

Basic education and the coronavirus

Version of 27 April 2020¹

Key new parts of the document, relative to the previous version (1 April), are highlighted in yellow.

Key points

► It is informative to look at the South African data on inter-personal contacts that are used in the epidemiological modelling which in turn has underpinned the arguments that schools should close during this pandemic. For the young, **what happens in schools accounts for over half of the inter-personal contacts usually associated with infections**. If one adds transport to and from school, this becomes just over two-thirds.

► However, **there is mounting evidence that schools are in fact not such important sites of infection**, and that the impact of school closures on ‘flattening the curve’ may have been over-estimated. A 6 April article in the Lancet journal, which has received considerable media coverage, has drawn from earlier studies to argue that infections in schools are low. However, this article has also been criticised for being one-sided. Yet there seems to be better evidence, no more than a few weeks old, saying the same thing, namely that schools are only weakly responsible for infections. A cross-country modelling exercise has concluded that during the current pandemic, school closures reduced infections by only 3%, while the full package of restrictions has reduced infections by about 60%. This analysis is in the process of being peer-reviewed, but has nonetheless been made public by a reputable journal. What is urgently needed is better evidence on how children transmit the virus differently from adults, as this difference seems to explain why school closures appear to make such a small difference. There is some evidence in the medical literature now confirming how little children infect others, but more is needed. It is worth noting that the WHO, already in February 2020, highlighted that it found little evidence that children were infecting adults in Wuhan, China. What would also help is firmer evidence from the few countries, specifically Sweden and Iceland, which have not implemented total school closures, on whether teachers at work are being infected to a significant degree. If official claims from those countries that such teachers are not suffering from higher rates of infection could be confirmed, it would strengthen the argument that children are transmitting the virus differently.

► The **inter-personal contacts data point to 50% more interaction, and more potential for infections, at the secondary level than the primary level**. This would be in line with the notion that subject-specific classrooms, with considerable movement by learners between classrooms in grades 10 to 12, is the norm.

► If one looks at Stats SA household data, factors which could promote infections are roughly similar at the pre-primary, primary and secondary levels. There is thus no overwhelming reason indicated by the household data for saying one level brings about more infections than others (but the previous bullet about subject-specific classrooms still stands). **At all levels, relatively safe transport modes, in particular walking, account for three-quarters of all transport**. This still leaves one-quarter of transport modes as high-contact and high-risk modes, but this does not differ much by educational level. The extent to which learners have people aged 65 and above, in other words people with high levels of vulnerability to the virus, in the same household, does not differ much by educational level (around 20% of learners, across all ages, have household members aged 65+).

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► One might expect psychologists to say that **implementing social distancing within schools is more difficult for young children at the primary level**, than for secondary-level youths. Unfortunately, no literature on this could be found. It should be kept in mind that how to respond to a pandemic such as the current one, within the schooling system and beyond, is not something we know a lot about. There is very valuable high-level and fairly generic advice, but for years the experts have been lamenting the absence of enough detail. For instance, there appear to be no rigorous step-by-step guides for taking decisions around when to close schooling systems, fully or partially. In short, even developed countries are poorly prepared for the pandemic.

► A particularly valuable resource currently is UNESCO's database, updated on a daily basis, of how school closures are proceeding. Currently, 210 countries have implemented school closures, which is virtually the entire world (though in some countries some regions have kept schools open). Only three countries have allowed certain levels of the system operate across the country. Of relevance to the South African debates, **Vietnam has not closed Grade 12, presumably to allow for preparations for national examinations to proceed**. In terms of the length of closures, by 27 April 2020 129 countries had closures exceeding 41 days, which is South Africa's current duration, with China's duration now sitting at 72 days. The UNESCO database will in future provide a valuable indication of how quickly schools are re-opening across the world. So far, only four countries have begun to re-open schools, all in a phased manner.

► The Minister has expressed specific concerns about Grade 12. If Grade 12 were to resume earlier than other grades, in other words **if we were to go for a 'Vietnam model', clearly subject-specific classrooms would have to be replaced** by a system where teachers, not learners, moved around the school, and where learners were arranged in the smallest possible groups. Losing days in the Grade 12 calendar will undoubtedly impact on examination results. However, insofar as days lost will pull everyone's results down in a similar fashion, there would not be that much unfairness within the class of 2020. The larger risk is perhaps a loss of comparability with the results of other years, something which could disadvantage the class of 2020 in, for instance, the university admissions process. But an Umalusi adjustment for the class of 2020 could deal with this. Perhaps the most concerning inequality is that learners from quintiles 1 to 3 schools who perform relatively well, and who compete with quintiles 4 and 5 learners in the university admissions process, will be disadvantaged by the lower levels of access to and use of modern technologies allowing for teachers to remain in contact with learners during the closure.

► How developing countries can deal with the serious health and nutrition problems brought about by the interruption of school feeding programmes is still not clear. It is probably worth watching what steps the World Food Programme, which is directly involved in school feeding in many poorer countries, takes. The options being considered by the WFP include **'take-home rations in lieu of the meals, home delivery of food and provision of cash or vouchers'**.

► At least at the secondary level, there are few schools where *all* learners have access to the internet and a computer (or tablet) at home, but at the same time there are few schools where *no* learners have access to these resources in the home. In half of schools, at least a third of learners have these resources at home. This is according to 2015 TIMSS Grade 9 data. Among teachers, access to these resources at home seems high, probably 85% or more. These figures raise an important ethical question. During school closures, should a teacher try to maintain contact, online, with as many learners as possible? Or would this be unethical and unfair, as those learners without the resources at home would be excluded? The question is a difficult one, and guidance is probably needed. **Arguably, teachers should attempt (or *must* attempt?) to remain in contact with as many of their learners as they can during school closures**. Clearly, there are greater complexities in the higher grades, where subject-teaching

occurs, and decisions would have to be taken around targeting specific learners, even within the group of learners who can be contacted.

