MEASURES FOR MANAGEMENT OF COVID-19 OUTBREAKS IN SCHOOLS

RAG – 26/01/2021

CONTEXT

In the past weeks, several COVID-19 outbreaks were recorded in schools in Belgium, some caused by the 501Y.V1 (B.1.1.7) variant ('UK variant'). In response, because of the higher transmissibility of this variant, it was decided to test broader than the current recommendations and test all pupils and school staff. In some schools this lead to the detection of an important number of additional cases, in other schools to only a few additional cases. Also in the Netherlands, there was an important school outbreak with the UK variant, followed by a broad testing of pupils, teachers, household members and eventually the community-wide that showed a rapid spread. The outbreak was most likely caused by a "super spreading" event in the school, with further transmission to siblings and parents.

The question was raised if, in the context of increased circulation of the new variants, the test strategy in school outbreaks needs to be revised. Furthermore, there is a need to have a more harmonized approach for the whole country.

CURRENT GUIDELINES FOR TESTING IN SCHOOL OUTBREAKS

In the event of a confirmed COVID-19 case in a primary or secondary school, the current RAG advice is to conduct an **epidemiological investigation** and assess the number of people who had a high-risk contact and a low-risk contact with the index case (according the applicable definitions). In response to the higher transmissibility of the new variants, children in elementary school who sat next to an index case in the classroom/refectory are now considered high-risk contact (independently of the variant involved). **High-risks contacts (inside and outside the school) follow the standard procedures** and are put in quarantine and tested, with a PCR, asap after the last exposure and on day 7 to end quarantine. If individual contact classification is not possible, because children don't have a fixed seat (e.g. in pre- and afterschool care) or because of lack of time, all the children and the teacher/care giver of the same group (class or bubble in other activity) are considered high-risk contacts.

Two or more confirmed cases with an epidemiological link in the same class, within a period of 14 days (7 days in periods of high incidence) are considered as a **cluster** . To avoid unnecessary

closure of classes, a protocol has been proposed by the RAG **for secondary schools** with **testing of all low-risk contacts** with a **rapid Ag test**, a first time asap, and a second time 2-4 days after the first test. The class is only **closed** if there are **four or more confirmed cases or if one fourth or more** of the class is positive. However, this has not been implemented, mainly because of logistical difficulties.

In the Fédération Wallonie Bruxelles, the standard procedure is followed (see above). In **Flanders**, a different protocol is being rolled out in which **all high-risk**, in both **primary and secondary schools** will be tested with a **rapid Ag test** asap after exposure, and retested with an RT-PCR on day 7. If suspicion of a cluster, low risk contacts can also be tested (in agreement with the medical single point of contact (mSPOC, medical expert representing the first line).

The advice with regard to **whole genome sequencing**, is to **select a number of positive samples** of outbreaks in schools (either 20% of the positive cases, or 5 positive cases). Because the number of outbreaks in schools is currently low, samples will be selected in all outbreaks. If the number of outbreaks increases, priority will be given to (1) Outbreaks with many positive pupils; (2) Outbreaks with relatively a lot of symptomatic pupils; (3) Repeat outbreaks; ad (4) Outbreaks in which the index case was confirmed to have a variant strain.

RECOMMENDATIONS

General recommendations

- The RAG reiterates its recommendation to apply the same measures for prevention and control, independently of the variant.
- The protocols developed by the authorities for organization of activities in schools should be followed. It is important to remind that preventive measures (such as for contact between teachers) have to be applied. Classes/care of children should be organised as much as possible with fixed seats or small groups, always the same children together. Teachers rooms should be closed and lunch/coffee consumption by teachers taken in their own classrooms. Also, the RAG previously already recommended that teachers in primary school should wear masks in “code red”, which is the epidemiological situation we are.
- Protocols also exist for the investigation and management of outbreaks in schools, which should be followed. Clear communication of this protocols is needed to local authorities in order to have a harmonized approach over the country. The decision to enlarge testing or closing schools should not be guided by public pressure.
- Current data collection on number of infections in schools does not allow to have a clear overview on the number and extent of the clusters. Enhanced data collection is therefore needed (responsibility of the communities, in collaboration with Sciensano).

Test strategy

Who should be tested:

- In **kindergarten and child care**,
    - The current guidelines are still valid for classification of risk contacts in the class/bubble: if the index case is a child, all the other children and adults are low risk contacts (LRC). If the index is an adult, all children are high risk contacts (HRC).
    - In case of a cluster: all children and the teacher/care giver are HRC. As for all other age groups, children that are identified as HRC are tested as soon as possible after identification of the risk contact and on day 7.

