

School/Daycare

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COVID-19 in Pediatrics Schools and Day care

Getting Children Back to school safely

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Developing COVID-19 Guidelines = Building a plane while flying

Acknowledging the evolving nature of the evidence

Frequent review of guidance to respond to new evidence

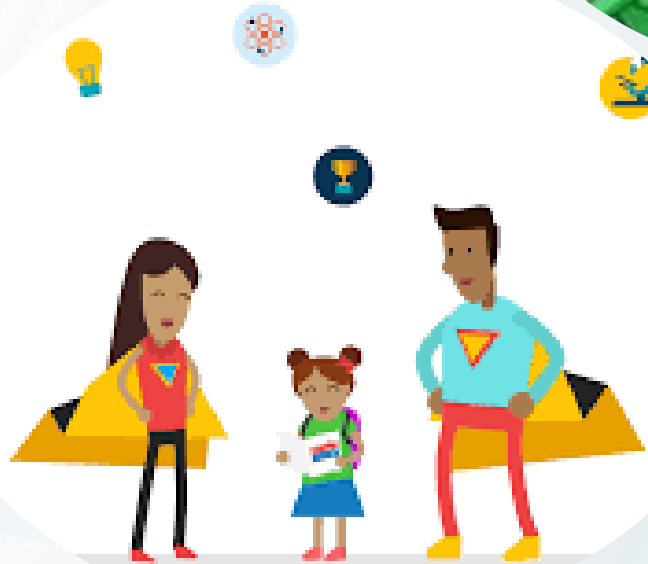
Be willing to adapt or change guidance based on the evidence



Rigorous scientific evaluation of the evidence

In the absence of evidence
– base decisions on basic scientific principles

Keeping children safe in these uncertain times



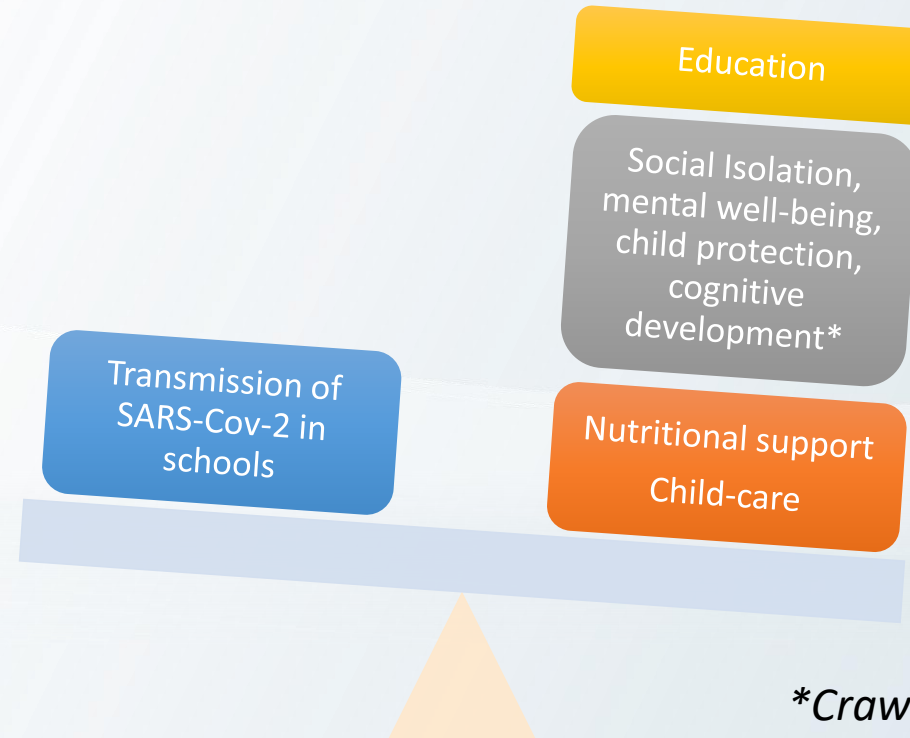
Weighing the Risks/Benefits of Opening Schools

RISKS

- ↓ risk of SARS-CoV-2 infection in children compared with adults;
- ↓↓ risk of Covid-19-related death in children
- ↓ prevalence of comorbidities (diseases like hypertension, diabetes) in children
- Likely lower transmission risk from children to adults;
- ? Contribution of children to outbreaks in school;

BENEFITS

- Distance learning (online) – need for access to computers, electricity and internet
- Disproportionate effect on vulnerable children, families and communities
- In SA – 9.6 million learners receive daily meals at school