There is currently much information and policy advice relating to schooling and the Covid-19 pandemic moving around. The aim of this input is to bring to the fore some facts, data and sources which may not be known or well understood, yet are important. The context is the guidance already issued by the Department of Basic Education in relation to Covid-19. The document is organised around a few key questions.

To what extent do normally functioning schools spread the virus? If schools close, and nothing else changes, to what extent does one slow down infections?

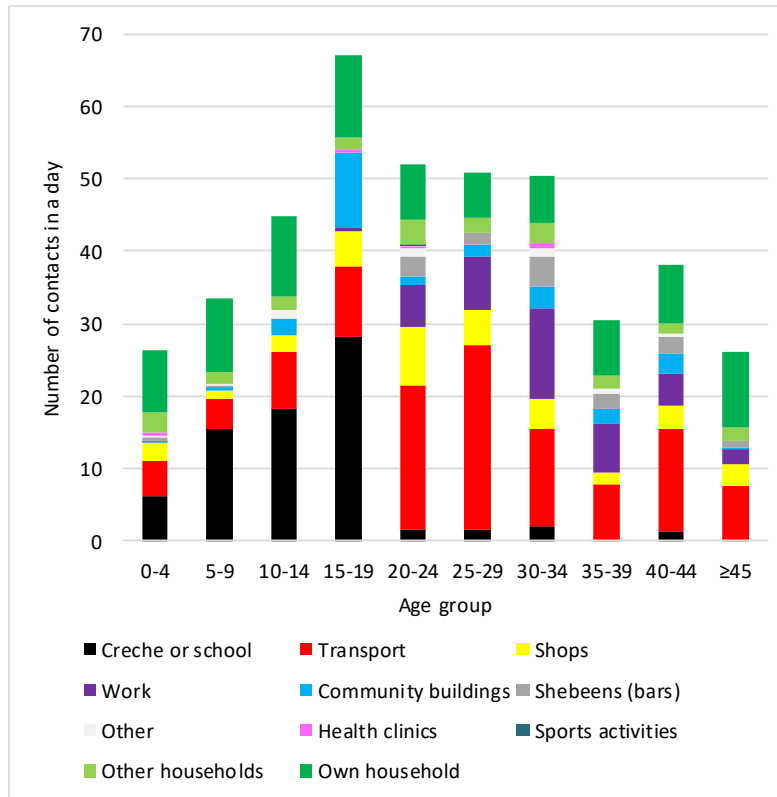
For anyone involved in education planning, it is **good to have a sense of the data which are used when health experts advocate for the closure of schools**. The data are drawn from ‘social mixing’ surveys, which generally employ a diary method. Randomly selected people are trained to fill in a diary on their actual contacts during a 24-hour period. The focus is generally other people one touches or talks to. In South Africa, there is basically just one survey that the epidemiologists draw from, and that is a 2010 survey run in a ‘poor township 40 km south of Cape Town’². This is probably Khayelitsha. This particular dataset was used in the widely quoted and recent Covid-19 projections produced by Imperial College London³. Those projections provide country-level details.

Figure 1 below graphs data from a table from the 2011 paper that uses the Cape Town data (the microdata do not seem to be publicly available). This graph helps to answer the above question. Contacts in school account for just over half of all the contacts made by people aged 5 to 19, and if one includes transport, which one can assume is largely transport to and from school, one finds that **over two-thirds of contacts are associated with school**. Epidemiologists often see transport as more risky than actual schooling insofar as there is considerable inter-generational mixing in, say, public transport. In schools, learners largely infect each other, but in public transport, they are more likely to infect older people, possibly people aged 65 and above who are particularly vulnerable to Covid-19. What is also interesting about the graph is the size of the ‘community buildings’ segment for those aged 15 to 19. It is not clear what this represents.

² Johnstone-Robertson *et al* (2011) and Wood *et al* (2012). These two papers draw from the same survey data. The statistics used for the graph are from the first paper.

³ Walker *et al*, 2020.

Figure 1: School and other contacts in a day in a Cape Town township



[Table_S2 + MG calcs.xlsx](#)

Projections on the pandemic focus a lot on what happens when the contacts shown in the graph are reduced. For instance, the Imperial College projections conclude that reducing contacts by 45% would reduce infections in South Africa from 89% to 61% of the population, and deaths from 220,000 to 150,000⁴. **Pausing education, and associated travel, achieves more than a 45% reduction for ages 5 to 19**, according to the graph.

In short, one can understand why the conclusion would have been reached that **closing schools can massively reduce transmission of the virus**.

However, there is now mounting, and mostly very recent evidence, that children do not transmit the virus behind Covid-19 as adults do. This obviously changes the picture substantially. In the appendix below, this evidence is discussed. It is noteworthy that the WHO struggled to find any cases in China of children infecting adults. A literature review in a Lancet journal, dated 6 April, and reported widely in the media, has argued that school closures are of much less benefit than was previously believed. However, the methods used by the review have been criticised. What is far more convincing are even more recent academic articles. Two stand out. One is an analysis using a model of across-country variation which concludes that the impact of school closures has been remarkably small. The other is an analysis of one case in France of an infected boy who did not infect other children, despite being in close contact with them.

⁴ Excel sheet accompanying Walker *et al* (2020). The scenario used is the one with R_0 equal to 3.0. This is a scenario used extensively in that report. Of course it uses a number of assumptions, including, very critically, how early in the process measures such as school closures are implemented.

How conducive to spreading the virus are the different levels of the education system? Put differently, are there stronger reasons for closing specific levels?

Unfortunately, the **data, evidence and theory around what to do with schools in a pandemic like the current one are under-developed**. There have been warnings about how under-prepared we are in general for pandemics, and the lack of good knowledge applies to basic education as well. However, we need to make the most of the little knowledge there currently is. One critical question is whether one should close just specific levels of the schooling system. As will be confirmed below, both the existing evidence, and a bit of new analysis presented here, are informative, yet do not point definitively in any direction.

