# “Scuola Sicura”: a school screening program to prevent the spread of COVID-19 among students in Piedmont, Italy

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**“Scuola Sicura”: a school screening program to prevent the spread of COVID-19 among students in Piedmont, Italy**

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**Abstract**

**Objectives**
The regional government of Piedmont approved an experimental screening testing program entitled "Scuola Sicura" with the aim to: rapidly contain thes spread of COVID-19 in the school population together with general mitigation strategies such as contact tracing, and case isolation, and to monitor the transmission rate in this population. In this paper we report the initial process and outcome evaluation results and the criticalities encountered during program rollout.
**Design**
Descriptive study of the trend in the period Janaury-March 2021.The evaluation of the preventive capacity of the program is limited to the period of in-class learning. The data sources used are the COVID-19 platform Piedmont, the archives of the local health Departments and the CedAP-SDO archive.
**Setting and participants**
The screening program targeted second and third grade students in first level secondary schools throughout Piedmont. Each class was subdivided into four groups; one group each week underwent screening, yielding one test per student per month.
**Main outcome measures**
The following indices were calculated with a 95% confidence interval:
1. number of positive cases detected vs. total number of students tested in the "Scuola Sicura" program;
2. number of positive cases detected outside the "Scuola Sicura" program vs total number of students enrolled in the 2nd and 3rd grades of first-level secondary schools in Piedmont.
To evaluate the preventive capacity, quarantines were detected. In order to investigate the spread of COVID-19 in households, the mother-child pair was tracked and cases of positivity among mothers were identified.
**Results**
69% of schools in Piedmont participated in the program; the actual participation was 19.5% of the total number of students enrolled in second and third grades of first-level secondary schools. SS detected 114 positives cases for SARS-CoV-2, yielding a prevalence of 0.52% (95%CI 0.42-0.61) when calculated for the total number of students tested by the program. Starting from 08.03.2021, the target classes have started distance learning: 69 of the 114 positive students were identified before that date, leading to the activation of 67 quarantine measures. For 61 of the 69 cases (88%) identified by SS before 8 March, the mother-child couple was reconstruncted through record linkage between the CedAP and SDO archives. Forty-six mothers perfomed a swab test after that of the child with a positive result in 24% of cases (n=11). Asymptomatic cases identified at screening accounted for 26.5% of the total number of cases occurred in the participating classes.
**Conclusions**
This is one of the few studies (and the first in Italy) to describe the functioning and predictive capacity of school screening testing for COVID-19 in a real-world situation. Our findings provide data-driven suggestions for government agencies when planning large-scale school screening testing programs. When well organized and implemented jointly with other transmission prevention measures and contact tracing, school screening may be a viable strategy to keep schools open when high levels of the virus are circulating in the community.

**Keywords:** COVID-19, Screening, School

**What is already known**

- Children and young people are less susceptible to contracting COVID-19 than are other age segments of the population; often asymptomatic or mildly, they can still carry and spread the virus.
- Though not demonstrated effective, one of the measures many countries adopted to contain the pandemic was repeated complete or partial school closure, with consequent negative effects on psychophysical health and learning.
- There are experiences in many countries and in some Italian regions of applying screening tests for COVID-19 in schools, but the preventive value of these experiences has yet to be clarified.

**What this study adds**

- The practical application of a structured school screening program for COVID-19 requires coordinated school-health work and careful communication to families.
- In a period of high spread of the virus in the community, the screening identified a quarter of the cases that occurred in the participating classes.
- Structured school screening, in association with other mitigation measures, can help keep in-class learning.

## Introduction

Children and young people are less susceptible to contracting COVID-19 than are other age segments of the population. Often asymptomatic or mildly symptomatic[1, 2], they can still carry and spread the virus. Though effectiveness was not quantified,[3] one of the measures many countries adopted to contain the pandemic was repeated complete or partial school closure. Keeping schools open, however, isneeded to mitigate the effect of prolonged closure on children's psychophysical health, continuity of learning, and on the gap in education inequalities. [4, 5]

The basic way to contain the spread of SARS-CoV-2 in schools is by nonpharmacological measures: creation of small groups, masking, ventilation of indoor environments, frequent handwashing, disinfection of hard surfaces.[6, 7] Screening, diagnostic testing of children with symptoms, and contract tracing can all help keep schools open.[8, 9] Many countries have conducted screening in compulsory schools[10, 9, 11] and universities.[12]

Regional governments in Italy have implemented similar actions and the Ministry of health has financed a project in which school screening testing is employed as an early warning strategy to identify COVID-19 outbreaks in schools in five regions in the country. The project, start now in experimental phase, involved serial COVID-19 antigenic rapid testing and pooled testing in a sample of middle school and high school students). Students were encouraged to take part in screening testing at their school when it reopened after breaks. Testing was variously organized, carried out using different types of tests, in different period of the pandemic. The preventive value of the initiatives has not yet been determined.[13]

In December 2020, the regional government of Piedmont approved an experimental screening testing program entitled "Scuola Sicura" with the aim of rapidly containing the spread of COVID-19 in the school population, together with general mitigation strategies such as contact tracing and case isolation, and monitoring the transmission rate in the target population. The first phase lasted from January to March 2021.