- In **primary and secondary schools**:
    - The current guidelines are still valid for classification of HRC in the class (in a single case and cluster).
    - Testing the whole school should only be done if the epidemiologically evaluation shows cases in several classes that do not have a link outside the school, such as belonging to the same household. This should be based on a risk evaluation done by the CLB//PSE and the mSPOC (in Flanders), with input from the health inspectors if needed (see existing procedures). The objective of testing the school is to have a snapshot of the extend of the virus circulation and does not necessary lead to closure of the whole school.

- Systematically test high-risk contacts of high-risk contacts, without awaiting the test result of the index high-risk contact, is not indicated (provided that the test capacities allows to continue testing HRC as soon as possible after identification of the contact).

Type of sample/test

- In **kindergarten and child care** the test to use should always be an RT-PCR. Ideally on a naso-pharyngeal or combined nasal/oral swab.
- In **primary and secondary schools**: the recommended test to test high-risk contacts and other contacts in the context of the outbreak investigation remains the RT-PCR, for both the first test and the second test on day 7.

School closure

- Schools should never be closed if less than 3 classes have clusters (at least 2 cases in the class without epidemiological link outside the school). In large schools (≥ 13 classes), a threshold of 25% of the classes need to have clusters before considering to close the whole school.

These proposed thresholds can be used as guidance, and have been set arbitrarily. There is no scientific evidence to set such thresholds.

- As foreseen in the current procedure, the final decision should be based on the risk analysis of the specific situation, by a team comprising CLB/PSE, the mSPOC (in Flanders), the mayor, the OST (Outbreak Support Team in FWB) and the health inspector.
  For Flanders, see:
  https://onderwijs.vlaanderen.be/sites/default/files/atoms/files/Procedure_sluiting_school.pdf.
  For FWB, see:
  http://www.enseignement.be/upload/circulaires/000000000003/FWB%20-%20Circulaire%207937%20(8192_20210128_112851).pdf

Practical considerations

- The existing test capacity (testing centers, general practitioners) should as much as possible be used.
- Mobile teams have been shown to be a useful complement, but present some challenges (not enough teams, depending sometimes on volunteers who are not available during the day, …) and can therefor never satisfy all needs.
- If a region is faced with a lot of testing needs, coordination is needed at the provincial level to define the priorities and organize the testing, together with the regional health inspectors, in close consultation with CLB/PSE and mSPOC (in Flanders).
- As already agreed on by the IMC on 21/01, it is important to have a grouped strategy, with sampling at the same place/by the same mobile team, tests performed by one same laboratory and possible linking of the results for all the tests related to the outbreak, by class. Prescription of the tests should occur through the collectivity tool.
- Since a test can never be mandatory, people can refuse to be tested. In that event they have to respect the full quarantine period of 10 days. If needed (e.g. strong suspicion of COVID-infection), the physician can register the person as a suspected, but not tested, case (eform 3), to allow contact tracing around the child.
- A flow chart to visualize the measures will be developed.

ELEMENTS OF DISCUSSION

- Although that at first sight it appears that primary schools are now relatively more affected than secondary compared to October, there is not sufficient evidence that this is the case. It is quite possible that more clusters are now detected in primary schools because there is more testing.
- There is a difference in type of contact between primary and secondary schools. In primary schools teachers have a closer contact with the pupils, and pupils do not wear masks. This is, however, already taken into account in the definition of high-risk contacts.
- There is currently a problem of capacity. While there are amply sufficient tests available (both RT-PCR and rapid Ag test) and there is sufficient lab and testing capacity, the bottleneck is in the prescription and sample collection that cannot adequately respond to the increasing demand. There is a need for coordination/decision taking at a higher level (=province) of testing priorities.
- Children in kindergarten are currently not tested as high-risk contact in the context of a cluster (unless they fulfil the conditions for testing in Children <6 years old). This creates anxiety in parents who want to know if their child might be infected. Also, this means that parents of an asymptomatic child HRC that is infected are not identified as being HRC and are not staying in quarantine. Ag RDTs are not recommended in this age group.
- Procedures for outbreak investigation and management do exist at regional level, but it is sometimes difficult to follow them because of external pressure.
- Testing the whole school is only meaningful if there are infections in more than one class, that do not have a link outside the school (for example children from the same household). Testing all children does not necessarily imply that all tested have to go in quarantine. This should be based on the risk analysis (HRC stay in quarantine but not the LRC).
- The protocol for testing LRCs with rapid Ag tests in the event of a school cluster, could serve as an example for a testing approach. Rapid Ag tests have the advantage of immediate results. However, sensibility in asymptomatic people is low and therefore, the test should be repeated after 2-4 days, or a negative test-result should be confirmed by a RT-PCR test. In addition, the pilot project using Ag tests in HRC in Flanders is facing many challenges. Testing can only be done after school hours (by the red Cross volunteers), and the number of tests to perform in the event of a cluster is too many for one evening. The use of Ag RDT seems only feasible for testing one or two classes, not an entire school.
- More use should be made of the existing testing capacity (in particular at testing centers) that is currently underutilized. There is no reason why testing in the context of a school cluster should use a different approach than testing for other indications.