A crucial resource for education planners is the Covid-19 school closures monitoring system which UNESCO has set up⁵. One should not follow global trends with regard to school closures and re-openings blindly, but it is of course useful to track the global patterns. By 27 April 2020, 210 countries had implemented school closures, according to the UNESCO database. Of these, 129 countries had school closures extending beyond South Africa's duration of 41 days to date. China's school closure has lasted the longest, at 72 days. A note column in the database indicates that three countries closed specific levels of the system. Sweden and Iceland have allowed the primary level to remain open. **Vietnam, on the other hand, as allowed just Grade 12 to remain open**. The two Nordic countries seem to have done this as many critical workers would have no-one looking after their children if schools closed. One can assume that Vietnam wants to prepare students for a final examination, which would of course also be a priority in South Africa. The notes in the database point to just four countries being in the process of at least partially re-opening schools: Japan, China, Denmark and Norway.

One important pattern in Figure 1 above is the fact that **social mixing in schools is around 50% higher for ages 15 to 19 than for younger learners**. This is almost certainly due to subject choices, and movements of learners between subject classes. Unless one rearranges movements in schools, this would be a point against having secondary schools open.

There are three factors one cannot easily change, and which could make the risks associated with re-opening specific levels of the system different: (1) modes of transport; (2) the viability of social distancing at different ages, given typical behavioural patterns; and (3) the presence of elderly people at home. Below, it is concluded that at least factors (1) and (2) are not very different at, say, the primary and secondary levels.

Table 1 reports on transport modalities, using the 2016 Community Survey microdata, which is based on a particularly large sample, meaning one can obtain statistics at a local level. In both schools and pre-school establishments, **three-quarters of learners are using low-risk transport, largely walking**.

⁵ <https://en.unesco.org/covid19>.

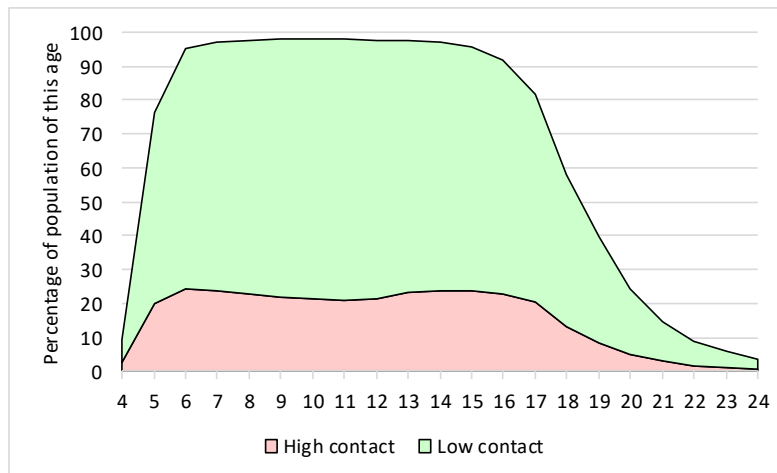
Table 1: Learner transport modes and contact risk

Transport mode as in Community Survey	In schools		In pre-school centres	
	Learners	%	Learners	%
Low-contact				
Walking	9,110,968	70	1,411,606	64
Bicycle	28,349	0	2,199	0
Motorcycle/scooter	24,954	0	4,795	0
Own car/private vehicle	746,300	6	232,544	11
Animal-drawn transport/use of animals...	9,382	0	2,934	0
High-contact				
Minibus taxi/sedan taxi	685,243	5	99,394	5
Bakkie taxi	154,519	1	42,575	2
Vehicle hired by a group of parents/students ⁶	1,256,270	10	299,383	14
Bus (public)	570,460	4	24,360	1
Vehicle provided by the institution	62,531	0	24,096	1
Vehicle provided the government and not paid for	200,883	2	10,881	0
Train (e.g. Metrorail, Gautrain)	35,166	0	898	0
Metered taxi	100,358	1	14,290	1
Other	55,814	0	18,916	1
Total	13,041,198	100	2,188,870	100
	% in low-contact	76		76
	% in high-contact	24		24

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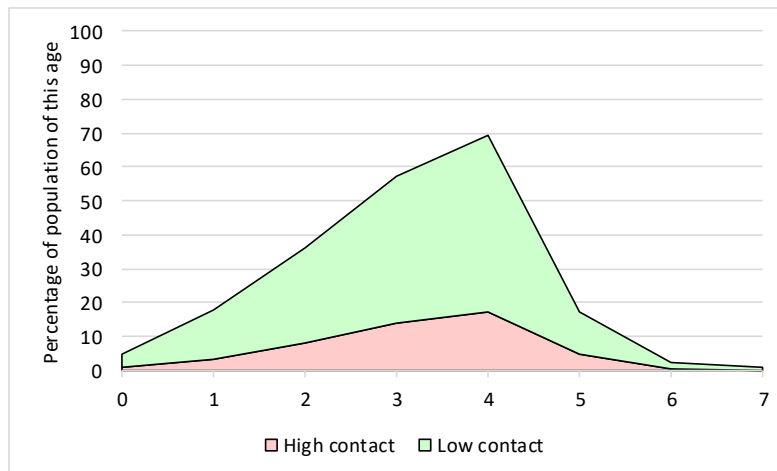
The following two graphs illustrate that there are no large differences by age. For instance, **secondary learners are not substantially more likely to use transportation with a high level of risk.**

Figure 2: Contact levels in transport for school learners



⁶ This category is noticeably large. The percentage for just primary schools would be 13%, for secondary schools 8%.

