightly because this will probably result in learning delays and possibly more child abuse.

Schools can play a role in continuing to motivate children to respect the general guidelines (see previous page), even during non-school and after-school activities. **This promotes uniformity and can reduce anxiety among parents, children and teachers and school management, as well as polarisation between groups.**

Primary school

It is important to keep schools open because they are an entry point for **reaching all population groups.**

In this way you can reach people that the normal media can't reach.

School offers security and structure for children.
This is particularly important for children whose home life is difficult.

Secondary school

Young people are more likely to follow the guidelines in a **controlled school environment** than when there is no supervision.
If we close the schools, we therefore have less knowledge about what young people are doing.

School is also important for young people because of **the structure/security, regularity and social contacts,** especially for those with a difficult home life.

Suggestions for further research

This recommendation exposes many gaps in our current knowledge.
Here we list a few that may be of added value in substantiating this research.

What is the effect of school closure on the mental well-being of children, teachers and parents?

How many infections actually take place at school?

How can we motivate young people to respect the guidelines?

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Summary

This recommendation is based on current scientific insights; however, these are inadequate.

The greatest evidential value consists of the fact that school closure probably causes a large learning delay and possibly more child abuse. At the same time we must balance the number of infections in the total population, something that helps determine whether schools should close.

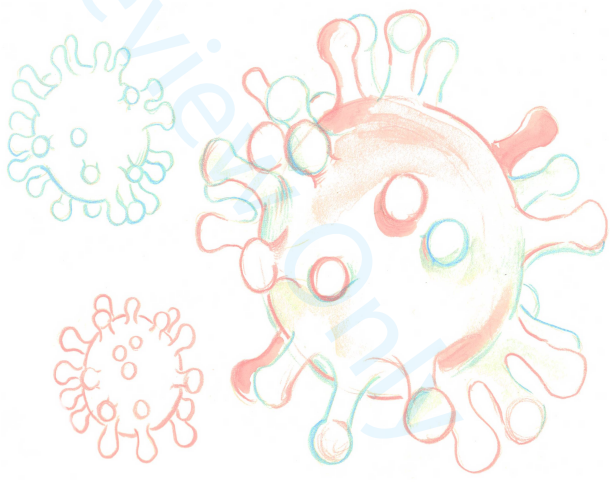
School is a crucial element of children's and young people's lives.
It is here that they develop themselves, their future and in so doing all our futures.
We should therefore think very carefully before closing schools.
New scientific insights will have an effect on this recommendation.

With this recommendation we make a leap from scientific insights to general recommendations for a specific question. We look at scientific studies and weigh these up against other arguments from a broad panel of stakeholders and report which have played a role.

Dealing with uncertainty is not a new phenomenon.
In the medical world too, only 1/3 of decisions are based on scientific evidence.

Panel members:

Bert Aertgeerts (general practitioner, chairman)
Trudy Bekkering (methodologist)
Nicolas Delvaux (general practitioner, methodologist)
Patrik Vankrunkelsven (general practitioner, methodologist)
Jaan Toelen (paediatrician)
Oscar Plomteux (pupil 4th year ASO)
Nore Milissen (pupil 4th year STW)
Lise Rans (pupil 4th year STW)
Katrien Masschalck (parent)
Annelies Pascal (teacher TSO)
Lode Sweldens (teacher BLO)
Sigrid Aertgeerts (director, nursery education)
Jeroen Vandenbussche (director, primary education)
Ignaas Devisch (ethicist)
Tinne Lernout (epidemiologist)
Elke Wollants (Manager COVID lab)
Marc Raes (paediatrician)
Sofie Crommen (child psychiatrist)
Geert Molenberghs (biostatistician)
Alexandra Seghers (CLB physician)
Pedro De Bruyckere (psychologist/pedagogue)
Guido van Ham (virologist)



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Appendix 2. GRADE ratings and detailed data

Outcome	Study	Characteristics	Results	GRADE-rating	Final GRADE
Learning delay	Maldonado & De Witte, 2020	Standardized tests in children in the last grade primary school. Comparing cohort 2020 to previous cohorts 2015 to 2019	<u>Learning loss in 2020</u> Social science: 0.33 SD French: 0.3 SD Dutch 0.29 SD Math: 0.19 SD - results were robust across different models - inequality within and between schools rose	Observational research No serious limitations No serious indirectness No serious inconsistency No serious imprecision Large effect (+0.5) Residual confounding (+0.5)	Moderate certainty
Child abuse (different sources 2020 vs 2019)	1. Child Focus	Number of reports on images of sexual abuse	During lockdown 679 reports vs 256 during same months in 2019 (+165%)	Observational research No serious limitations No serious indirectness[1] No serious inconsistency No serious imprecision	Low certainty
	2. CLBch@t	Number of chats on abuse at helpline for students	During lockdown 79 reports vs 61 during same months in 2019 (+30%)		
	3. helpline 1712	Number of persons contacting this helpline on abuse	During lockdown +44% reports compared to same months in 2019		
Child abuse (Sept 2020 vs May 2020)	4. helpline (sexual) abuse of children	Number of persons contacting this helpline (nupraatikerover.be)	In May 2020 100 reports vs 65 in September 2020 (+54%)		
COVID infections	National surveillance data; CLB for teachers	Number of persons with a positive test	reported in paper	Observational research No serious limitations Serious indirectness[2] No serious inconsistency No serious imprecision	Very low certainty

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Mental health children	'Grote Corona Studie'	Survey among children	reported in paper	Observational research No serious limitations Serious indirectness[2] No serious inconsistency Serious imprecision[3]	Very low certainty
	CLBch@t	Number of chats (May vs September 2020) (Lockdown 2020 vs same months 2019	<u>Per 14 days (May vs September):</u> depression: 16 vs 5 anxiety: 16 vs 9 suicidal thoughts: 18 vs 15 <u>Per 6 months (2020 vs 2019)</u> depression: 169 vs 82 anxiety: 139 vs 35 suicidal thoughts: 190 vs 137		
Child neglect	CLB reports	Interventions because of physical or mental neglect	In 2020, +32%	Observational research No serious limitations Serious indirectness[2] No serious inconsistency No serious imprecision	Very low certainty