*Crawley et al. *BMJ Paediatric*. 2020 Apr

Context: Distant Learning and Risk Mitigation



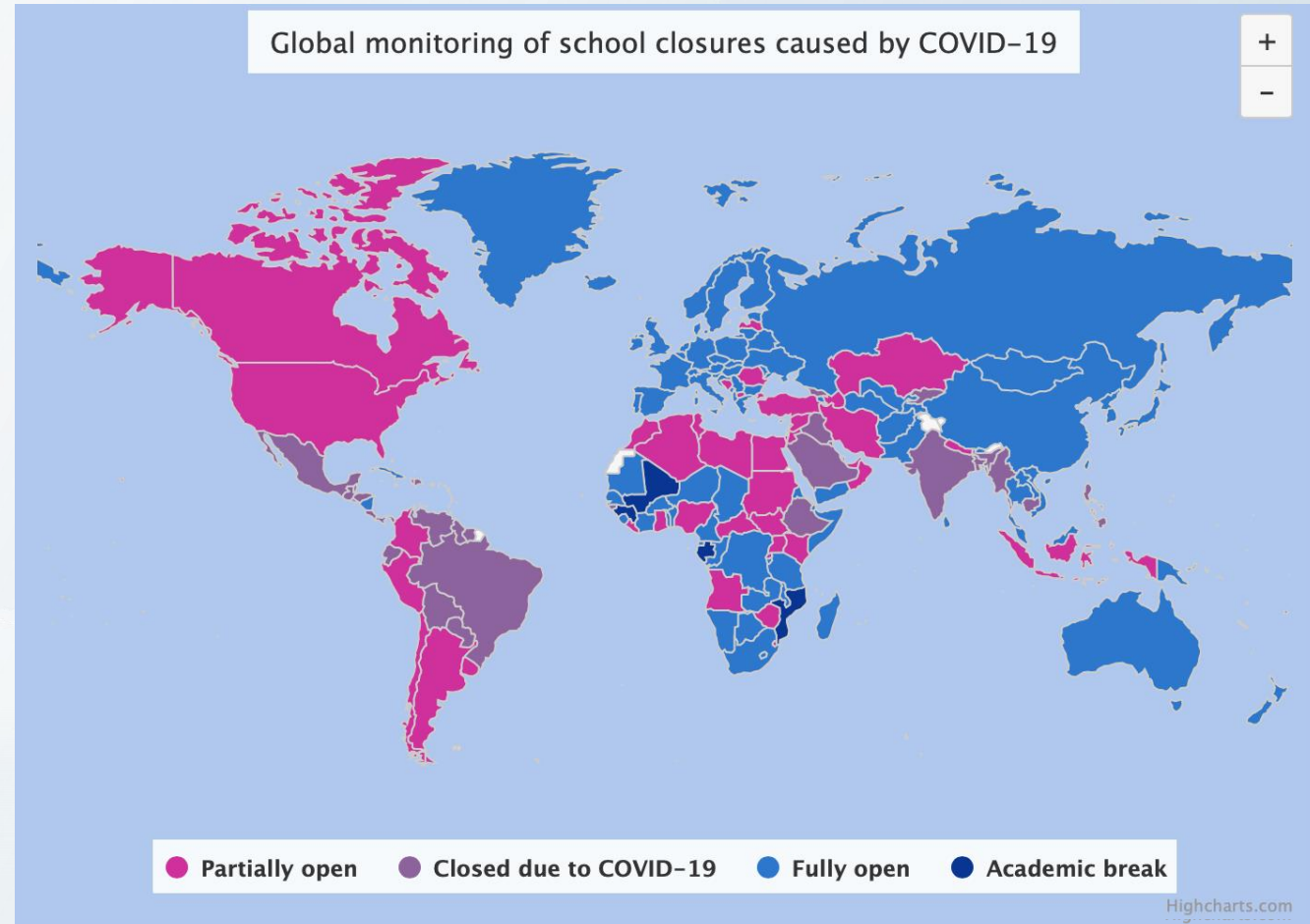
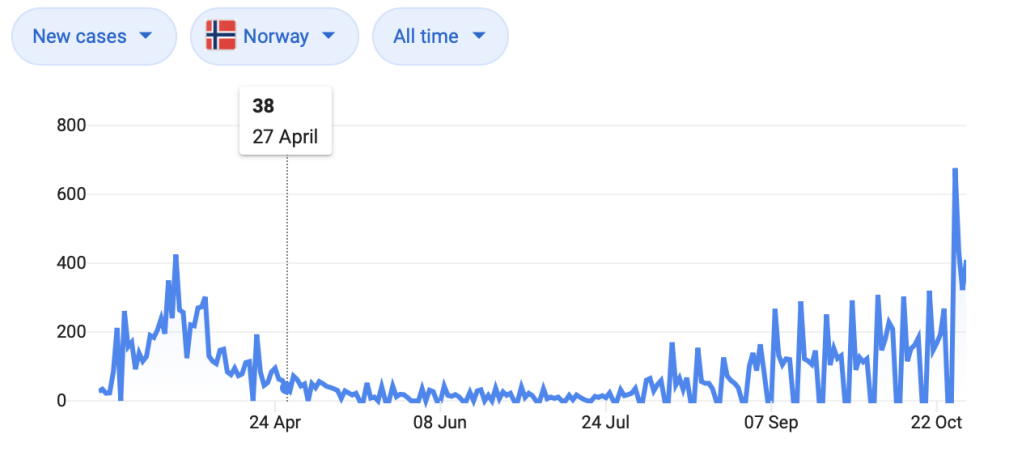
Rural School in the Eastern Cape
– South Africa