Figure 3: Contact levels in transport for pre-school learners



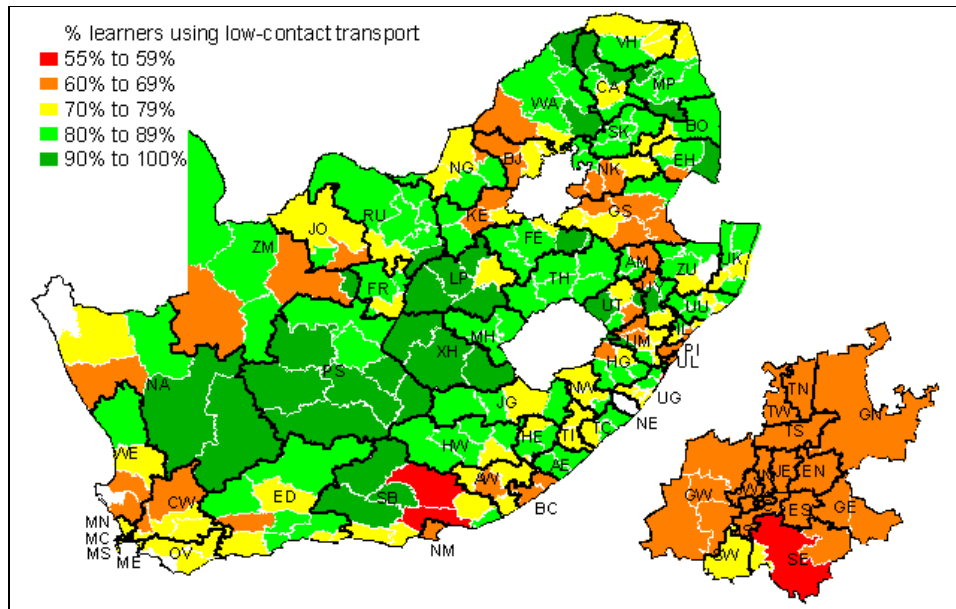
What about the geographical distribution of low-contact transportation modes? Table 2 below points to somewhat safer (from an infection angle) transport modes for non-metro areas than for metro areas. If there is a pattern worth highlighting in this table, it is that among provinces with large rural populations, **Eastern Cape’s figure of 72% of secondary learners using ‘safe’ transport is relatively low.** This is likely to be due to the history of a differently structured schooling system in that province. In around half of the province, secondary schools have historically started in Grade 10, and have been less accessible than in other provinces, meaning learners moving to these schools have had to depend fairly strongly on public transport.

Table 2: Learners in low-contact transport by province urban status

	Primary % learners		Secondary % learners	
	Non-metro	Metro	Non-metro	Metro
EC	87	68	72	65
FS	84	82	87	78
GP	69	67	71	67
KN	80	70	80	66
LP	85		82	
MP	79		79	
NC	81		78	
NW	74		73	
WC	78	74	71	69
SA	81	70	78	67

The following map provides the picture by municipality, onto which the education districts have been superimposed. There are two large municipalities adjacent to the Nelson Mandela Metro which stand out as they are non-metro municipalities marked in red (higher levels of risk): **Blue Crane Route and Sundays River Valley.** The unusualness of these two municipalities, specifically the higher levels of contact in the commuting of learners, is worth noting.

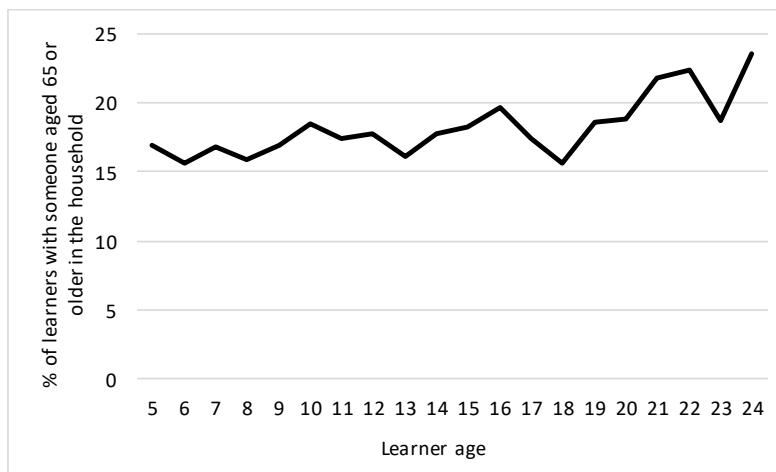
Figure 4: Learners in low-contact transport by district



I looked for research into the viability of implementing social distancing for younger children. Logically, **the older the learner is, the easier it is to explain and promote social distancing**. This, one would expect, would constitute a strong argument for early re-opening of secondary schools, and delays for primary schools. Unfortunately, I found no research to guide us on this point.

The Imperial College projections pay considerable attention to **how people aged 65 and above are distributed across households**⁷. Figure 4 below illustrates that while older learners are a bit more likely to have these elderly people at home, the differences across age are not great (this uses the Community Survey data). One cannot argue on the basis of this that secondary learners are more likely than primary learners to infect the elderly.

Figure 5: Learners with the elderly at home



⁷ Walker *et al*, 2020: 4.

What strategies have been developed and tested to implement social distancing in schools that are open?

The answer to this question is, in short, very little has been developed in terms of well-conceptualised and evaluated strategies. A useful 2018 article from the US confirms this knowledge gap, but also puts together what the thinking has been⁸. The table appearing below focusses on **the complex matter of social distancing rules**. Such rules are probably the most difficult rules to formulate, communicate and enforce. Other rules governing how to respond to individuals displaying Covid-19 symptoms, and the deep cleaning of common areas in schools, are probably easier. The categories in the first column, and the examples in the second column, are from the US article (these are from *before* the current crisis). The third column reflects current rules published in Singapore⁹, and the fourth current rules from England¹⁰, all in response to Covid-19, and all applicable where schools have not been closed yet (or, one assumes, when they re-open). What is worth noting is that the Singapore rules include the systematic testing of the body temperatures of learners. This would not appear foreign in a schooling system that has traditionally weighed learners to combat obesity, and has learner weight built into the regular EMIS reporting systems.