1: Data from Sept 2020 vs May 2020 yield very similar results compared to data from 2020 vs 2019

2: In May 2020 multiple corona measures were in place; with this data we cannot disentangle the effect of closing schools only on these outcomes

3: Data May vs September 2020 is based on low numbers

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Appendix 3. Details of members of the panel

Name	Expertise	Affiliation
B. Aertgeerts	General practitioner, chair	Academic Centre of General Practice, KU Leuven, Belgium
G.E. Bekkering	Methodologist	Academic Centre of General Practice, KU Leuven; Centre for Evidence-based Medicine, Leuven, Belgium
N. Delvaux	Methodologist, general practitioner	Academic Centre of General Practice, KU Leuven, Belgium
P. Vankrunkelsven	Methodologist, general practitioner	Academic Centre of General Practice, KU Leuven; Centre for Evidence-based Medicine, Belgium
J. Toelen	Paediatrician	UZ Leuven, Belgium
O. Plomteux	Pupil 4th year	Secondary school Geel, Belgium
N. Milissen	Pupil 4th year	Secondary school Heverlee, Belgium
L. Rans	Pupil 4th year	Secondary school Heverlee, Belgium
K. Masschalck	Parent	Veerle, Belgium
A. Pascal	Teacher secondary education	Hotelschool Ter Groene Poorte, Brugge, Belgium
L. Sweldens	Teacher special primary education	BLO De Olm, Herk-de-Stad, Belgium
S. Aertgeerts	Director nursery education	Basisschool Heilig Hart, Heverlee, Belgium
J. Vandenbussche	Director primary education	Basisschool Boven-Lo, Kesselo, Belgium
I. Devisch	Philosopher of Medicine and Ethics	Department of Public Health and Primary Care UGent, Gent, Belgium
T. Lernout	Epidemiologist	Sciensano, Brussels, Belgium
E. Wollants	Manager COVID lab	Clinical and Epidemiological Virology KU Leuven; REGA Institute, Leuven, Belgium
M. Raes	Paediatrician	Jessa Hospital, Hasselt, Belgium
S. Crommen	Child and adolescent psychiatrist	Praktijk voor Kinderpsychiatrie Zutendaal, voorzitter VVK vzw, Belgium
G. Molenberghs	Biostatistician	I-BioStat, UHasselt/ KU Leuven, Belgium
A. Seghers	Physician	VCLB Leuven, Belgium
P. De Bruyckere	Psychologist, educationalist	Teacher Training Department, Artevelde University College, Belgium; researcher, SCS, University of Leiden, Netherlands
G. Vanham	Immuno-virologist	Institute of Tropical Medicine and University of Antwerp, Belgium

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Closing schools for SARS-CoV-2: A pragmatic rapid recommendation

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Complete List of Authors:
Bekkering, Geertruida; KU Leuven Academic Center for General Practice; Center for Evidence-Based Medicine
Delvaux, Nicolas; KU Leuven Academic Center for General Practice
Vankrunkelsven, Patrik; KU Leuven Academic Center for General Practice; Center for Evidence-Based Medicine
Toelen, Jaan; UZ Leuven Pediatrics; KU Leuven, Department of development and Regeneration
Aertgeerts, Sigrid; Primary School Heilig Hart
Crommen, Sofie; Practice for Child Psychiatry
Debruyckere, Pedro; Artevelde University College, Teacher Training Department; University of Leiden, SCS
Devisch, Ignaas; UGent, Department of Public Health and Primary Care
Lernout, Tinne; Sciensano
Masschalck, Katrien
Milissen, Nore
Molenberghs, Geert; UHasselt BIOMED, Data Science Institute; KU Leuven, Center for Biostatistics and Statistical Bioinformation
Pascal, Annelies; Secondary school
Plomteux, Oscar
Raes, Marc; Jessa Hospital vzw, Pediatrics; Hasselt University - Faculty of Medicine and Life Sciences
Rans, Lise
Seghers, Alexandra; Vrij CLB
Sweldens, Lode; Special Primary Education, De Olm
Vandenbussche, Jeroen; Primary Education Boven-Lo
Vanham, Guido; Institute of Tropical Medicine
Wollants, Elke; Clinical and Epidemiological Virology KU Leuven; KU Leuven Rega Institute for Medical Research
Aertgeerts, Bert; KU Leuven Academic Center for General Practice

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Closing schools for SARS-CoV-2: A pragmatic rapid recommendation

Corresponding author: Geertruida E Bekkering, KU Leuven, Academic Centre for General Practice, Kapucijnenvoer 33, blok j, 3000 Leuven, Belgium

Email: trudy.bekkering@kuleuven.be

Co-authors:

- Nicolas Delvaux, Academic Centre of General Practice, KU Leuven, Belgium
- Patrik Vankrunkelsven, Academic Centre of General Practice, KU Leuven; Centre for Evidence-based Medicine, Belgium
- Jaan Toelen, Department of Pediatrics, UZ Leuven, Department of Development and Regeneration, KU Leuven, Belgium
- Sigrid Aertgeerts, Primary school Heilig Hart, Heverlee, Belgium
- Sofie Crommen, Practice for child psychiatry, Zutendaal, Belgium
- Pedro De Bruyckere, Teacher Training Department, Artevelde University College, Belgium; researcher, SCS, University of Leiden, Netherlands
- Ignaas Devisch, Department of Public Health and Primary Care, UGent, Gent, Belgium
- Tinne Lernout, Sciensano, Brussels, Belgium
- Katrien Masschalck, Veerle, Belgium
- Nore Milissen, Heverlee, Belgium
- Geert Molenberghs, I-BioStat, UHasselt/ KU Leuven, Belgium
- Annelies Pascal, Hotelschool Ter Groene Poorte, Brugge, Belgium
- Oscar Plomteux, Geel, Belgium
- Marc Raes, Jessa Hospital, Hasselt, Belgium
- Lise Rans, Heverlee, Belgium
- Alexandra Seghers, VCLB Leuven, Belgium
- Lode Sweldens, BLO De Olm, Herk-de-Stad, Belgium
- Jeroen Vandenbussche, Primary school Boven-Lo, Kessel-Lo, Belgium
- Guido Vanham, Institute of Tropical Medicine and University of Antwerp, Belgium
- Elke Wollants, Clinical and Epidemiological Virology KU Leuven; REGA Institute, Leuven, Belgium
- Bert Aertgeerts, Academic Centre of General Practice, KU Leuven, Belgium

Keywords: COVID-19; practice guideline; schools; child; adolescent

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Reference count: 36

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What is known about the subject

1. In 2020, many governments closed schools temporarily as a way of controlling SARS-CoV-2 infections in their countries.
2. Although closing schools may seem like a useful way of reducing infections in theory, several harms became clear during the first lockdown.