Here we report the initial process and outcome evaluation results and the criticalities encountered during program rollout. We analyzed program adherence, estimated the number of new asymptomatic cases compared to the epidemiological trend outside the program, and evaluated the preventive capacity of school screening testing as a measure to inform planning for the next school year.

*The program*

The screening program targeted second and third grade students in first level secondary schools throughout Piedmont. Participation was voluntary and could be withdrawn at any time. Written, informed consent was obtained from parents. Each class was subdivided into four groups on the basis of participant students; one group each week underwent screening, yielding one test per student per month.[14] The minimum proportion of students per class required for the class to be enrolled was 25%. Missed screening appointments were not rescheduled.

Screening was managed independently by the twelve local health Departments in Piedmont in collaboration with the comprehensive schools. The school principal's offices handled communication with the students' families, collected informed consent, and provided the school class list of students participating in the program. Each local health Department was responsible for test scheduling, dealing with positive test results, and designating testing centers within its jurisdiction where students could go for the swab test: molecular or antigen or both. Positive cases were defined as a positive molecular swab test result or a positive antigen swab test confirmed by molecular testing. In certain rare cases, particularly during the worst phase of the pandemic, some local health units defined cases as positive for SARS-COV-2 if the antigen test was positive without confirmation by molecular testing.

When a student tested positive, the local health departments evaluated the potential risk of transmission according to Ministry of Health criteria. If contact occurred between the student testing positive and his/her class in 48 hours previous the result of the test, then the entire class was quarantined for 14 days and all further screening tests for the class were discontinued. If the antigen swab test resulted a false negative by the molecular swab test, the quarantine was discontinued and the students returned to school.
The data presented here were generated between January and March when the infection rate in Piedmont was particularly high. Screening was performed for 2 months; some health Department began screening before others, so that the entire study period is about 3 months.

## Material and methods

### *Data Sources*

*Data from the COVID-19 platform*

The data for the present study came chiefly from the COVID-19 Platform Piedmont, created by the Consortium for the Piedmont IT system (*Consorzio per il sistema informativo del Piemonte*); the management software traces and monitors the data of patients with COVID-19. Integrated with regional healthcare databases, the platform allows for following the care pathway of patients accessing health services. For the "Scuola Sicura" program, an application was designed specifically for transmitting the data to the regional database so they could be linked with the main tables. Through this application, the health Departments entered students' names and appointments at the testing centers. The swab test results were entered by the laboratories that performed the analysis, specifying the swab test type and the reason why it was performed.
The COVID-19 platform data were pseudoanonymized and made available to the Epidemiology Service in a "Clone data warehouse" environment, where health data archives of the Piedmont IT System are stored. The platform contains the data on all molecular and rapid antigen swab test results, including those from private laboratories, pharmacies, doctors' offices, nursing homes, health Departments, and hospitals (preadmission screening, primary care providers, etc.).
The main variables in the tables consulted for the purposes of the present study are: type of swab test, result (positive, negative, to take charge, unconfirmed), date of test result, and reason for performing the test (e.g., symptomatic, asymptomatic but close contact, confirmed negativity after positive test result, "Scuola Sicura" screening, etc.).

*Local health Department data*

The local health Department data were used to describe participation in the program and to compare it with the surveillance data (symptoms and contact tracing). Each health Department produced a summary file containing the following information for each school class: total number of students, number of students participating in the screening program, and number of students who had undergone a swab test. Data on swab test type (rapid antigenic or molecular), date test resulted positive, reason why swab test was performed (screening or other), date quarantine started and ended (if imposed) were collected for all COVID-19 positive cases. The health Departments provided the same kind of data for their jurisdiction if positive cases were found also among students in classes not participating in the program, except that school screening could not be given as a reason for swab testing and quarantine.

*Data on hospital discharge and birth assistance*

In order to investigate the spread of COVID-19 in households, the mother-child pair was tracked based on data from birth assistance certificates. We extracted data on births in Piedmont between 2006 and 2009 (birth cohorts of the "Scuola Sicura" program) from the birth assistance archives,

including out-of-region births of resident women. The birth assistance certificates contain anonymized data on the child, the code number of the hospital where born, and the medical chart number of the mother. We then linked these data with those of hospital discharges to establish the anonymous identity of the newborn and reconstruct the mother-child pair. We then linked these paired data with those of the COVID-19 platform to determine whether a swab test resulted positive. Information on the mother's level of education was also retrieved from the birth assistance archives (low=none, primary/middle school; medium=high school, high=college and over) in order to investigate a possible difference in the distribution of this variable between mothers of students who had at least one screening test and the others.