A table such as the following could of course be used to fine-tune the existing social distancing rules and guidelines of South Africa's education departments.

⁸ Uscher-Pines *et al*, 2018.

⁹ 'What precautionary measures are in place in schools?' at <https://www.moe.gov.sg/faqs-Covid-19-infection#qoxh6> (accessed 30 March 2020).

¹⁰ 'Coronavirus (Covid-19): implementing social distancing in education and childcare settings' at <https://www.gov.uk/government/publications/coronavirus-Covid-19-implementing-social-distancing-in-education-and-childcare-settings/coronavirus-Covid-19-implementing-social-distancing-in-education-and-childcare-settings#how-to-implement-social-distancing> (accessed 30 March 2020).

Category	United States	Singapore	England
Canceling or postponing after school activities	Cancel performances, sports practices, or games	Suspension of Co-curricular Activities	
Increasing space among students during in-person instruction	Move class outdoors; re-arrange desks to increase space; divide classes into smaller groups; require that students remain seated while in class	Fixed exam-style seating for primary 3 students and above; fixed group cluster seating for primary 1 and 2 and MOE Kindergarten students	
Canceling classes or activities that occur within the school day with a high rate of mixing/contact	Cancel physical education class; cancel field trips; cancel choir	Suspension of large group and communal activities such as assemblies, camps and mass celebrations	
Partial closure	Closure of one class; closure of one grade		Ensure class sizes reflect the numbers of teaching staff available and are kept as small as possible [for instance, stop learners from coming to school if their class teacher is ill]
Reduced schedule	Shorter school week; shorter school day; students come on alternating days		
Suspending use of common areas	Lunch in class rather than in lunch room; no recess		
Segregating students within common areas	Require that students only eat with classmates in lunchroom; require that students stay in assigned section of school yard	Assigned seating and wipe-down routine in canteens; assigned play areas for students to play in reduced group sizes	Stagger lunch times, break times and the movement of pupils around the school to reduce large groups of children gathering
Reducing the load on common areas through altered scheduling	Let classes out at different times so fewer students are in the hall at any one time; homeroom stay (in which students remain in one classroom and teachers rotate in and out)	Staggered recess times	
Implementing standard workplace social distancing measures for teachers and other staff	Reduce face to face meetings; cancel staff meetings		
Reducing mixing during transport	Suspend buses; discourage use of public transportation		Consider how children arrive at the education or childcare setting and reduce any unnecessary travel on coaches, buses or public transport; discourage parents from gathering at school gates

What is the policy advice for schooling systems of global bodies such as WHO and UNESCO?

The WHO and UNESCO guidance is by now fairly widely known, and is in line with what appears under the previous question¹¹. There are **no detailed guidelines, it appears, on how to take decisions relating to school closures and re-openings**. UNESCO has invested in providing advice on implementing distance education, but this seems best suited for developed country contexts, or for the middle class in developing countries.

How might one resume just Grade 12 schooling in South Africa early?

There is understandably much interest in ensuring that Grade 12 learners do not miss any days of schooling, given the Matric examinations. It is useful, however, to keep in mind how any disadvantage resulting from missed days would be felt. The NSC is largely a tool to allow post-school institutions and employers to select people. ***As long as all Grade 12 learners miss the same number of days in 2020, the risk of within-cohort misrepresentation is limited. But the risk of across-cohort misrepresentation would be high.*** To put this in simple language, if one had a situation where due to a natural disaster in just one province, many Grade 12 school days were missed in that province, then there would be a terrible unfairness applicable to the learners of just that province. They would essentially be disadvantaged, relative to Matriculants from other provinces, when applying for places at university and in employment. However, if learners in the entire country miss X number of days, then all learners lose out equally. If universities must select, say, the top half of applicants for a particular programme, it is likely that they will select the same group of people they would have selected if no days had been missed. The rankings of students would remain the same.

An important caveat applies, however. Better off school communities in which it is possible to manage a degree of online communication between teachers and learners would be unfairly advantaged. This could widen the gap between, say, the top one-third of Matriculants and the bottom two-thirds. But it is a gap which historically exists, and which would be widened. It is not a new gap. ***What would be particularly unjust is the impact on better performing learners in historically disadvantaged schools.*** To illustrate, around 5% of black African and coloured Grade 12 learners obtain 60% or more in mathematics. That figure is 25% for white and Indian Grade 12 learners. Around three-fifths of the 5% (for black African and coloured) is learners from relatively disadvantaged quintiles 1 to 3 schools, so 3% in total¹². It is this 3% of black African and coloured learners who would be particularly disadvantaged. Usually, they would compare quite well to their quintiles 4 and 5 counterparts, for instance in the university admissions process. However, if days are missed in 2020, they would be pulled back in the rankings insofar as their environments did not allow for the kind of distance learning possible in typical suburban settings. This 3% may seem like a small number, and indeed it is just a little over 10,000 learners. However, this group of learners are of particular importance in terms of social cohesion, the representativity of the growing middle class and breaking the inter-generational continuance of poverty.

With days being missed, the 2020 cohort would be clearly disadvantaged relative to, say, the 2019 cohort. This problem could be addressed by making the 2020 NSC look a bit different, with a clear indication that this student missed X days due to a national disaster. Another approach is of course for Umalusi to permit an exceptional 2020 adjustment. That way the disadvantage suffered by 2020 students would be reduced. This disadvantage needs to be avoided, as far as possible. ***Post-school institutions and employers do not look at the NSCs***

¹¹ 'Key messages and actions for Covid-19 prevention and control in schools' at https://www.who.int/docs/default-source/coronaviruse/key-messages-and-actions-for-Covid-19-prevention-and-control-in-schools-march-2020.pdf?sfvrsn=baf81d52_4 (accessed 30 March 2020).