What this study adds

.

1. Our panel concluded that closing schools should be prevented as long as possible because we are much more certain of the harms than of the benefits.
2. Closing schools probably results in a large learning delay, affecting disadvantaged children disproportionally.

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Abstract

Background In Belgium schools closed during the first lockdown in March 2020, with a partial re-opening in May. They fully re-opened in September. During the summer, infections started to increase in the general population, speeding up in September. Some measures were taken to limit social contacts but those were insufficient to mitigate the exponential rise of infections in October. Children were still receiving all lessons at school at that time and it was questioned whether this position was tenable. We systematically compared the benefits and harms of closing primary and secondary schools and developed a recommendation.

Methods A multidisciplinary panel, including school pupils and teachers, educational experts, clinicians and researchers produced this recommendation in compliance with the standards for trustworthy rapid guidelines. The recommendation is based on data collected through national surveillance or studies from Belgium, and supported by a rapid literature review.

Results Closing schools during the first lockdown probably resulted in a large learning delay and possibly led to more cases of child abuse. We are uncertain about the effect on the infection rate, hospitalisations, transmission rates, mental health of children, teachers, and parents. The panel concluded that the balance of benefits and harms of closing schools clearly shifts against closing schools. Detrimental effects are even worse for vulnerable children. This recommendation is affected by the local virus circulation.

Conclusion The guideline panel issues a strong recommendation against closing schools when the virus circulation is low to moderate, and a weak recommendation against closing schools when the virus circulation is high. It does not apply when the school system cannot function due to lack of teachers, too many children who are at home, or a shortage of support services. As the results of international studies are consistent with Belgian study results, this recommendation may also be relevant internationally.

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Introduction

Many governments closed schools as a means of containing the spread of the virus during the first wave of the SARS-CoV-2 pandemic. The reasoning for this was based mainly on influenza outbreaks, where transmission of the virus is predominantly driven by children. It is unclear if school closures are effective in coronavirus outbreaks, where transmission dynamics appear to be different.[1]

Belgium started its lockdown on 18 March 2020, when schools, shops, sports activities, restaurants and cafés were ordered to close. The measures were eased from 18 May onward, when schools partially re-opened. Face masks were required from 18 May at schools (pupils above 12 years of age, teachers, and other personnel involved) and from 7 July in places where people could not observe a distance of 1.5 metres. In March 2020, testing for SARS-Cov-2 was available but limited to hospitalised patients and symptomatic healthcare personnel. From 4 May onward symptomatic persons in the general population were also tested. Testing of high-risk contacts started on 12 June 2020.

Besides limiting the contacts between children at school, the closures force parents to work at home and thus indirectly reduce parental work-related contacts. However, early on in the COVID pandemic the adverse effects of school closures were reported.[2] An evidence-based approach to these data is now needed. We aimed to develop a recommendation for schools weighing up the benefits and harms based on data from Belgium, supported by international literature.

Methodology

The guideline panel consisted of a multidisciplinary team, including pupils, teachers, school management boards, educational experts, parents, clinicians, researchers, and guideline methodologists (Table 2, Appendix 3). Recruitment of involved public (students, parent, teachers and management board) was pragmatically, for clinicians and researchers we identified seniors in their field of expertise. The panel met twice via web conferences.

The panel followed the BMJ Rapid Recommendations procedure for creating trustworthy recommendations,[3] using the GRADE approach.[4] GRADE provides a systematic and transparent framework to develop evidence-based recommendations. It is based on a PICO (population, intervention, comparator and outcome)-structured research question with relevant outcomes, a systematic summary of the evidence, and criteria for moving from evidence to recommendation or decision.[5] Our aim was to assess whether we could use this for questions related to the COVID pandemic.

Public involvement

Eight individuals (three pupils, one parent, two teachers and two school managers) were full panel members and involved in all steps of our recommendation developmental process. These panel members identified important outcomes, and led the discussion on values and preferences of schoolchildren, practical issues and feasibility. All participated in the teleconferences and met all authorship criteria.

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Importance of outcomes

The scope of the recommendation was discussed with the panel members. Subsequently, the importance of potentially relevant outcomes was individually rated by each panel member on a scale from 1 to 9 (7–9 critical, 4–6 important, 1–3 of limited importance), as recommended by the GRADE approach.[6] For each outcome, the mean scores were calculated and outcomes that scored ≥7 were eligible to be selected for the recommendation. To ensure the outcome was considered important by several parties, we selected outcomes that were rated as important (score ≥7) by at least 50% of the panel (Table 1).

Summary of evidence

For each outcome we searched for reliable data from Belgium, with a focus on Flanders, as many important factors are specific to a particular country, such as school system and implemented COVID measures. We searched for data on the above-mentioned outcome measures during two time periods that were comparable in the best possible way. We considered other parallel COVID measures, such as the closure of shops, restaurants, cafés, sports facilities, but also the testing strategy and wearing of face masks. Finally, we decided to compare data from the second half of May (when schools had been fully closed for 6 weeks) and the second half of September (when schools had been re-opened fully since 1 September).