- As for all test indications, the testing approach should be customer-friendly: easily accessible and fast.
- Clear criteria to decide if only the class, part of the school or the whole school should be closed are needed. There should be a minimal threshold below which a school should never be entirely closed, and a percentage of classes with cases in larger schools. Of note is that sections of a school should be considered as separate "schools"' if there is no contact between students/staff of the sections.
- A pilot study among high-risk contacts of high-risk contacts is ongoing in Limburg. Preliminary results show that the positivity rate in HRCs of HRCs is low.

The following experts contributed to this advice:

Steven Callens (UZ Gent), Laura Cornelissen (Sciensano), Laetitia De Crombrugghe (ONE), Bénédicte Delaere ((CHU-UCL Namur), Olivier Denis (CHU-UCL Namur), Frédéric Frippiat (AViQ), Alexandra Gillissen (ONE), Herman Goossens (UAntwerpen), Marie Hallin (ULB), Naima Hammami (Zorg en Gezondheid), Marie Pierre Hayette (CHU-Liège), Niel Hens (UAntwerpen en UHasselt), Te-Din Daniel Huang (CHU-UCL Namur), Vicky Jespers (KCE), Yves Lafort (Sciensano), Barbara Legiest (Zorg en Gezondheid), Tinne Lernout (Sciensano), Pieter Libin (UHasselt), Romain Mahieu (COCOM), Pierrette Melin (CHU de Liège), Muriel Mendez (Kaleido), Christelle Meuris (CHU de Liège), Thomas Orban (SSMG), Elizaveta Padalko (UZGent), Paul Pardon (FOD Volksgezondheid), Michele Pommé (Deutschsprachige Gemeinschaft), Nathalie Ribessse (ONE), Petra Schelstraete (UZGent), Stefan Teughels (Wachtposten Vlaanderen), Olivier Vandenberg (LHUB-ULB), Koen Vandendriessche (UZA), Dimitri Van der Linden (UCL), Roel Van Giel (Domus Medica), Anouk Vanlander (VWVJ), Inge Van Trimpont (CLB), Pieter Vermeersch (UZ-Leuven).

BACKGROUND

SARS-CoV-2 transmission among children and in schools

An extended literature review on SARS-CoV-2 transmission among children and in schools is available in the RAG 'SARS-CoV-2 transmission in primary school children' of 10/11/2020, and an update is provided in the RAG update of 12/01/2021.

An ECDC Technical Report of 23 December 2020 summarized that children of all ages are susceptible to and can transmit SARS-CoV-2, but that **younger children appear to be less susceptible to infection, and when infected, less often lead to onward transmission** than older children and adults (1). Transmission of SARS-CoV-2 can occur within school settings and clusters have been reported in preschools, primary and secondary schools across Europe. **Incidence of COVID-19 in school settings appear to be impacted by levels of community transmission**. Where epidemiological investigation has occurred, **transmission in schools has accounted for a minority of all COVID-19 cases** in each (EU) country. A recent prospective study testing contacts of positive cases in primary schools in Norway, confirmed that transmission in primary schools is minimal (2). A study in Switzerland tested children serologically in June-July and October-November 2020, and investigated clustering of seropositive cases within classes and schools. The conclusion was that clustering of seropositive cases occurred in very few classes and not across entire schools despite a clear increase in seropositive children during a period of high transmission of SARS-CoV-2.