Urban School in KZN – South Africa

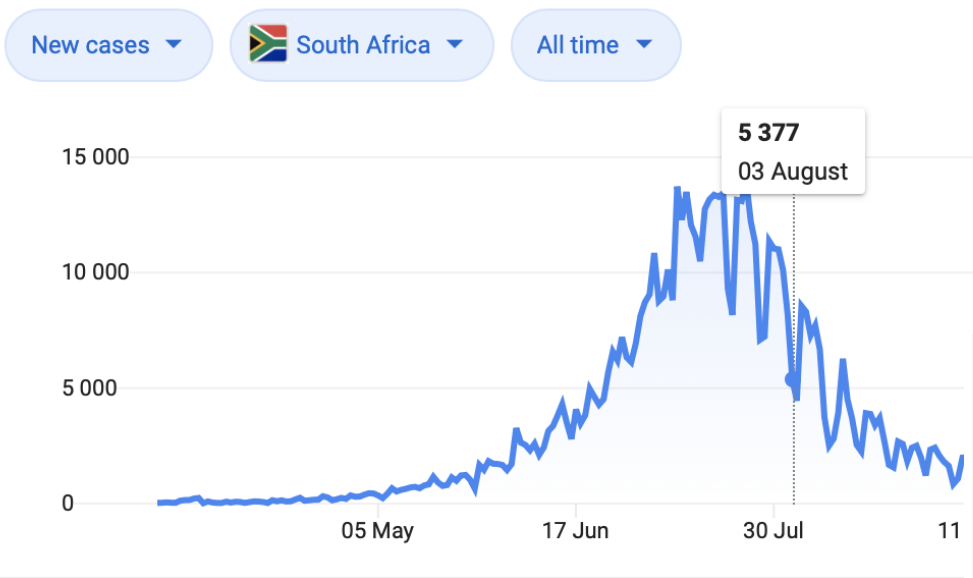


School closures – June – November 2020

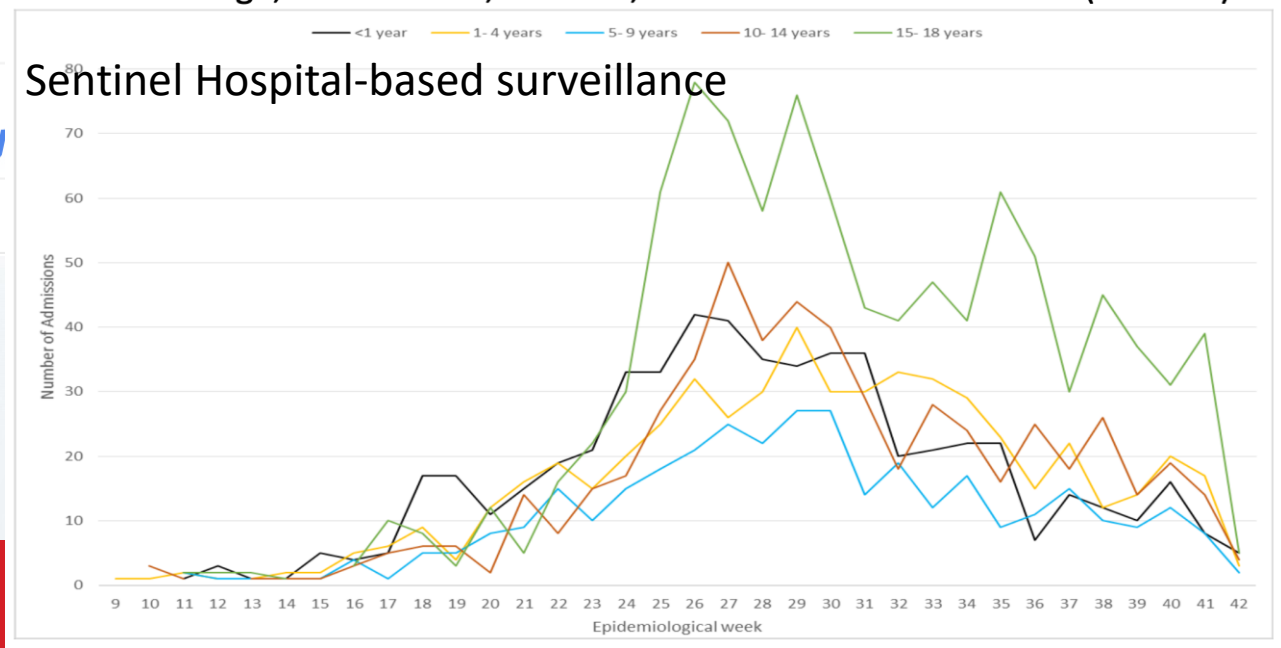
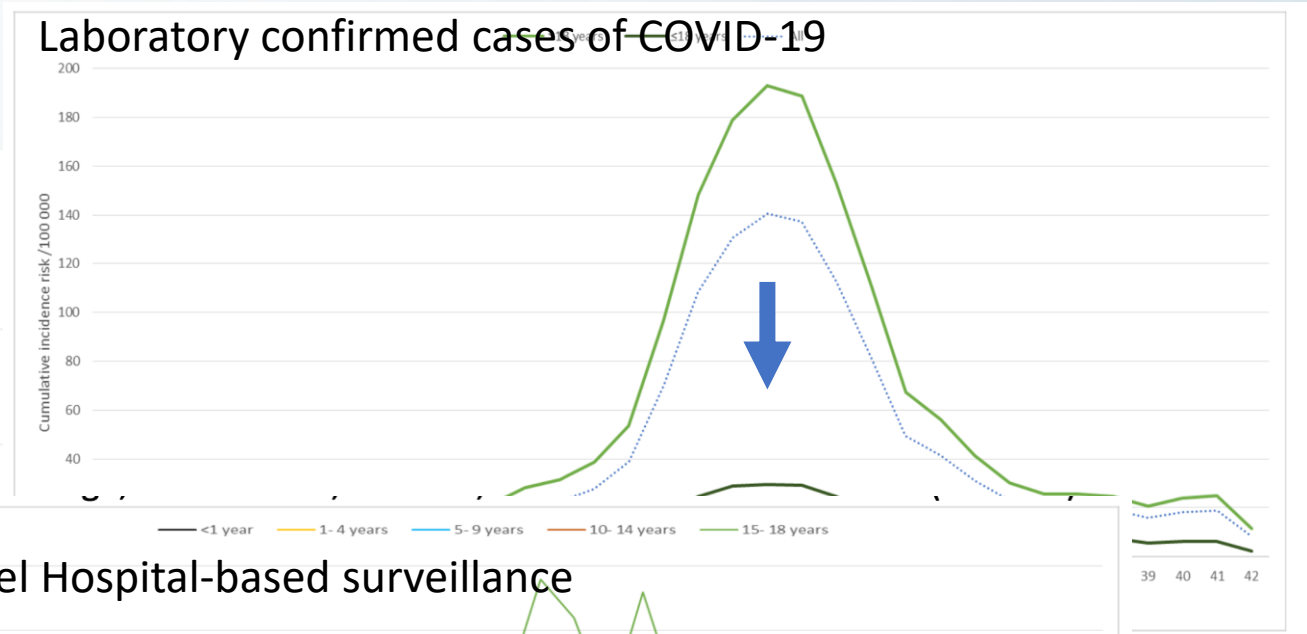
At the height - 1.19 billion students out of school in 150 countries