Data sources

We used national surveillance data for the number of COVID cases and hospital admissions.[7,8] The number of infections among grandparents was estimated using the number of cases among those aged 55 to 75 years. The centre that provides educational, medical and psychological support to schools and schoolchildren in Flanders (CLB –'centre for schoolchild support'), provided the number of infections among teachers.[9]

Learning delay was assessed based on the result for a standardised test in the 6th grade (last year) of primary schools in Belgium over a six-year period (2015 to 2020).[10] These tests evaluated several subjects: mathematics, Dutch, science, social science and French. The mental health of children was assessed using the largest survey on COVID performed by several Belgian universities.[11] We used the percentage of children reporting feeling well and the percentage of children that scored lower than 3 on the General Health Questionnaire-12 (GHQ12, lower scores reflect better mental health). In addition, we examined data on chats with the CLB (CLBch@t), an online helpline for school children.[12] The number of chats about anxiety, depression or suicidal thoughts were used as indicators of poor mental health.

Child abuse was estimated based on the number of reports via three separate sources: Child focus,[13,14] and two different helplines[15,16] We compared data from March to August 2020 with the same months in 2019, and also the last 2 weeks in May and September in 2020. Finally, we used the number of interventions for neglect at the centre for schoolchild support.[14] We did not find data sources for other outcomes. See Appendix 2 for more details.

Literature

We performed a rapid literature review and searched for reviews on the effect of school closure on our selected outcomes. We searched PubMed, the Cochrane Database of Systematic Reviews and websites of organisations that collated COVID evidence (COVID-19 Scientific Advisory Group, WHO, ECDC, Sciensano).

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From evidence to recommendations

The panel discussed the evidence and formulated specific recommendations. They considered the balance of benefits, harms and practical issues relating to either closing schools or keeping them open (the intervention and control), the quality of evidence, values and preferences of schoolchildren, feasibility, and acceptability, based on personal perception of participation, all with a different background and expertise. Formal methods were used to reach a consensus. Recommendations can be either strong or weak and in favour of or against a certain course of action.

Results

Benefits

Comparing the number of COVID-19 cases (teachers, schoolchildren, adults, grandparents alike) and hospital admissions, all numbers were higher in September compared to May (Table 3a).

Certainty of evidence for these results was rated as very low (see Appendix 2); results were based on surveillance data, which were downgraded because of indirectness (the results are likely affected by the fact that in May additional corona measures were implemented and because the dynamic of the epidemic curve as well as the test strategy differed between the two time periods).

We found no Belgian data on transmission from teachers or schoolchildren to their families. Literature reviews concluded that the effect of school closure on number of infections was inconsistent [1,17]

Harms

A learning delay was found in students in the last year of primary school (Table 3b). This evidence was rated of moderate certainty; it was based on observational research but was upgraded. The study was performed well and sensitivity analyses confirmed that the results were robust. In addition, the observed effect was large considering that these children (last year) could go back to school before other years, i.e. on the 18th of May 2020. It is therefore to be expected that the effects for other students may even be larger as they returned to schools later. This is called residual confounding.

Scores on well-being were higher in September compared to May. In addition, the number of chats about depression, anxiety and suicidal ideation were higher in May. The certainty of these results was downgraded because of indirectness (multiple corona interventions).

Data from several sources illustrated higher numbers of reports of child abuse in May compared to September and higher numbers in 2020 compared to 2019. The certainty of evidence was rated low, because data were based on observational studies. Results were not downgraded because the effect was consistent in multiple data sources.

No data was found on the mental health of teachers and parents and long-term consequences of learning delay.

Results of reviews and studies showed that the closure of schools was associated with a learning loss, and that the lockdown increased violence and levels of stress among children and an increased use of health lines.[18-22]

Values and preferences of schoolchildren

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The panel judged that variability amongst schoolchildren probably exists. First, there are age differences between children in primary and secondary schools. Their age affects how they learn and the role of contact with peers. Second, the panel expects that there are differences in preferred learning environment between (secondary school) children; some prefer to study at home, while others prefer studying in a classroom setting. Some children function well with online schooling while others learn better in a physical schooling environment.

Practical issues

The closure of schools means that schools need to provide online education. It is unclear if this type of education is developed to the best of the schools' ability. Closed schools also mean that children need to be cared for at home. This creates stress for parents, even more so when they have to work from home.

Keeping schools open requires that all basic COVID measures are implemented in the school environment, such as the wearing of face masks, keeping distance (including during lunch breaks and also for teachers), and washing hands. Schools make people cluster, and mixing clusters must be prevented as much as possible (in their class/year, before and after school, traveling to and from school, during breaks).

Feasibility/acceptability

School management reported that they increasingly have to deal with many teachers and children that are absent due to sickness or quarantine. Therefore, this recommendation does not apply when the school system can no longer function due to an excessive number of people being sick or in quarantine.

Panel members noted polarisation between people being afraid of becoming infected or infecting relatives and those that wanted to carry on as usual. Polarisation occurred among schoolchildren, teachers, parents, and between these groups. For example, some parents may be afraid to send their children to school.

Recommendation

The panel recommends against closing schools as long as possible (see Figure 1 Infographic). The recommendation is strong because the certainty of evidence of harms outweighs the certainty of evidence for the advantages. This means that the panel expects that keeping schools open is beneficial for almost all students, and even more so for disadvantaged or vulnerable children.

However, in the event of a major spread of the virus, and an increased risk that clusters of cases spread in schools, the recommendation becomes weak and schools may close, locally, partially, and/or for a limited amount of time. The recommendation does not apply when the school system can no longer function due to a lack of personnel or schoolchildren as a result of illness or quarantine.

Discussion

Evidence from Belgian studies suggests that the closure of schools has a negative impact on children. School closure in the spring of 2020 probably resulted in a learning delay of about 6 months across students.[10] Learning delay is serious as it may have long-term consequences, such as significant loss of future income.[23] The panel also argued that learning delay disproportionately affects disadvantaged children. This was confirmed in the

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study of Maldonado & De Witte[10] showing that inequality within, but also between, schools increased substantially. In addition, school closure may lead to increased child abuse. For children at risk of violence, school may be a safe haven.
Because schools are a crucial part of children's lives, the decision to close schools should not be taken lightly. The recommendation is strong because the certainty of evidence about the possible harms outweighs the certainty of evidence about the benefits. Although our panel decided to make a weak recommendation in case of high virus spread, there is currently no consensus on any threshold for this decision.