However, the above summary **does not consider the possible higher infectivity** of new variants, such as the variant 501Y.V1 Initial concerns of a possible higher infectivity in children of this variant (more than in adults) were contradicted by the latest technical brief of Public Health England. Utilizing data up to January 4, 2021, no significant differences were found in age distribution by S-gene detection (see RAG update measures primary schools 12/01/21).

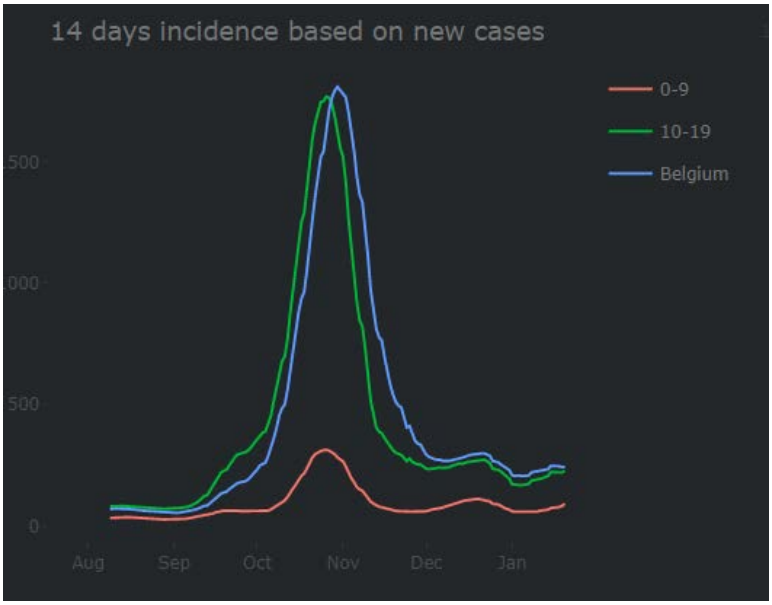
SARS-CoV-2 infections in schools in Belgium

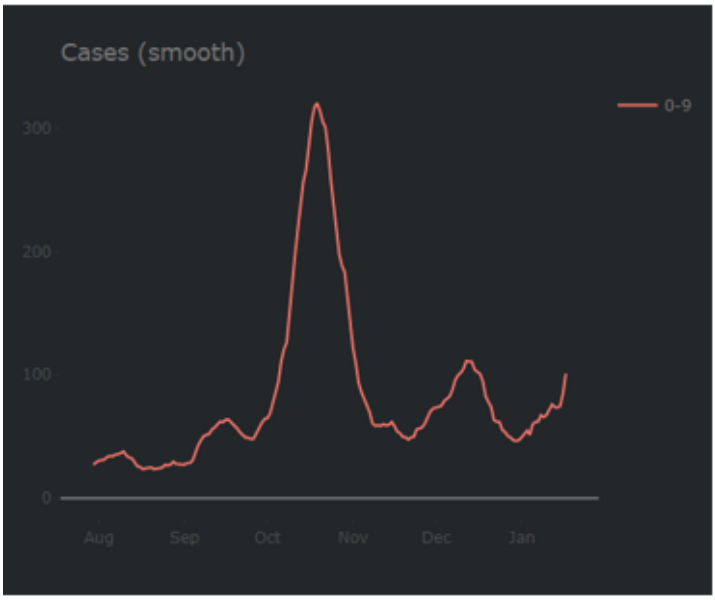
A description of the current extent of SARS-CoV-2 infections in schools in Belgium is available in the RAG update of the guidance on prevention of SARS-CoV-2 in children in primary school age of 12 January. Key points were:

- The epidemic curve in schools greatly **follows the same evolution as in the general public**, but with a delay.
- **Less than one fifth of the cases** reported by the school health services were considered as probably having been **infected within the school**.
- Teachers and other **school staff** appear to be **mostly infected by colleagues** and less by pupils.