Transmission of SARS-CoV-2 in Schools



Children and adolescents account for approximately 40% of the population



Sweden – Open school policy

- Keep sick staff and students at home
- Raise awareness of hand hygiene
- Extra-cleaning (once a day - including cleaning toilets, surfaces like doors and handrails, and wiping toys, computers, and textbooks)
- Social distancing (limit groups to <50 people/spacing of classrooms)
- Head outdoors – move activities outside / sports requiring close contact stopped

Sero-prevalance survey – Sweden

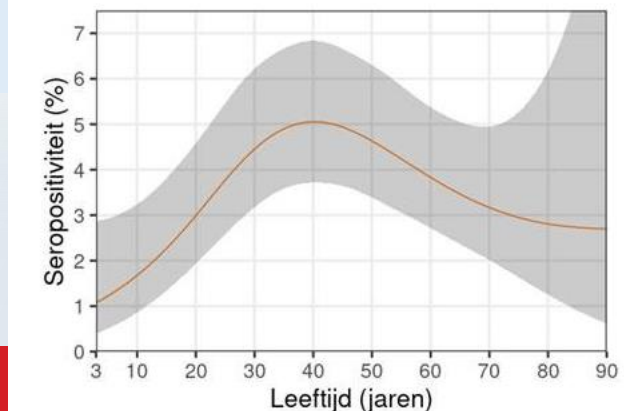
Under 19 years: 4.9%

20-64 years: 6.7%

Sero-prevalance survey – Netherlands

Under 20 years: 2%

Over 20 years: 4 %





Australia – New South Wales

COVID-19 in schools and early childhood education and care services (ECEC) – the Term 1 and 2 experience in NSW, Australia

TERM 1 (Feb 2020 – 9 Apr 2020)

- Cases: 27 (12 students and 15 staff members) from 25 educational settings (15 schools and 10 ECEC services)
- 1,448 individuals (1,185 students and 263 staff members) were identified as close contacts of these primary 27 cases.
- In schools, only 1 primary school child, 2 secondary school children and 2 staff members were considered likely to have contracted COVID-19 from exposure to cases at their schools.
- Nine ECEC services reported no secondary cases.
- However, one ECEC service experienced a large outbreak, with 6 staff members and seven children infected and additional community-based transmission.
- **The attack rate in this investigation ranged from 1.2% (all settings) to 0.5% (schools only).**

TERM 2 (7 Apr 2020 – 3 Jul 2020)

- Cases: 6 individuals (4 students and 2 staff members) from 6 educational settings (5 schools and 1 ECEC service).
- 521 individuals (459 students and 62 staff members) were identified as close contacts of these primary 6 cases.
- No secondary cases were reported in any of the 6 educational settings.
- In Term 2 no student or staff member contracted COVID-19 from a school or ECEC setting.

	Secondary attack
All settings, all contacts, including single ECEC outbreak	1.2% (18/1448)
All settings, all contacts, excluding single ECEC outbreak*	0.4% (5/1411)
All settings, all child case to child contacts	0.3% (2/649)
All settings, all child case to staff member contacts	1.0% (1/103)
All settings, all staff member case to child contacts	1.5% (8/536)
All settings, all staff member case to staff member contacts	4.4% (7/160)
All settings, all staff member case to child contact, excluding single ECEC outbreak*	0.2% (1/511)
All settings, all staff member case to staff member contacts, excluding single ECEC outbreak*	0.7% (1/148)
All settings, tested population	2.8% (18/633)
All settings, tested population, excluding single ECEC outbreak	0.8% (5/598)
All schools, all contacts	0.5% (5/914)
All schools, tested population	1.3% (5/375)
Single ECEC outbreak, * all contacts	35.1% (13/37)
Child close contacts	28.0% (7/25)
Staff close contacts	50.0% (6/12)

Data are rate % (n/N). SARS-CoV-2=severe acute respiratory syndrome coronavirus 2. ECEC=early childhood education and care. *This outbreak resulted in at least four generations of infection and there was no evidence of child to child or child to staff transmission (unpublished).

Table 4: Secondary attack rates of SARS-CoV-2 infection by educational setting and testing approach



Singapore

- This report describes the risk of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) transmission among children in educational settings (preschool and secondary school).

Table 1. Clinical Epidemiology and Nasopharyngeal Swab Results of School/Preschool Contacts (N = 119)