Results of other studies/reviews

The results of our rapid review were consistent with the results of our primary data: there is no strong evidence that the closure of schools reduces the number of infections. Although some studies reported significant declines in both incidence and mortality when schools closed,[24] it is difficult to disentangle the effects of closing schools with other corona measures. A prospective cohort study in Australia reported that children and teachers did not contribute significantly to COVID-19 transmission via attendance in educational settings, where effective case-contact testing and epidemic control strategies exist for the population.[25] Sweden, were schools remained open, reported low incidence of severe Covid-19 cases. [26] The importance of stringent COVID measures is supported by two studies on youth camps: one showing that outbreaks may be completely prevented by adhering to clear measures[27] versus increased infections when these measures were less strict/not adhered to.[28] French guidelines therefore also conclude that the educational and social benefits of school far outweigh the risk of possible infections.[29]

The susceptibility and role of children in the transmission of SARS-CoV-2 has been widely discussed in the literature. There is a consensus that transmission of SARS-CoV-2 is plausible, but based on the published reports to date from both prior to COVID-19 lockdown and following re-opening, the risk of transmission from children to children and children to adults in primary school and day-care settings appears low, particularly when infection control measures are in place.[1,17,30,31]

COVID-19 impacts those with low socioeconomic status unequally.[32,33] Although we did not examine the effect of school closure on social inequalities, an increase is likely as the learning delay also affects disadvantaged children disproportionally. The reduction of social inequalities would be an argument to keep schools open. Another argument is that schools are an entry point for reaching all population groups, also those people that the normal media can't reach.

Strengths and limitations of this recommendation

Although the methodology for this recommendation was originally developed for the field of medicine[3], it appeared to be useful for this COVID question as well. There was also added value in having a broad panel, as a large number of different views were considered.
Using stringent methods, we rated the certainty of evidence for the effect of closing schools. This provides the reader with insight into how certain we are that the effects from the studies reflect the effect in the real world. This strict methodology illustrates that it is difficult to examine the effects of school closure and it also contributes to the transparency of the guideline process.

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Certainty of evidence for benefits underpinning this recommendation is very low for the following reasons. First, SARS-Cov-2 is a new virus, and evidence is changing regarding its characteristics and impact on society. Second, the data collected is based on observational studies, and because multiple COVID measures were implemented at the same time we could not separate out the effect of closing schools. Third, we compared two periods that had a different dynamic of virus transmission (decreasing in May and rising in September). Fourth, the testing strategy slightly evolved between the two periods, with increased testing of asymptomatic people (all high-risk contacts and travellers returning from high-risk areas) in September. Finally, although one study suggests the GHQ-12 is a valid index of psychological wellbeing in young adolescents,[34] this needs further assessment, also in younger children. While these limitations do not change our conclusion, it is important to remember that they may distort the results. In the field of medicine, many guidelines are based on low-quality evidence.[35]

Pandemics such as COVID force governments to make choices, as keeping schools open comes at a cost for other domains (health, economy). Governments should communicate their priorities, and they should do so in a way that allays any concerns from parents, teachers and children about not closing schools.[36] The whole community needs to make responsible choices about their social contacts to keep the virus circulation as low as possible in order for our children to benefit from lessons at school.

Further research

This study shows that there are still many questions to be answered. Most importantly, we need high-quality prospective studies evaluating where children become infected and the degree of risk of secondary infections in school settings, when all COVID measures are correctly implemented.

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Appendixes

1: Infographic 'Closure of schools during COVID-19: Rapid Recommendation' Part B. Practical issues, Other considerations and Summary

2: GRADE ratings and detailed data

3: Details of members of the panel

All details of this guidelines are available via MAGICapp:
https://app.magicapp.org/#/guideline/4746

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Table 1. PICO-structured question for our recommendation.

Population: All those directly and indirectly involved in primary or secondary schools and anyone who can be infected with COVID

Intervention: school closure (full or partial) with online lessons

Control: Keeping schools open – all children take lessons at school

Outcomes: number of COVID infections (teachers, children ages 0-5, 6 to 12, 13 to 19, adults, elderly, grandparents); risk of transmitting virus to family; learning loss (short and long term); mental well-being of children, teachers and parents; child abuse and child neglect.

Table 2. Characteristics of the panel

Number and role	Gender	Expertise
3 Pupils	Boy aged 14, 2 girls aged 15	All in secondary education
1 Parent	Female	Has 2 children in primary education
2 Teachers	Female Male	In secondary education In primary special education
2 School managers	Female Male	Direction nursery education Director primary education
7 Clinicians	3 males Female 2 Males Female	General practitioners Psychiatrist Paediatricians Physician in youth health care
8 Researchers	Female Male Male Female Male Male Female Male	Manager COVID lab Educationalist Immuno-virologist Epidemiologist Biostatistician Philosopher of Ethics Methodologist Methodologist

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Table 3a. Summary of benefits of closing schools. Results from Belgian studies and rapid review.

Benefits	**Schools closed**	**Schools open**	**Certainty of evidence (GRADE)**	**Conclusions of reviews**
	Per 100,000 for 14 days			
Number of infections among teachers	6	174	Very low	Typically only single or few (<5) infections among staff in schools.[1]
Number of infections among 0-5 yrs 6-12 yrs 13-18 yrs 19-65 yrs 65+ yrs	 7 5 9 24 38	 22 158 331 223 83	Very low	Opening/closing schools has inconsistent results on community transmission levels. Re-opening schools does not seem to be associated with increased infections in community. [17] Risk of infections in secondary schools is higher compared to primary schools.[30]
Number of infections among grandparents	20	111	Very low	
	Totals			
Number of hospitalisations due to COVID infections	453	804	Very low	
Risk of transmission from child or teacher to household	No Belgian data			The risk of transmission from children (to household or community) is inconclusive.[1]

Table 3b. Summary of harms of closing schools. Results from Belgian studies and rapid review.