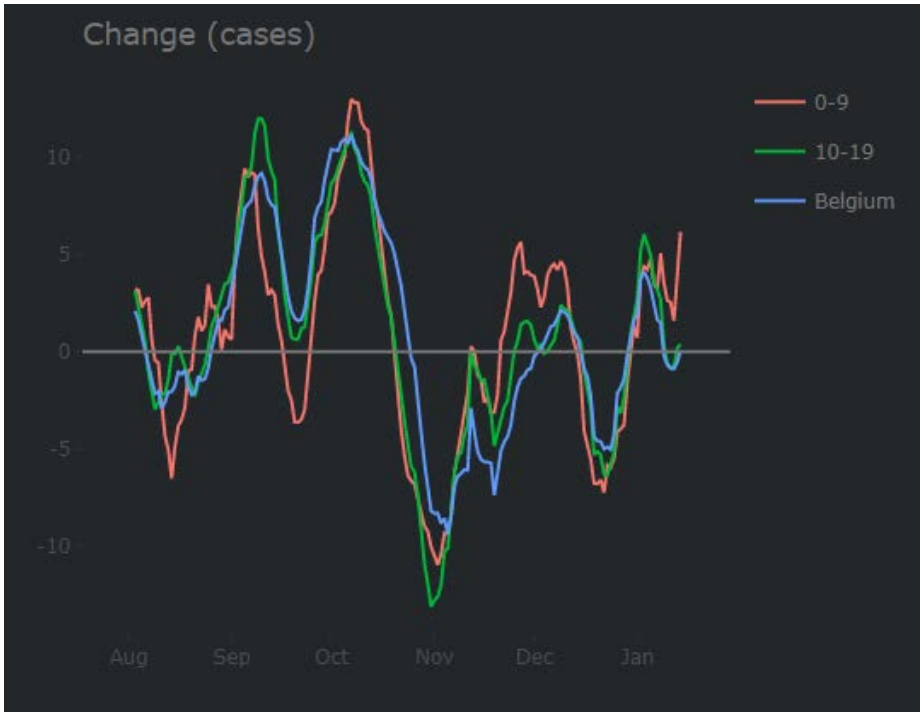
- Infections among younger children (<12 years) are much less common than among older children, but do occur.

The figures below focus on data for the 0-9 aged and 10-19-years old. In both age groups, a similar small increasing trend is observed for the 14d-cumulative incidence compared to the whole population. The incidence in 0-9 years old remains much lower than in the other age-groups. Looking at the trend in absolute numbers of cases in the 0-9 years old, we see a first small flare-up in December, stopped by the Christmas holidays, and a second ongoing flare-up, at an equal level for now as before the holiday period.