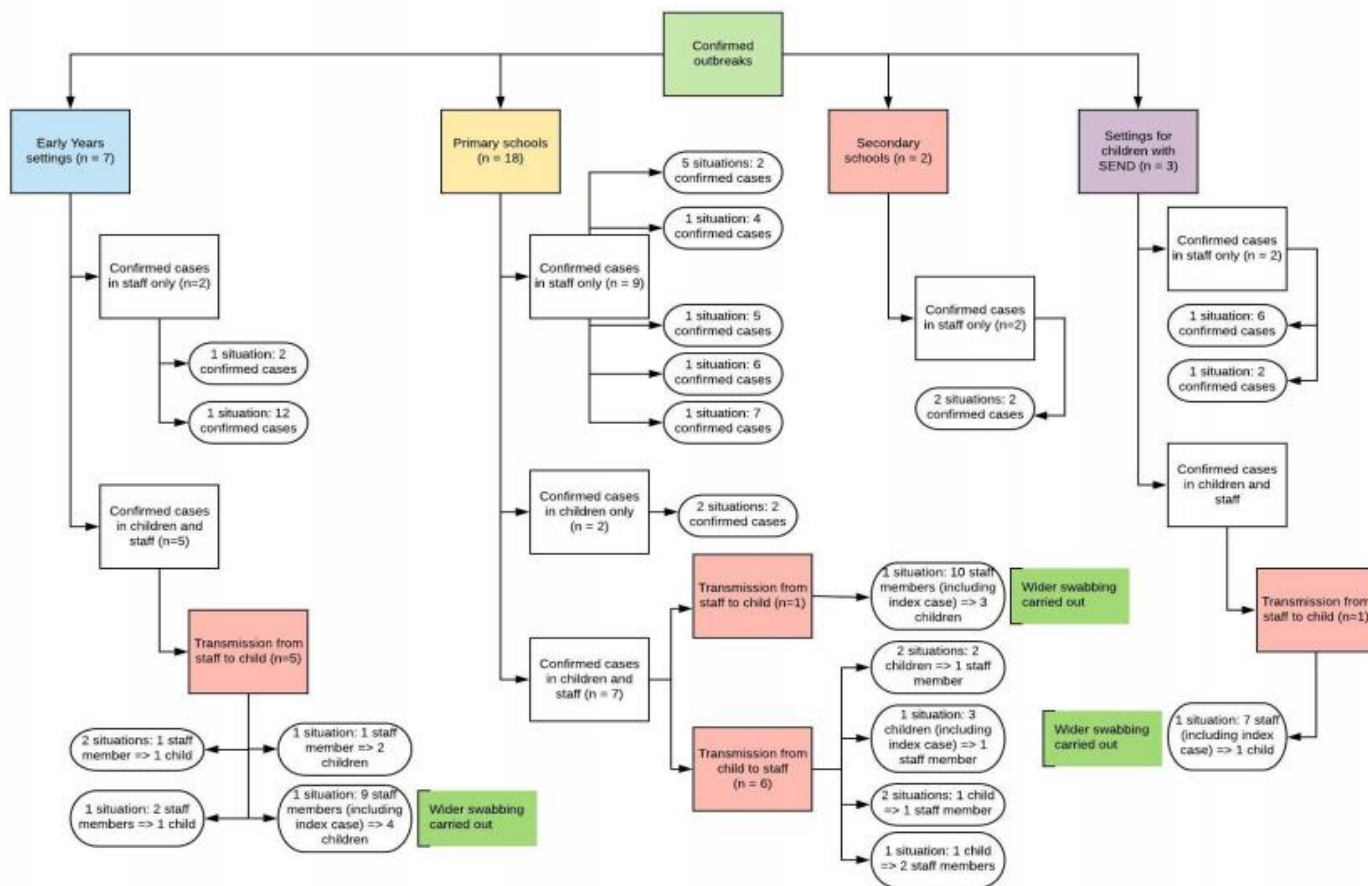
Characteristic	Secondary School (n = 8)	Preschool 1 (n = 34)	Preschool 2 (n = 77)	
Presence of symptoms in contacts	Yes	Yes	Yes (n = 8)	No (n = 69)
Age, mean, y (range)	12.8 (12.0–15.0)	4.9 (2.8–6.2)	4.1 (3–6)	3.6 (1–6)
Sex				
Male	8 (100)	20 (58.8)	4 (50)	36 (52.2)
Female	0 (0)	14 (41.2)	4 (50)	33 (47.8)
Admitted				
Yes	5 (62.5)	11 (32.3)	0	0
No	3 (37.5)	23 (67.6)	8 (100)	69 (100)
NP sample SARS-CoV-2 PCR positive	0	0	0	0
Interval between last exposure to index case and date of first NP sample from contact, d, mean (range)	11 (7–15)	5 (4–7)	5.5 (2–16)	9.5 (9–16)
Close contact under quarantine				
Yes	5 (62.5)	9 (26.5)	8 (100)	69 (100)
No	3 (37.5)	25 (73.5)	0	0
Contact				
Same class	5 (62.5)	9 (26.4)	Unknown	Unknown
Same year	1 (12.5)	7 (20.6)	Unknown	Unknown
Same school	2 (25.0)	18 (52.9)	8 (100)	69 (100)
No. of NP specimens taken				
1	3 (37.5)	23 (67.6)	8 (100)	69 (100)
≥2	5 (62.5)	11 (32.4)	0	0
Symptoms				
Fever	2 (25.0)	5 (14.7)	3 (37.5)	NA
Cough	7 (87.5)	32 (94.1)	5 (62.5)	NA
Sore throat	1 (12.5)	1 (2.9)	1 (12.5)	NA
Rhinorrhoea	3 (37.5)	14 (41.2)	6 (75.0)	NA
Shortness of breath	1 (12.5)	0	0	NA
Diarrhea	1 (12.5)	0	0	NA
Chest radiograph findings				
Normal	1 (12.5)	0 (0)	NA	NA
Abnormal	0 (0)	4 (11.8)	NA	NA
Not done	8 (87.5)	30 (88.2)	8 (100)	NA

- A 12-year-old student who attended secondary school and a 5-year-old who attended preschool were both found to be SARS-CoV-2 positive
- In the secondary school setting, a total of 8 students from the school developed symptoms and were screened for SARS-CoV-2 during the incubation period.
- All 8 symptomatic student contacts tested negative from that school.
- In the preschool setting (preschool 1), a total of 34 preschool student contacts developed symptoms during the incubation period post-exposure and were swabbed for SARS-CoV-2.
- All 34 symptomatic contacts at the preschool were found to be negative for SARS-CoV-2.
- The third incident involved a preschool cluster where the index case was an adult staff member.
- This preschool setting (preschool 2) developed into a significant cluster (16 adult staff members and 11 cases from their own households were infected)
- A total of 77 children from the preschool (about 73% of the total preschool student population) were evaluated.
- Of these, 8 were symptomatic and 69 were asymptomatic.
- SARS-CoV-2 infection was not detectable from screening of all 77 children.



England

- Summarize the cases, clusters and outbreaks of COVID-19 in educational settings during the month of June



- 67 single confirmed cases, 4 co-primary cases and 30 COVID-19 outbreaks during June 2020, with a strong correlation between number of outbreaks and regional COVID-19 incidence
- Overall, SARS-CoV-2 infections and outbreaks were uncommon across all educational settings.
- Staff members had an increased risk of SARS-CoV-2 infections compared to students in any educational setting, and the majority of cases linked to outbreaks were in staff.
- The probable transmission direction for the 30 confirmed outbreaks was: staff-to-staff (n=15), staff-to-student (n=7), student-to-staff (n=6) and student-to-student (n=2).