Harms	**Schools closed**	**Schools open**	**Certainty of evidence (GRADE)**	**Conclusions of reviews**
	Per 100,000 for 14 days			
Learning delay (short and long term)	Loss of 6 months		Moderate	Dutch children had a learning loss of one fifth of a school year.[18] A learning delay may cause long-term consequences, estimated on the basis of a study that evaluated long-term effects of a school strike in 1990 in Wallonia.[19]
Mental health of children % children feeling well	May 57%	Sept 82%	Very low	During the lockdown increased levels of distress, worry and anxiety in children and young people were reported. [20]

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% children <3 GHQ12	45%	55%		
Mean number of chats about anxiety, depression, suicidal thoughts		- 43%		
Child abuse (Mean number of reports) 2020 vs 2019 (Mar-Aug) May vs Sept 2020	 + 80% + 54%		Low	The pandemic seems to increase the number of contacts to helplines significantly. The number of contacts related to violence is inconsistent. [21] The lockdown seems to increase the number of incidents of violence against women, children and adolescents.[22]
Neglect Number of interventions due to neglect 2020 vs 2019	-32%		Very low	
Mental health of parents	No Belgian data			
Mental health of teachers	No Belgian data			

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Figure 1. Infographic 'Closure of schools during COVID-19: Rapid Recommendation'. Part A. Population, Comparison, Recommendation, Comparison of benefits and harms, and Practical issues

(Figure added as separate file)

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Closure of schools during COVID-19: Rapid Recommendation

Population

Individuals in school environment (nursery, primary, secondary, boarding)

- Schoolchildren
- Teaching staff and personnel
- Individuals partially at, or in contact with, schools (interns, CLB, bus drivers, cleaning staff, ...)

Members of society

- Family members of directly concerned, grandparents
- Everyone who can be infected by COVID-19

Comparison

Schools closed **or** Schools open

Recommendation

Closed		Open	
Strong	Weak	Weak	Strong

Strong recommendation to keep schools open if there is a low or moderate infection level among pupils

Closed		Open	
Strong	Weak	Weak	Strong

Weak recommendation to keep schools open if there is a high infection level among pupils.

This recommendation applies:

To primary schools, nursery schools and secondary schools, but not technical colleges or universities.

This recommendation does not apply:

If the school system can no longer function (e.g. because of a shortage of teachers)

If the vast majority of the pupils cannot follow regular lessons at school

If there are problems with support services (such as CLB, technical staff, childcare, etc...)

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Comparison of benefits and harms

Balance of favourable versus unfavourable effects

We are uncertain whether the closure of schools has a favourable effect on the number of infections among direct (teachers and children) and indirect contacts. There are other factors at play that have a significant influence on the infection numbers (total lockdown, phase of epidemic, etc...).

The closure of schools probably leads to a major learning delay and possibly to an increase in child abuse.

We are uncertain about the effect on the mental well-being of children and the risk of neglect.

There are no Belgian data about the effect on the risk of transmitting the virus to the home situation and the mental well-being of teachers and parents.

Values/preferences of schoolchildren

There is a great difference between schoolchildren in nursery, primary and secondary education. Each age group has its own way of learning and its own needs in relation to social contacts. There are also differences between children themselves; How well can they study, how do they prefer studying (alone or in a classroom), what is the home situation like?

Within secondary education there is a huge diversity between the different study trajectories (e.g. between theoretical or more practical subjects). A small minority of schoolchildren prefer to follow lessons at home. Others really prefer to stay at home out of apathy (e.g. extra sleep, more gaming, more smartphone use).

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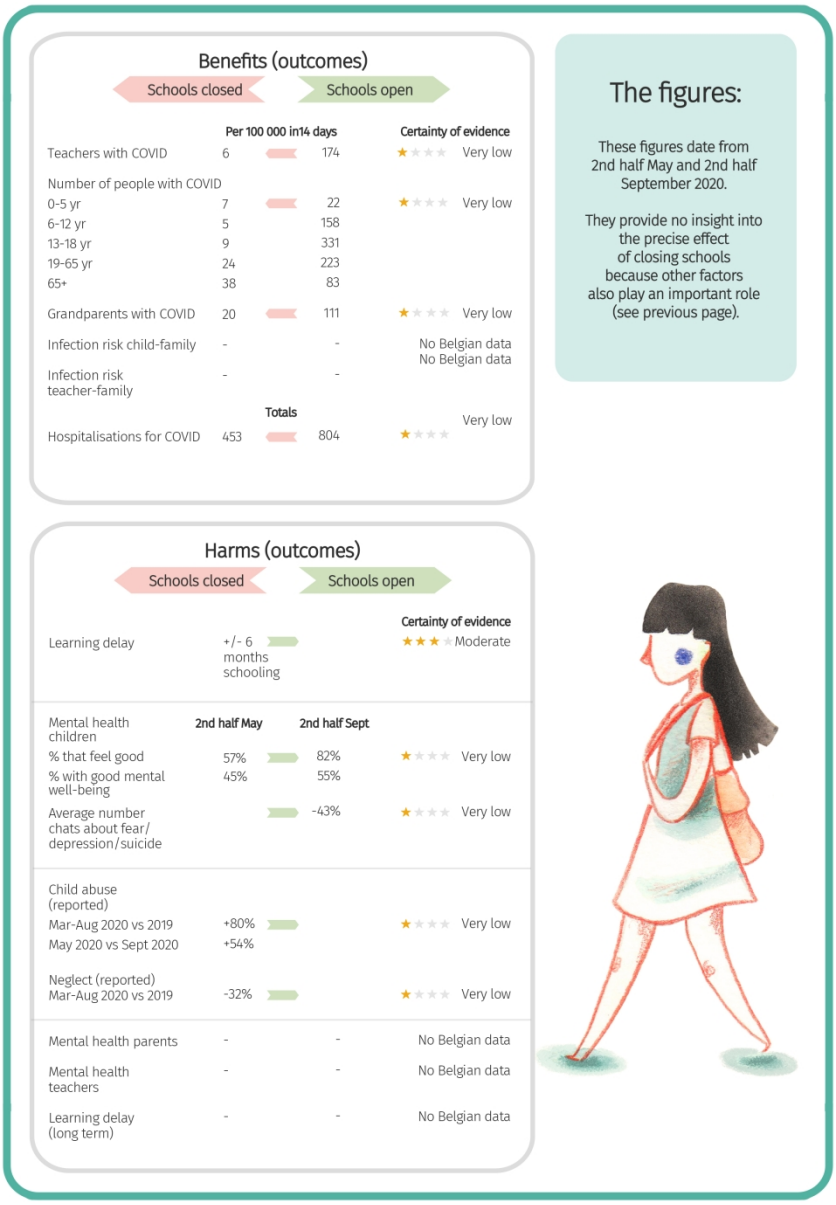

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Practical issues

Schools closed

Digital education has not yet been perfected in all its aspects:

- How do you maintain contact with pupils?
- How do you differentiate (age and level)?
- Are all teachers sufficiently familiar with the the technical aspects and methods?
- How do you give practicals and lessons in arts subjects?
- Does every child have internet access, a computer, and a quiet space at home?