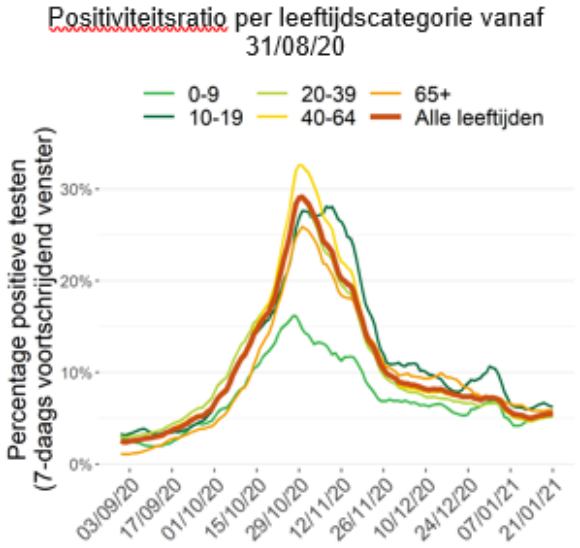


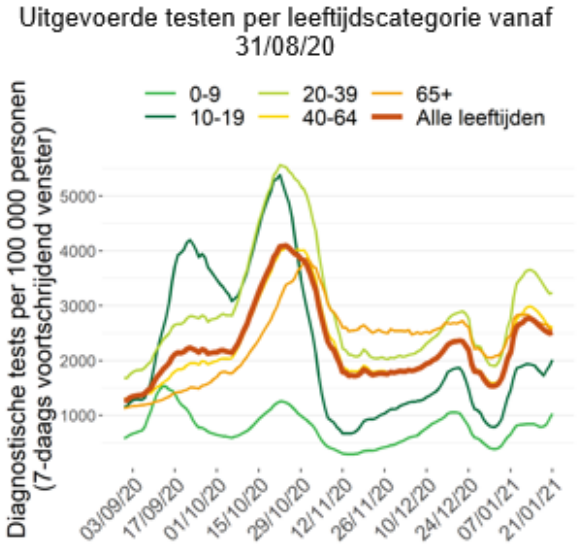


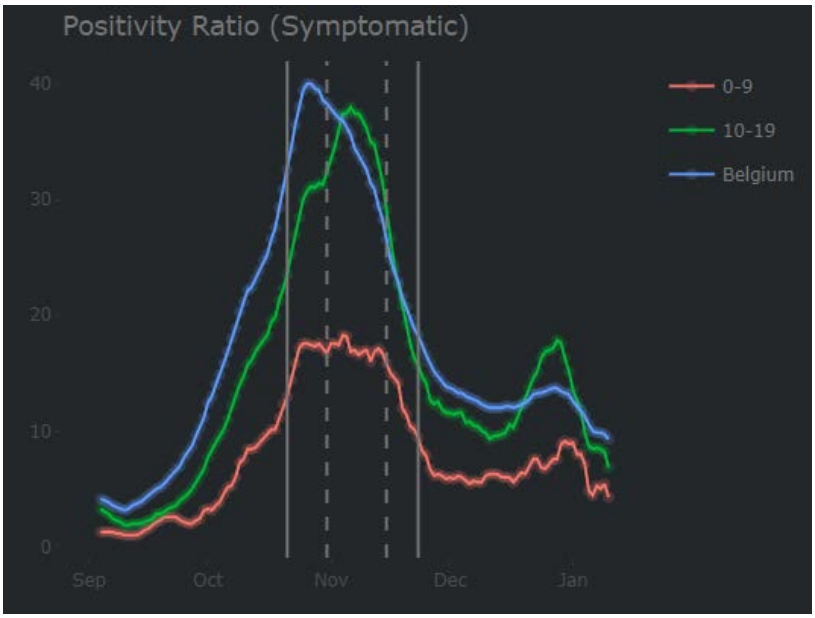
However, when we look at change (expressed in % compared to the previous 7 days), we see that the change (increase) is more important in the 0-9 years old, compared to the other age groups.

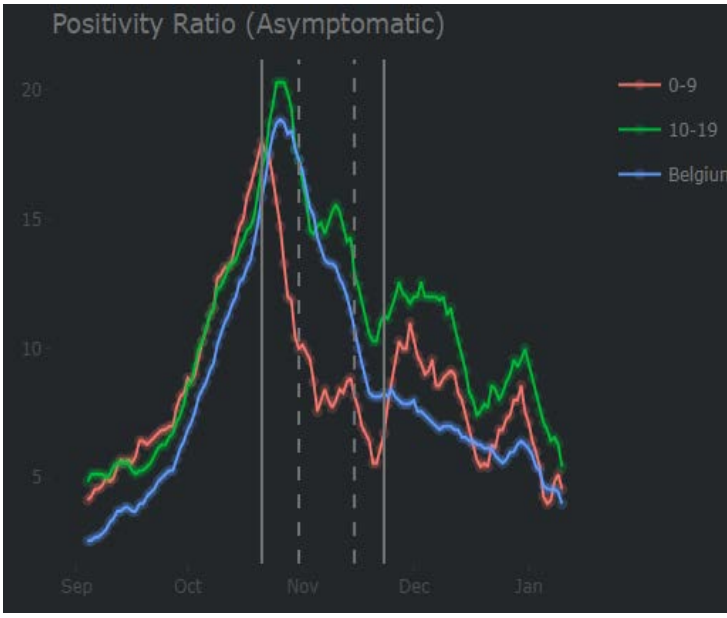


Part of the observed increase in < 20 years old could be explained by increased testing/screening in these age group. Unlike the older age groups, the number of tests performed is increasing in the 0-9 and 10-19 years old, whereas the overall PR is stabilizing. In symptomatic persons, the PR is stable in 0-9 and decreasing in 10-19 years old (based on tests with e-form available). In asymptomatic persons, the trend is decreasing for all age groups.