Figure 4c: Summary of outbreaks by the type of educational setting in which they were reported, and likely direction of transmission between staff and students attending educational settings

France

Cluster of COVID-19 in Northern France: A Retrospective Closed Cohort Study

- Between 30 March and 4 April 2020, we conducted a retrospective closed cohort study among pupils, their parents and siblings, as well as teachers and non-teaching staff of a high-school located in Oise.
- Of the 661 participants (median age: 37 years), **171 participants had anti-SARS-CoV-2 antibodies.**

Table 2: Proportion of participants with anti-SARS-CoV-2 antibodies

		N	N (%) seropositive	P
Gender	Male	251	55 (21.9)	0.07
	Female	410	116 (28.3)	
Age group	≤14	37	1 (2.7)	<0.001
	15-17	205	82 (40.0)	
	18-44	177	39 (22.0)	
	45-64	239	49 (20.5)	
	≥65	2	0 (0.0)	
Status	Pupil	240	92 (38.3)	<0.001
	Teacher	53	23 (43.4)	
	School staff	27	16 (59.3)	
	Parent of a pupil	211	24 (11.4)	
	Sibling of a pupil	127	13 (10.2)	
	Other	3	3 (100.0)	

SARS-CoV-2 infection in primary schools in northern France: A retrospective cohort study in an area of high transmission

- Between 28-30 April 2020, a retrospective cohort study was conducted among pupils, their parents and relatives, and staff of primary schools exposed to SARS-CoV-2 in February and March 2020 in a city north of Paris, France.
- IAR was:
 - primary school pupils 45/510 (8.8%)
 - teachers 3/42 (7.1%)
 - non-teaching staff 1/28 (3.6%)
 - parents 76/641 (11.9%)
 - relatives 14/119 (11.8%)
- Three SARS-CoV-2 infected pupils attended three separate schools with no secondary cases



Ireland

- Heavey et al aimed to examine the evidence of paediatric transmission in the Republic of Ireland in the school setting
- Three paediatric cases and three adult cases of COVID-19 with a history of school attendance were identified.
- The available epidemiological data for all of these cases indicated that they had not been infected with SARS-CoV-2 in the school setting.
- **Among 1,001 child contacts of these six cases there were no confirmed cases of COVID-19.**
- In the school setting, among 924 child contacts and 101 adult contacts identified, there were no confirmed cases of COVID-19.

Cases of coronavirus disease with a history of school attendance and contacts, Ireland, 1 March–13 March 2020 (n = 1,160 individuals)

Case	Age group in years	Symptoms	Number of contacts				Number of secondary cases			
			Child		Adult		Child		Adult	
			School	Other ^a	School	Other ^a	School	Other ^a	School	Other ^a
1	10–15	Fever	475	29	30	3	0	0	0	0
2	10–15	None	125	30	25	8	0	0	0	0
3	10–15	Fever	222	14	28	0	0	0	0	0
4	Adult > 18	Coryza/cough	52	2	4	38	0	0	0	2
5	Adult > 18	Cough	39	2	2	3	0	0	0	0
6	Adult > 18	Cough	11	0	12	1	0	0	0	0

^a Other transmission settings include households of friends and family and recreational activities.

- **Limitations of studies:** Sample size of children. Inclusion of symptomatic patients only, thus not reflecting the spectrum of SARS-CoV-2 infection, especially asymptomatic presentations frequently seen in children
- Recent SARS-CoV-2 RNA load comparisons across age groups have yielded inconsistent conclusions, finding similar or lower VL in children depending on the type of statistical analysis used, sample-collection time period, and diagnostic assay used
- Assuming that VL in children is higher, what other parameters drive infectiousness other than VL:
 - Symptoms, duration of exposure
 - Nature of exposure
 - Proximity of exposure
 - Environment of exposure
 - Host susceptibility
 - Hygiene practices

SARS-CoV-2 Infections in Schools

- Infections in children reflect the extent of transmission in the community – majority of school-going children are infected at home
- Staff in schools (educators and non-educators) will have a similar probability of becoming infected in a community as society opens-up and potential transmission events increase.

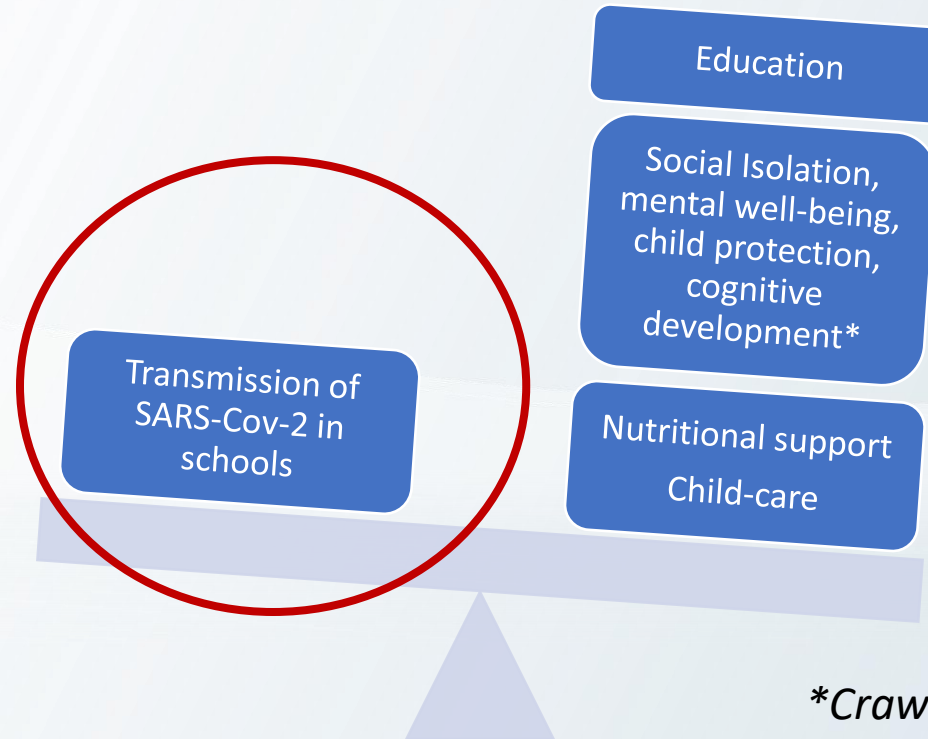
HOW DO WE PREVENT TRANSMISSION AT SCHOOLS