¹² Gustafsson, 2016.

of just one cohort at a time. Many youths apply for university or college studies two or three years after first entering Grade 12, meaning post-school institutions are reviewing NSCs issued in different years at one point in time. There should be as little inconsistency as possible in the standards applied to different Grade 12 cohorts. With many days missed, and given that one is dealing with a *national* disaster, an argument for a special Umalusi adjustment would be very strong.

There would of course be strong pressure to resume Grade 12 schooling at physical schools as soon as possible. An obvious solution might be to allow only Grade 12 learners to return to school (so to follow the Vietnam strategy), and to ensure that movement through the school of subject-specific groups is eliminated, and that **'homeroom stay' is implemented through having teachers, not learners, move**¹³. One could examine past Grade 12 examinations data to come up with some practical examples. For instance, if among learners in a register class, half take biology and half history, one could require the biology and history students to remain in separate classes for the whole day, every day. When a subject taken by everyone, for instance English, was taught, this could be done by having the teacher spend some time with, say, the biology students, while giving the history students work to do on their own.

What have countries done to date to compensate for school feeding programmes?

Some googling reveals that the United States is implementing **'grab-and-go' nutrition strategies** where poorer students come to school to obtain their school lunch, and then immediately go home. This would be particularly relevant for the US, which is a rich country with particularly high levels of income insecurity among the poorest (and Covid-19 is of course making this insecurity worse).

How developing countries are coping with the increased risk of undernourishment due to the interruption of school feeding schemes is difficult to gauge now. The World Food Programme (WFP), which works with many poor countries on school feeding, especially in Africa (but not South Africa), is looking at the following to alleviate disruptions in their regular programmes: **'take-home rations in lieu of the meals, home delivery of food and provision of cash or vouchers'**¹⁴.

What nutrition programme stop-gaps might work in the South African context?

A recent Business Day article mentions the possibility of directing funds which would normally go to school nutrition to increased social grants¹⁵. If South Africa were to implement some form of grab-and-go, large gatherings of learners or parents at one time would need to be avoided. Uncooked food for a week, what would normally be used for school meals, could be given to parents, while perhaps targeting only households with the greatest need.

¹³ An emphasis on homeroom classes was part of Taiwan's response to the 2009 H1N1 pandemic, according to Viner *et al* (2020: 2).

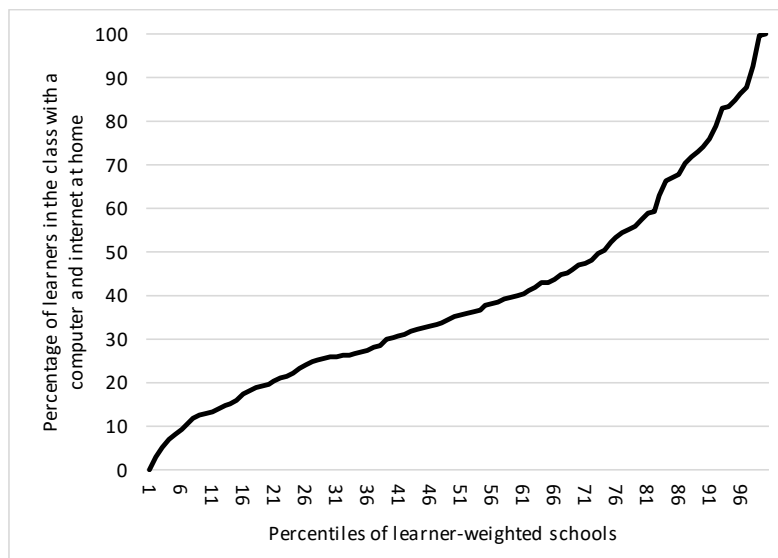
¹⁴ 'World Food Programme gears up to support children left without meals due to Covid-19 school closures' at <https://www.wfp.org/news/world-food-programme-gears-support-children-left-without-meals-due-covid-19-school-closures> (accessed 30 March 2020).

¹⁵ 'Government needs to come up with a plan to help poor families now that schools are shut' by Nic Spaull, 22 March 2020, at Business Live.

What innovative approaches could be taken for continuing schooling at home in a resource-scarce school community?

Statistics in a recent Daily Maverick article indicate that only **around half of learners have the technology at home to link up online with their teachers**¹⁶. A figure of around 50% makes it clear that is not just historically advantaged schools, or suburban schools, which have options for distance learning (historically white and Indian schools account for only around 12% of enrolments). However, ethical guidance is probably needed for teachers faced with a situation where some of her learners can be accessed online, but others not. This is not an easy situation, yet it is the norm, as shown in the following graph, which draws from 2015 Grade 9 TIMSS data. In almost no schools do all learners have a computer and the internet at home. But at the same time, in almost no schools do *no* learners have this at home. In over half of schools, at least a third of learners have these facilities at home (see the curve above value 50 on the horizontal axis). Turning to teachers, the DBE’s 2017 School Monitoring Survey found that 85% of teachers accessed educational materials on the internet (the survey covered by primary and secondary teachers). Of course, some of this access may be at school, though other data suggest that internet access at home would also be high for teachers.

Figure 6: Computer and internet access in the home among learners



Even if it is unfair, **it is probably correct and permissible for teachers to remain in contact with as many learners as they can**. This would need to be made clear to teachers, however, to protect them from accusations of unethical practice.

The Daily Maverick article points to the benefits of the **national workbooks programme** during school closures, and suggests that the message could be sent out that older learners should assist younger learners in the same household with their schoolwork. To illustrate the scope for this, 44% of primary school learners are in households which also have at least one secondary learner.

In some countries (such as Sweden), the effect of school closures, at the primary and pre-school levels, on the ability of essential workers to do their work has been a concern. In **South Africa’s context of high unemployment and the ability of many households where people are employed to pay for child-minders**, this is likely to be less of a concern.

¹⁶ ‘Covid-19: How to keep education going in a time of school closures’ by Martin Gustafsson, 24 March 2020, on Daily Maverick.