Concern and stress among parents:

- How is it possible to combine childcare and working at home? This is much more of a burden for primary school children but also for children with (behavioural) problems.

Schools open

Concern and stress among parents:

- "My kids are not guinea pigs"

Fear among children/teachers of infecting others or becoming ill themselves

Sufficient focus on carrying out all basic measures at school (see box below), also during breaks (canteen, staffroom) and the journey to/from school (adequate public transport).

This means mandatory face mask for teachers and secondary school children. Some find this difficult.

Open schools mean clustering of people and this increases the risk of infection

- Clustering of(grand)parents when picking up (grand)children
- Clustering of children on way to school on the bus or train
- During breaks, children cluster in the playground or canteen

The safety measures adhered to by educational institutions, education personnel and pupils, ensure that the virus can spread much less easily.

This is how we prevent transmission:

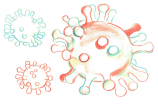
*** Stay at home if you are ill. ***

*** Wash your hands. This removes any virus particles on your skin. ***

*** When you practise physical distancing, the droplets fall on the ground.***

By wearing face masks, you prevent droplets and micro-droplets from spreading.
Ventilation dilutes and evaporates any possible micro-droplets.

Source: Onderwijs Vlaanderen



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Other considerations

General

Corona has had an enormous impact on all of us, and for the time being we will have to live with it.
This recommendation has been drawn up on the basis of current knowledge that is very inadequate.
We are still learning about this epidemic and the consequences of certain choices.

This continuous learning process is also taking place within education.
The recommendation concerns the impact of a total closure. On the basis of current insights, alternative measures are more likely, with the aim of minimising the learning delay and offering a safe place to those children that need it.
Examples include half-capacity classes, lessons just for certain children, re-arranging timetables.

These meetings took place during an upsurge of the virus.
This influences the current recommendation. Experiencing first hand the serious effects of the virus can also change the arguments.

The number of children suffering abuse has risen despite schools being partially closed and therefore fewer opportunities for teachers to alert the CLB. These figures could therefore be an underestimation

Children can also transmit Covid-19, although the current scientific research shows that they transmit the virus less than adults. Everyone needs to continue respecting the basic guidelines as regards contact with children.

As a society, we have to make choices. Do you take measures that curb the economy or do you close the schools? What takes priority? The decision to close schools should not be taken too lightly because this will probably result in learning delays and possibly more child abuse.

Schools can play a role in continuing to motivate children to respect the general guidelines (see previous page), even during non-school and after-school activities. **This promotes uniformity and can reduce anxiety among parents, children and teachers and school management, as well as polarisation between groups.**

Primary school

It is important to keep schools open because they are an entry point for **reaching all population groups.**

In this way you can reach people that the normal media can't reach.

School offers security and structure for children.
This is particularly important for children whose home life is difficult.

Secondary school

Young people are more likely to follow the guidelines in a **controlled school environment** than when there is no supervision.
If we close the schools, we therefore have less knowledge about what young people are doing.

School is also important for young people because of **the structure/security, regularity and social contacts,** especially for those with a difficult home life.

Suggestions for further research

This recommendation exposes many gaps in our current knowledge.
Here we list a few that may be of added value in substantiating this research.

What is the effect of school closure on the mental well-being of children, teachers and parents?

How many infections actually take place at school?

How can we motivate young people to respect the guidelines?

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Summary

This recommendation is based on current scientific insights; however, these are inadequate.

The greatest evidential value consists of the fact that school closure probably causes a large learning delay and possibly more child abuse. At the same time we must balance the number of infections in the total population, something that helps determine whether schools should close.

School is a crucial element of children's and young people's lives.
It is here that they develop themselves, their future and in so doing all our futures.
We should therefore think very carefully before closing schools.
New scientific insights will have an effect on this recommendation.

With this recommendation we make a leap from scientific insights to general recommendations for a specific question. We look at scientific studies and weigh these up against other arguments from a broad panel of stakeholders and report which have played a role.

Dealing with uncertainty is not a new phenomenon.
In the medical world too, only 1/3 of decisions are based on scientific evidence.

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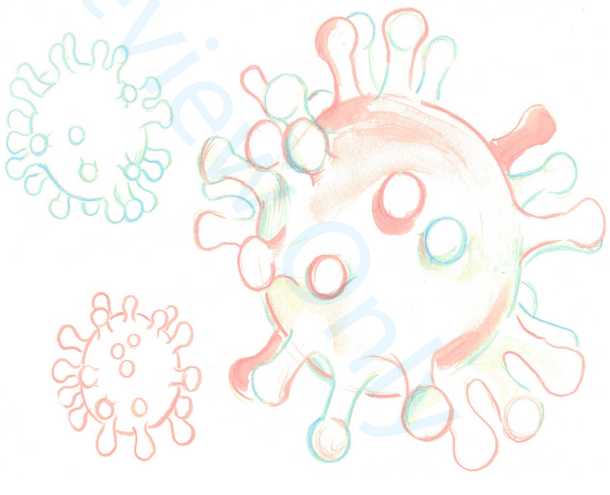
Panel members:

Bert Aertgeerts (general practitioner, chairman)
Trudy Bekkering (methodologist)
Nicolas Delvaux (general practitioner, methodologist)
Patrik Vankrunkelsven (general practitioner, methodologist)
Jaan Toelen (paediatrician)
Oscar Plomteux (pupil 4th year ASO)
Nore Milissen (pupil 4th year STW)
Lise Rans (pupil 4th year STW)
Katrien Masschalck (parent)
Annelies Pascal (teacher TSO)
Lode Sweldens (teacher BLO)
Sigrid Aertgeerts (director, nursery education)
Jeroen Vandenbussche (director, primary education)
Ignaas Devisch (ethicist)
Tinne Lernout (epidemiologist)
Elke Wollants (Manager COVID lab)
Marc Raes (paediatrician)
Sofie Crommen (child psychiatrist)
Geert Molenberghs (biostatistician)
Alexandra Seghers (CLB physician)
Pedro De Bruyckere (psychologist/pedagogue)
Guido van Ham (virologist)



Infographics & Illustrations: Lisa Van der Auwera

Appendix 2. GRADE ratings and detailed data

Outcome	Study	Characteristics	Results	GRADE-rating	Final GRADE
Learning delay	Maldonado & De Witte, 2020	Standardized tests in children in the last grade primary school. Comparing cohort 2020 to previous cohorts 2015 to 2019	<u>Learning loss in 2020</u> Social science: 0.33 SD French: 0.3 SD Dutch 0.29 SD Math: 0.19 SD - results were robust across different models - inequality within and between schools rose	Observational research No serious limitations No serious indirectness No serious inconsistency No serious imprecision Large effect (+0.5) Residual confounding (+0.5)	Moderate certainty
Child abuse (different sources 2020 vs 2019)	1. Child Focus	Number of reports on images of sexual abuse	During lockdown 679 reports vs 256 during same months in 2019 (+165%)	Observational research No serious limitations No serious indirectness[1] No serious inconsistency No serious imprecision	Low certainty
	2. CLBch@t	Number of chats on abuse at helpline for students	During lockdown 79 reports vs 61 during same months in 2019 (+30%)		
	3. helpline 1712	Number of persons contacting this helpline on abuse	During lockdown +44% reports compared to same months in 2019		
Child abuse (Sept 2020 vs May 2020)	4. helpline (sexual) abuse of children	Number of persons contacting this helpline (nupraatikerover.be)	In May 2020 100 reports vs 65 in September 2020 (+54%)		
COVID infections	National surveillance data; CLB for teachers	Number of persons with a positive test	reported in paper	Observational research No serious limitations Serious indirectness[2] No serious inconsistency	Very low certainty

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				No serious imprecision	
Mental health children	'Grote Corona Studie'	Survey among children	reported in paper	Observational research No serious limitations Serious indirectness[2] No serious inconsistency Serious imprecision[3]	Very low certainty
	CLBch@t	Number of chats (May vs September 2020) (Lockdown 2020 vs same months 2019	<u>Per 14 days (May vs September):</u> depression: 16 vs 5 anxiety: 16 vs 9 suicidal thoughts: 18 vs 15 <u>Per 6 months (2020 vs 2019)</u> depression: 169 vs 82 anxiety: 139 vs 35 suicidal thoughts: 190 vs 137		
Child neglect	CLB reports	Interventions because of physical or mental neglect	In 2020, +32%	Observational research No serious limitations Serious indirectness[2] No serious inconsistency No serious imprecision	Very low certainty

1: Data from Sept 2020 vs May 2020 yield very similar results compared to data from 2020 vs 2019

2: In May 2020 multiple corona measures were in place; with this data we cannot disentangle the effect of closing schools only on these outcomes

3: Data May vs September 2020 is based on low numbers

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Appendix 3. Details of members of the panel

Name	Expertise	Affiliation
B. Aertgeerts	General practitioner, chair	Academic Centre of General Practice, KU Leuven, Belgium
G.E. Bekkering	Methodologist	Academic Centre of General Practice, KU Leuven; Centre for Evidence-based Medicine, Leuven, Belgium
N. Delvaux	Methodologist, general practitioner	Academic Centre of General Practice, KU Leuven, Belgium
P. Vankrunkelsven	Methodologist, general practitioner	Academic Centre of General Practice, KU Leuven; Centre for Evidence-based Medicine, Belgium
J. Toelen	Paediatrician	UZ Leuven; Department of Development and Regeneration, KU Leuven, Belgium
O. Plomteux	Pupil 4th year	Secondary school St Dimpna, Geel, Belgium
N. Milissen	Pupil 4th year	Secondary school Heilig Hart, Heverlee, Belgium
L. Rans	Pupil 4th year	Secondary school Heilig Hart, Heverlee, Belgium
K. Masschalck	Parent	Veerle, Belgium
A. Pascal	Teacher secondary education	Hotelschool Ter Groene Poorte, Brugge, Belgium
L. Sweldens	Teacher special primary education	BLO De Olm, Herk-de-Stad, Belgium
S. Aertgeerts	Director nursery education	Primary school Heilig Hart, Heverlee, Belgium
J. Vandenbussche	Director primary education	Primary school Boven-Lo, Kessel-Lo, Belgium
I. Devisch	Philosopher of Medicine and Ethics	Department of Public Health and Primary Care UGent, Gent, Belgium
T. Lernout	Epidemiologist	Sciensano, Brussels, Belgium
E. Wollants	Manager COVID lab	Clinical and Epidemiological Virology KU Leuven; REGA Institute, Leuven, Belgium
M. Raes	Paediatrician	Jessa Hospital, Hasselt, Belgium
S. Crommen	Child and adolescent psychiatrist	Practice for Child psychiatry Zutendaal, voorzitter VVK vzw, Belgium
G. Molenberghs	Biostatistician	I-BioStat, UHasselt/ KU Leuven, Belgium
A. Seghers	Physician (youth health care)	VCLB Leuven, Belgium
P. De Bruyckere	Psychologist, educationalist	Teacher Training Department, Artevelde University College, Belgium; researcher, SCS, University of Leiden, Netherlands
G. Vanham	Immuno-virologist	Institute of Tropical Medicine and University of Antwerp, Belgium

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