RISK MITIGATION

Weighing the Risks/Benefits of Opening Schools

RISKS

- ↓ risk of SARS-CoV-2 infection in children compared with adults;
- ↓↓ risk of Covid-19-related death in children
- ↓ prevalence of comorbidities (diseases like hypertension, diabetes) in children
- Likely lower transmission risk from children to adults;
- ? Contribution of children to outbreaks in school;

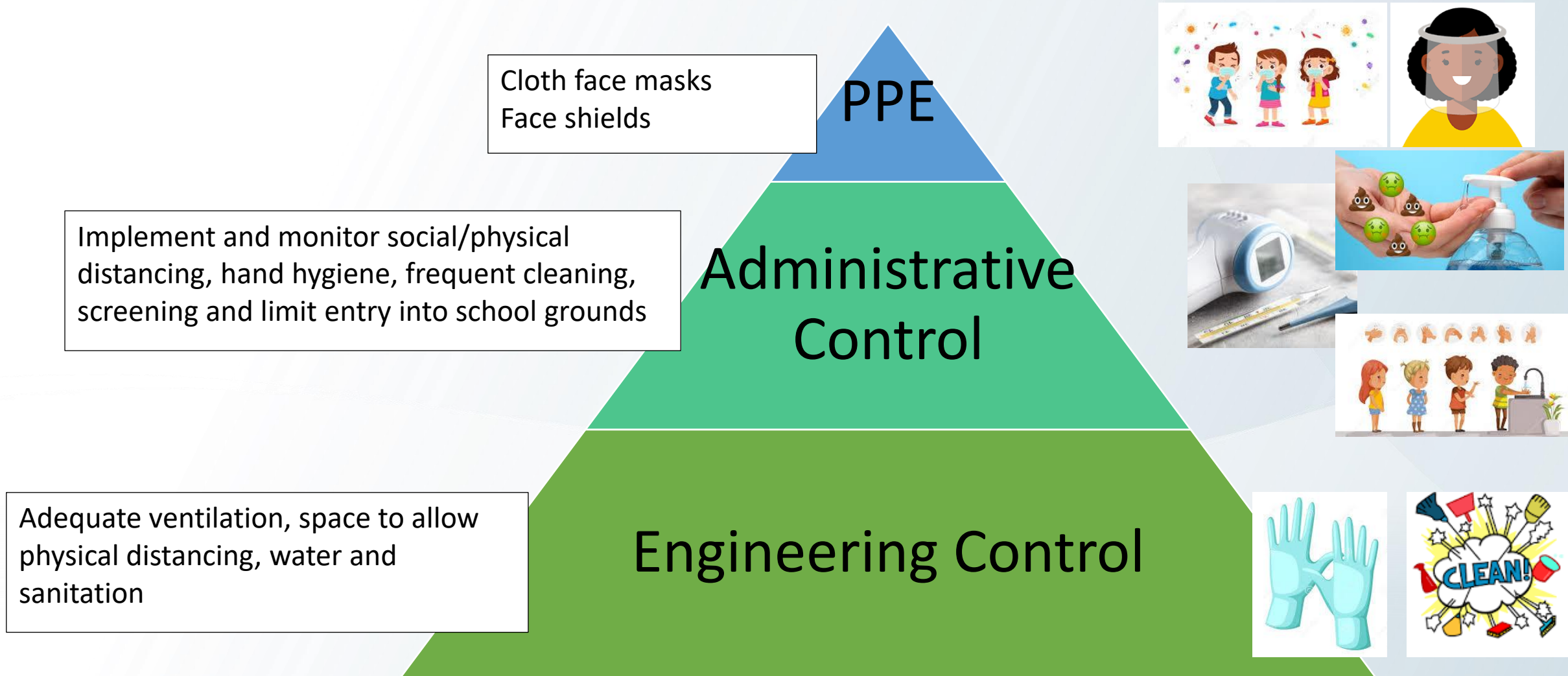


BENEFITS

- Disproportionate effect on vulnerable children, families and communities
- Distance learning (online) – need for access to computers, electricity and internet
- In SA – 9.6 million learners receive daily meals at school

*Crawley et al. *BMJ Paediatric*. 2020 Apr

Risk Mitigation in the Schools



Public health and social principles of mask wearing:

- Given the limited evidence on the use of masks in children for COVID-19 or other respiratory diseases, including limited evidence about transmission of SARS-CoV-2 in children at specific ages, the formulation of policies by national authorities should be guided by the following overarching public health and social principles:
- **Harm:** Do no harm: the best interest, health and well-being of the child should be prioritized.
- **Development and learning:** The guidance should not negatively impact development and learning outcomes.
- **Feasible:** The guidance should consider the feasibility of implementing recommendations in different social, cultural and geographic contexts, including settings with limited resources, humanitarian settings and among children with disabilities or specific health conditions.

Young children and masks

Children aged up to five years should not wear masks for source control. This advice is motivated by a “do no harm” approach and considers:

- childhood developmental milestones
- compliance challenges and
- autonomy required to use a mask properly.