Appendix: Further details on the school closure evidence

This appendix digs a bit deeper into the scientific evidence, once again using likely questions people may ask as a point of departure.

What evidence is currently (or may soon be) influential in the public debates, and how has this evidence been received by policymakers?

If one performs a neutral (i.e. non-personalised) South Africa-based google search using ‘Covid-19 evidence on school closures’ (nothing in inverted commas), one obtains a lot of news articles and opinion pieces essentially **asking whether countries are perhaps over-emphasising the benefits of closing schools** during the current pandemic, especially if one also considers the human and social costs of school closures. This is the predominant narrative, and largely these narratives use one prominent literature review published in one of the ‘supplementary journals’ of *The Lancet*, namely *The Lancet Child & Adolescent Health*¹⁷. The article was published on 6 April 2020, the title being ‘School closure and management practices during coronavirus outbreaks including Covid-19: a rapid systematic review’¹⁸. The fact that one ‘rapid’ literature review receives so much attention is indicative of how little good evidence there is to draw from.

The article pays particular attention to studies on school closures in relation to other coronavirus outbreaks, meaning essentially **the 2003 SARS outbreak**. It also looks at school closures and *influenza* outbreaks, such as the 2009 H1N1 outbreak, but emphasises that it is best to examine other coronaviruses. The WHO explains the difference between influenza viruses and the virus behind Covid-19¹⁹: in general, influenza spreads *faster*, but if someone is infected with the Covid-19 virus, he or she generally spreads it to *more people*²⁰. This seems to be because one is contagious for a longer period in the case of Covid-19.

Important limitations of the Lancet article are discussed below. These limitations are only weakly acknowledged in the media. Many of the media articles easily create the impression that the evidence we have is quite solid, when it is in fact not. For instance, a Reuters article is headed ‘School closures will have little impact on Covid-19 control, review finds’. That clearly exaggerates the conclusiveness of the review. The Science Media Centre provides a useful web page where experts respond to the Lancet article²¹. Many experts find the Lancet article an important contribution. One of them, Neil Ferguson, whose own 2020 work is referenced prominently in the Lancet article, suggests that **bias could have arisen in the Lancet article because other work by Ferguson which looks at school closures in combination with other non-school restrictions was not referenced**, and that other work points to school closures being an important and effective part of a broader strategy.

What is often not made explicit is that what underlies uncertainties relating to the effectiveness of school closures is **a massive knowledge gap relating to how the Covid-19 virus is transmitted between children**. What has received some media coverage is a recent

¹⁷ There is the ‘main’ *The Lancet* journal, which is widely known, and this has a number of specialised ‘sister journals’.

¹⁸ Viner *et al*, 2020.

¹⁹ The correct name of the virus is SARS-CoV-2.

²⁰ ‘Q&A: Similarities and differences – Covid-19 and influenza’ at <https://www.who.int/news-room/q-a-detail/q-a-similarities-and-differences-Covid-19-and-influenza> (accessed 26 April 2020, and dated 7 March 2020 on the web page).

²¹ ‘expert reaction to systematic review on the effectiveness of school closures during coronavirus outbreaks (including Covid-19)’ at <https://www.sciencemediacentre.org/expert-reaction-to-systematic-review-on-the-effectiveness-of-school-closures-during-coronavirus-outbreaks-including-Covid-19/> (accessed 26 April 2020).

academic article²² which puts forward evidence that children are particularly weak transmitters of the virus. But that article is based on the case of just *one boy*, aged nine. Yet given how little evidence there is on the matter, this article has received media attention²³, and is considered an indication that children do not transmit the virus easily, in part because they do not get ill from the virus in the way older people do.

The article does add weight to an observation made by **the WHO in its February 2020 report on its mission to China**. In that report, it was considered noteworthy that no reports could be found of children infecting adults. This is captured in the italicised sentence below, from a paragraph dealing with transmission by children (italics not in the original)²⁴:

Data on individuals aged 18 years old and under suggest that there is a relatively low attack rate in this age group (2.4% of all reported cases). Within Wuhan, among testing of ILI samples, no children were positive in November and December of 2019 and in the first two weeks of January 2020. From available data, and in the absence of results from serologic studies, it is not possible to determine the extent of infection among children, what role children play in transmission, whether children are less susceptible or if they present differently clinically (i.e. generally milder presentations). The Joint Mission learned that infected children have largely been identified through contact tracing in households of adults. *Of note, people interviewed by the Joint Mission Team could not recall episodes in which transmission occurred from a child to an adult.*

Different information on transmissions between children would radically alter the models which governments have turned to so far for guidance. To illustrate, Imperial College London **modelling has so far assumed that children transmit the virus largely as adults do**. This is clear in the following, from Neil Ferguson's work²⁵:

We predict that school and university closure will have an impact on the epidemic, under the assumption that children do transmit as much as adults, even if they rarely experience severe disease

If children do not transmit as much as adults, then this must change the findings around the impacts of school closures.

One article one can expect to become widely quoted in the coming weeks, and one which says important things about school closures, is Banholzer *et al* (2020). This is dated 21 April. The article presents a cross-country analysis focussing on 20 non-Asian rich countries, mostly European, but also the United States, Canada and Australia. It uses a statistical model to estimate the impacts of introducing seven different restrictions, one of which is school closures (though only primary schools are considered), on new cases of infected people identified each day. **The findings are remarkable and support the position that school closures have a particularly small impact on 'flattening the curve'**. The following graph is taken from the article. It shows how many more new cases per day would have been identified in the United Kingdom if particular restrictions had not occurred. School closures only reduced new cases by around 3%, against almost 60% for other restrictions combined.