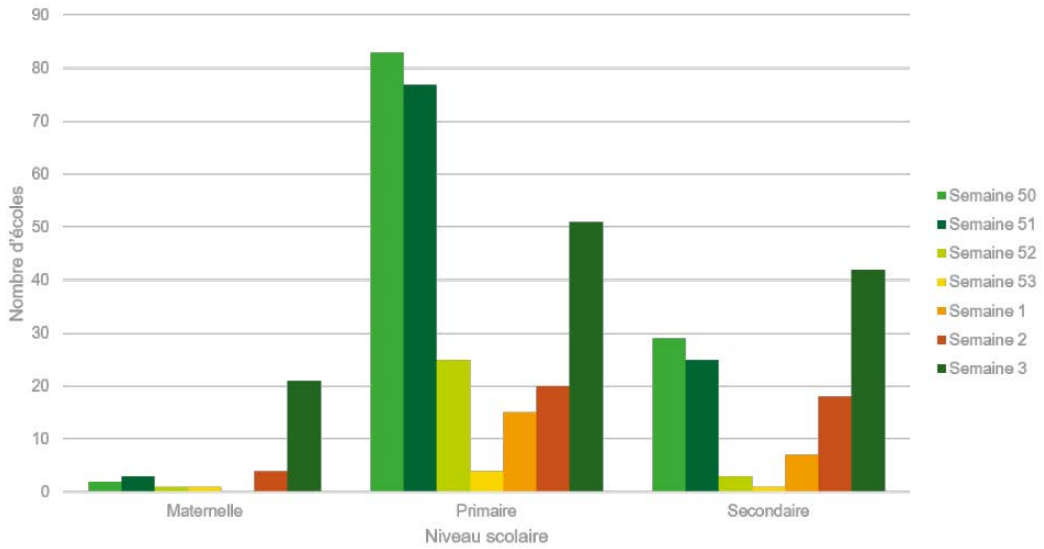






Recent clusters in schools can be analysed based on the school-surveillance. The regions are reporting data to Sciensano on cases occurring in the school population. The school services (PSE/CLB) report on number of infections in schools (pupils and staff), including reason of testing. The Figure below shows the evolution of the number of clusters, derived from the number of index cases (pupils) reported as giving rise to secondary cases among pupils. There is a clear increase in the number of clusters, in all age groups in week 3, compared to the previous weeks. Similar numbers of clusters or even higher numbers were, however, also observed before the Christmas holidays. It should be noted that these numbers are a significant underestimate of the real number, as they are derived from data on secondary infections. However, since the method is the same, the data do allow for a trend to be followed.

Number of clusters by education level and by week, week 50 à 3 (Source LARS et PSE/PMS)



Test strategies in schools

ECDC

In their latest update (23 December), ECDC continues to recommend testing at schools and other educational settings in the following hierarchy: (1) symptomatic cases; (2) asymptomatic high-risk exposure (close) contacts of cases; and (3) **possibly school-wide testing when clusters of confirmed cases**.

When there are clusters, a school-wide testing approach may be considered, **on the condition that clear objectives for the testing activity are determined and there is an agreed plan of action, following the test results.**

The choice of the best testing method will depend on the surveillance objectives and the epidemiological situation. **RT-PCR remains the gold standard for SARS-CoV-2 testing, although that rapid Ag tests, can be applied in the following ways**:

- In the context of *contact tracing*, rapid Ag tests can allow for a more rapid identification of infectious contacts, under the condition that they are performed within the window of a high viral load (up to five days after the onset of symptoms or less than seven days after the last exposure). In other cases, the test should be repeated by RT-PCR as quickly as possible.
- For ***screening staff or students in a large outbreak*** as part of a school-wide testing approach.

In its Technical Report on the use of rapid Ag tests (19 November 2020), ECDC recommends in high-prevalence populations to confirm negative rapid Ag test results with an RT-PCR or a second rapid Ag test a few days later, and in populations with a low prevalence **to confirm positive results with an RT-PCR** (3).

In a situation where a nasopharyngeal or other upper respiratory specimen is not acceptable and/or to increase the acceptance of children being tested, **saliva could be considered as an alternative specimen for RT-PCR testing**, but not for rapid antigen detection test.

CDC

The latest recommendation from CDC with regard to testing in K-12 schools (elementary, middle and high-schools) dates from December 4 (4). The first priorities are (1) persons with symptoms of COVID-19; (2) persons who have had contact with someone with COVID-19; and (3) **all students, faculty, and staff with possible exposure in the context of outbreak settings**.

If the school is experiencing an outbreak, the school should immediately notify public health officials and collaborate to facilitate increased testing and contact tracing, as necessary. School administrators working in close collaboration with public health officials might choose to test students, teachers, or staff for purposes of surveillance, diagnosis, screening, or in the context of an outbreak and public health consultation.

Health departments can use a **tiered approach** to determine which close contacts and other potentially exposed persons could be tested and either isolated or quarantined. *Tier 1* are the *close contacts*, *tier 2* the *potential contacts* (students, teachers, and staff in the same classroom/cohort/pod as the person with COVID-19 who always kept 6 feet distance between persons), and *tier 3 potentially exposed individuals* (Students, teachers, and staff who shared a common space (e.g., teacher's lounge, library) and were not using the space at the same time as the index case, but where short duration exposure to an index case cannot be definitively ruled out.