Benefits vs Harms of wearing a mask

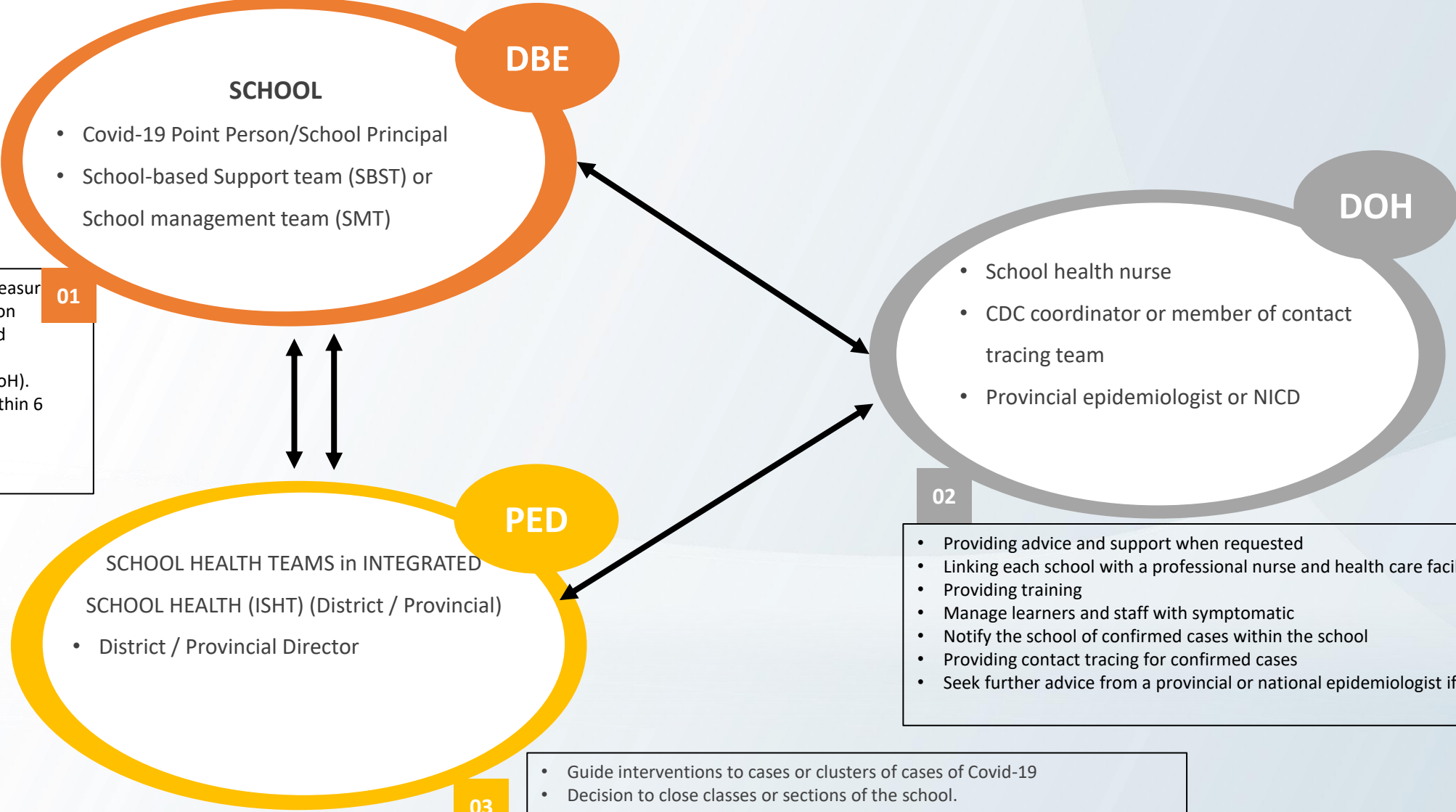
- Mask wearing during seasonal influenza outbreaks in Japan noted that the use of masks was more effective in higher school grades (9-12 years old children in grades 4-6) than lower grades (6-9 year olds children, in grades 1-3).
- Under laboratory conditions and using non-betacoronaviruses, suggested that children between five and 11 years old were significantly less protected by mask wearing compared to adults, possibly related to inferior fit of the mask.
- Other studies found evidence of some protective effect for influenza for both source control and protection in children, although overall compliance with consistent mask wearing, especially among children under the age of 15, was poor.
- Use and acceptability of mask wearing to be highly variable among children, ranging from very low to acceptable levels and decreasing over time while wearing masks. One study was carried out among primary school children during COVID-19 and reported 51.6% compliance.
- Warmth, irritation, breathing difficulties, discomfort, distraction, low social acceptability and poor mask fit were reported by children when using masks. The effectiveness and impact of masks for children during play and physical activity have not been studied; however, a study in adults found that N95 respirator and surgical masks reduced cardiopulmonary capacity during heavy exertion.

Evaluating potentially harmful practices

- Spray tunnels that use chlorine-based disinfectants have been shown to cause respiratory, and skin problems and eye irritation, therefore, should be avoided entirely, particularly in children.
- The use of environmental spraying/ fogging/ fumigating of the environment have not been demonstrated to impact transmission of COVID-19.



Guidelines for Management of COVID-19 cases in schools



And Finally

- Education is a **basic right** of all Children
- COVID-19 pandemic is with us for the next few years
- Children usually have no or very mild features of COVID-19 and maybe less likely to transmit the virus. Need to protect students and staff at risk of severe COVID-19
- There are risk mitigation interventions to control spread in schools
- Need for more research on transmission of SARS-CoV-2 in schools and evidence based interventions to contain the spread



**“EDUCATION
IS THE MOST POWERFUL
WEAPON WHICH YOU CAN USE TO
CHANGE THE WORLD.”**

**NELSON
MANDELA**

Aknowledgements

- South African Ministerial advisory Committee on COVID-19 (Safe return to school – task team): Prof SS Abdool Karim, Prof S Velapi, Prof Shabir Madhi, Vjay Reddy, Natalie Mayet, Nic Spaull, Dr Nandi Siegfried, Prof Lesley Bamford (DOH), Granville Whittle (DBE)
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