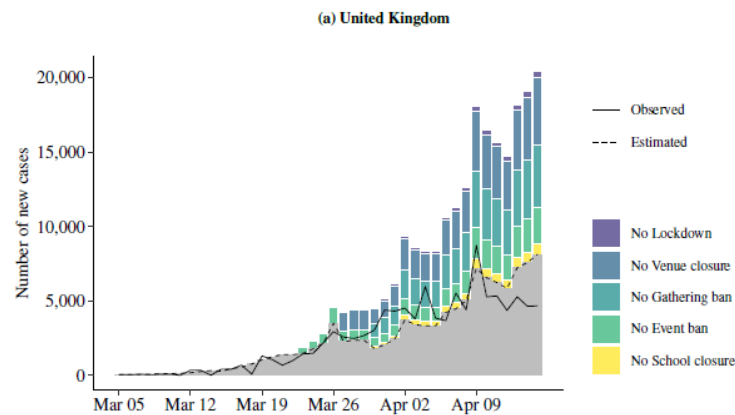
²² Danis *et al* (2020).

²³ 'Boy with Covid-19 did not transmit disease to more than 170 contacts' in *The Guardian* (online), dated 21 April 2020.

²⁴ World Health Organization, 2020: 11.

²⁵ Ferguson *et al*, 2020: 15.

Figure 7: Finding from Banholzer et al



In simple terms, what are the key approaches to gathering evidence on the effects of school closures?

There are essentially three analytical approaches.

First, one can **predict effects through an epidemiological model**. This is what the Imperial College London work referred to above was about. Specifically, that work involved using the ‘SIR’ model with age-specific variables²⁶. It also involved using country-specific data on contacts of the type described above.

Second, one can **look backwards at actual trends in one country**. The evidence here with regard to Covid-19 is still preliminary. A South African example would be Professor Abdool Karim’s conclusions regarding the impact of South Africa’s restrictions. Karim found that the number of new cases a day dropped, and attributed this to the success of the restrictions²⁷. The disadvantage with one-country studies is that restrictions are often imposed simultaneously, making it impossible disentangle the effects of one restriction, such as school closures, from another.

Third, one can **look backwards at actual trends across several countries**. This is what the Banholzer *et al* article discussed above does. This is probably the approach that permits the most reliable conclusions. One is dealing with what has actually happened, and because countries do slightly different things, for instance in relation to the point at which school closures are implemented, it may be possible to disentangle the various interventions. This approach may also be applicable in a large country, such as the United States, where different states or regions pursue different restriction strategies.

What is the relevance of the currently available evidence for South Africa?

The evidence that schools are not a major source of infections in the Covid-19 context has been mounting, and at this point seems fairly convincing. However, the evidence we have is still preliminary. A month from now, and beyond, the evidence can be expected to be firmer.

One unambiguous thing that the current research does underline is that *restrictions relating to schools cannot be seen in isolation from restrictions elsewhere in society*. To illustrate, one

²⁶ Walker *et al*, 2020: 15.

²⁷ ‘SA’s Covid-19 epidemic: Trends & Next steps’ obtained from <https://www.groundup.org.za/media/uploads/documents/slim.pdf> (accessed 26 April 2020).

can attempt to limit infections by closing schools, or only allowing certain learners to come to school, *but the net effect of this must take into consideration what children not attending school are doing*. If children not in school are under ‘lockdown’ at home, then one can expect infections to decline. However, if there is no lockdown and children are socialising with each other in the street, in sports clubs, and so on, then the net effect of the school restriction may be limited. Schools are a likely site for infections, but they also keep learners away from *other* sites of infection.

The 6 April Lancet literature review, which has received wide media coverage, and which questions the efficacy of closing schools, should be read critically. It should be noted that the authors call the review a ‘rapid’ one. Presumably, it is not meant to be strongly conclusive. Someone who produced a key analysis used in the Lancet review has suggested the review is a bit one-sided and does not weigh up all the relevant evidence. This is telling. Moreover, the article fails to explicitly address the critical underlying question of how the virus is transmitted among children. It also fails to explain how key differences between the 2003 SARS outbreak and Covid-19 affect the applicability of lessons from SARS in the current context. The Lancet article relies strongly on evidence gathered during the 2003 outbreak.

Evidence that emerged *after* the 6 April Lancet article, however, seems to provide a more solid basis for arguing that schools are a less important site for transmissions than what was previously believed. A 21 April article by Banholzer *et al*, accepted for consideration by a reputable journal, but still not peer-reviewed, uses a cross-country model and finds that relative to other roughly simultaneous interventions, school closures have a tiny effect on reducing infections. This analysis focusses on just rich countries. It should be possible to replicate the work for a wider set of countries in future, yet it is difficult to imagine how the effects of school closures in developing countries would be substantially different to those in rich countries. The Banholzer *et al* article, especially if it passes the peer review process (there seems to be no obvious reason why it would not), is definitely an analysis worth taking into account when deciding on school strategies.

What would completely change the discourse around school closures is new evidence on how much less children infect others, relative to adults. The Danis *et al* article provides important evidence on how unlikely children are to transmit the virus, yet it focusses on just one case. The WHO did state, however, as early as February, that it struggled to find evidence of children infecting adults in China, which strengthens the Danis *et al* finding.

What is worth monitoring is evidence emerging from Sweden and Iceland, virtually the only two countries which did not close primary schools (though both closed secondary and tertiary institutions). If Covid-19 cases among teachers in these countries are not higher than those for other comparable adults, then that would support the finding that schools are not major sites of infection. The Swedish state epidemiologist argued in a recent interview that there is no evidence of higher rates of infection among teachers. However, published and verified statistics in this regard appear not to be available. Teachers in Sweden, insofar as they have argued for the closure of primary schools, have concentrated not so much on risks associated with interaction with learners, but on the risks of using public transport to move to and from work, when other workers have been encouraged or, in the case of secondary teachers, forced to work from home²⁸.

²⁸ From an article on the website of the magazine of the teacher union, <https://skolvarlden.se/artiklar/tegnell-om-larares-oro-ar-inte-mer-sjuka-an-andra>. Using Google translate, the title becomes ‘Tegnell about teachers’ concerns: They are no more sick than others’. Date is 14 April 2020.

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