CDC further states that classrooms or schools experiencing an active outbreak may **temporarily close** for in-person learning.

The Netherlands

RIVM has updated its test strategy in schools on January 22 (5).

If there are 3 or more cases within the same school, that are epidemiologically linked, an outbreak investigation is initiated. All close contacts are requested to go in quarantine and be tested with an RT-PCR after 5 days. In some circumstances, it can be useful to test more children and/or staff (with or without complaints) to get a better view of the outbreak. For example, all groups/classes with one or more indexes, or **the entire school in case of a large and rapid spread throughout the school**'. It also recommends now testing in school children younger than 12 years.

RIVM plans a study testing all pupils of a class with a confirmed case (pupil or teacher) on day 0, and conducting a follow-up investigation among household members of positive cases. Negative cases are retested after 5-7 days and serologically tested after 28 days. The purpose is to clarify the role of children in within-school transmission.

In addition, pilot studies are underway for an **alternative testing policy with rapid tests** in which the entire class/group is tested, resulting in positive tested persons going into isolation, negative tested persons being allowed to continue school (category 3 or other contact), and all identified close contacts (category 2) going into quarantine (regardless of the test result).

France

The Government of France has announced plans to **expand screening of SARS-CoV-2 in schools**, including in children 6-12 years old, and to test up to one million pupils and teachers each month, but no details are yet available (6).

United Kingdom

From January 2021 onwards, all staff and students of all schools and colleges with secondary-age students were to be **repeatedly tested** in England (7). Students would be offered two rapid Ag tests a week, spaced three to five days apart and staff once weekly. Anyone with a positive result would need to leave school/college, and take a confirmatory RT-PCR. In a later phase, the strategy was to be expanded to primary schools. The test would be done on a swab, possibly self-administered by the student/staff.

On 4 January 2021, a national lockdown was announced and schools and colleges could only allow vulnerable children and young people and the children of critical workers to attend (8). All other school and college children and young people will learn remotely until at least the February

half term. The repeat test strategy will continue to be used for the support staff and children that still attend secondary schools.

Other countries

In several countries, such as Germany or Denmark, schools are currently **closed** and no testing is therefore performed.

REFERENCES

1. ECDC. COVID-19 in children and the role of school settings in transmission - first update [Internet]. Stockholm: ECDC; 2020 Dec [cited 2020 Dec 30]. Available from: https://www.ecdc.europa.eu/en/publications-data/children-and-school-settings-covid-19-transmission

2. Brandal LT, Ofitserova TS, Meijerink H, Rykkvin R, Lund HM, Hungnes O, et al. Minimal transmission of SARS-CoV-2 from paediatric COVID-19 cases in primary schools, Norway, August to November 2020. Eurosurveillance. 2021 Jan 7;26(1):2002011.

3. Options for the use of rapid antigen tests for COVID-19 in the EU/EEA and the UK [Internet]. European Centre for Disease Prevention and Control. 2020 [cited 2021 Jan 25]. Available from: https://www.ecdc.europa.eu/en/publications-data/options-use-rapid-antigen-tests-covid-19-eueea-and-uk

4. CDC. Communities, Schools, Workplaces, & Events [Internet]. Centers for Disease Control and Prevention. 2020 [cited 2021 Jan 8]. Available from: https://www.cdc.gov/coronavirus/2019-ncov/community/schools-childcare/k-12-testing.html

5. Handreiking contact- en uitbraakonderzoek COVID-19 bij kinderen (0 t/m 12 jaar) | LCI richtlijnen [Internet]. [cited 2021 Jan 23]. Available from: https://lci.rivm.nl/Handreiking-contact-en-uitbraakonderzoek-kinderen

6. Covid-19 : la France veut tester jusqu'à un million d'enfants et d'enseignants chaque mois [Internet]. France 24. 2021 [cited 2021 Jan 24]. Available from: https://www.france24.com/fr/france/20210114-covid-19-la-france-veut-tester-jusqu-à-un-million-d-enfants-et-d-enseignants-chaque-mois

7. COVID-19 National Testing Programme: Schools & Colleges Handbook. NHS - Test and Trace; 2020.

8. What parents and carers need to know about early years providers, schools and colleges [Internet]. GOV.UK. [cited 2021 Jan 12]. Available from: https://www.gov.uk/government/publications/what-parents-and-carers-need-to-know-about-early-years-providers-schools-and-colleges-during-the-coronavirus-covid-19-outbreak