***Statistical analysis***

The data collected by the local health Departments were aggregated for the entire region; the total values and percentage distribution of initial adherence to the program, actual participation, positive swab test results, and quarantine were calculated. Within each school class, positive cases found by screening ("Scuola Sicura" cases) and positive cases detected by other means (non "Scuola Sicura" cases) were identified as such.

The results from the rapid antigen and the molecular swab tests dated between 04 January 2021 and 28 March 2021 of the 2006 to 2009 birth cohorts were selected from the COVID-19 platform. Only swab tests that resulted positive or negative and that belonged to students residing in Piedmont were included analysis. A case was defined positive if:

1. the molecular swab test was positive;
2. the antigen swab test was positive and confirmed by molecular testing within 7 days;
3. the antigen swab test was positive and a control swab test was also positive.

On confirmation from the local health Departments, residual cases were defined positive if the antigen swab test resulted positive without molecular confirmation.

The index date was the day the molecular test results were returned in the first instance and the date of the antigen swab test in the other three instances. For positive cases all swab tests performed for whatever reason within 21 days of the index data (maximum duration of quarantine) were eliminated as were control swab tests after 21 days. For antigen swab tests that resulted positive but then negative by subsequent molecular testing were eliminated other swab tests if performed during the following 7 days.

The swab test results were then divided into two groups according to whether from the "Scuola Sicura" program or not and stratified by week. For each week, each student was counted only once even if more than one swab test had been performed. The weekly number of persons tested refers to the students who underwent at least one swab test for that week. The following indices were calculated with a 95% confidence interval:

1. number of positive cases detected vs. total number of students tested in the "Scuola Sicura" program;
2. number of positive cases detected outside the "Scuola Sicura" program vs total number of students enrolled in the 2nd and 3rd grades of first-level secondary schools in Piedmont;

Time trends were calculated based on these two indices. To detect turning points in the trends we used the joint point regression model (National Cancer Institute ver. 4.9.0.0) (https://surveillance.cancer.gov/jointpoint).

To investigate the spread of COVID-19 infection by mother-child pair, we looked at the test results of students found positive at screening; we then searched the COVID-19 platform for data on the swab test results of mothers who underwent a swab test within 21 days after their son/daughter was found positive. Positive cases among the mothers was defined like that for the students.

The Ministry of health issued the decision to start remote learning nationally for first-level secondary school grades 2 and 3 as of 8 March 2021. Quarantine counts and analysis of mother-child pairs were done for the period from 4 January 2021 to 7 March 2021. Time trend analysis was performed for the data collected up to 28 March 2021.
The use of personal data was performed in compliance with data privacy regulations. All information collected and recorded on electronic devices has been pseudoanonymized.

**Results**
A total of 428 schools (69% of schools in Piedmont) participated in the program. Just over half (50.4%) of the total number of school classes took part in the program (Table 1), involving a total of 41,501 students (52.7% of the student population) who potentially benefitted from screening. At the beginning of the program 19,413 students participated (24.7% of total school enrolment); however, not all who initially agreed to participate ultimately did: some withdrew consent, others did not keep their test appointment. A total of 15,318 underwent at least one swab test: 19.5% of the total student population of second and third graders in first-level secondary schools in Piedmont; 51.6% were male and 96% were in the 2007 and 2008 birth cohorts.

**Table 1** - Schools, classes and students participating in the "Scuola Sicura" program- January-March 2021.

| | N | Total in Piedmont | % |
|---|---|---|---|
| Participating schools | 428 | 622 | 69.7 |
| Participating classes | 1,942 | 3,856 | 50.4 |
| Participating students | 19,413 | 78,689 | 24.7 |
| Students who have undergone at least one test | 15,318 | 78,689 | 19.5 |
| - males | 7,891 | 40,910 | 19.3 |
| - females | 7,427 | 37,779 | 19.7 |
| - born in 2007 | 7,250 | 39,069 | 18.6 |
| - born in 2008 | 7,451 | 39,620 | 18.8 |

There was wide variability in program adherence across the region (Table 2): over 40% of students received at least one swab test in only two local health Departments jurisdictions, while adherence was under 10% in three jurisdictions.

**Table 2** – Percentage of students who have undergone at least one test, stratified for local health Department (ASL).

| | **Students who have undergone at least one test** | **Total students** | **%** |
|---|---|---|---|
| ASL 1 | 1,645 | 7,196 | 22.9 |
| ASL 2 | 183 | 3,469 | 5.3 |
| ASL 3 | 1,109 | 2,726 | 40.7 |
| ASL 4 | 1,095 | 7,972 | 13.7 |
| ASL 5 | 317 | 3,431 | 9.2 |
| ASL 6 | 3,196 | 6,791 | 47.1 |
| ASL 7 | 2,627 | 15,390 | 17.1 |
| ASL 8 | 1,034 | 10,860 | 9.5 |
| ASL 9 | 1,867 | 9,548 | 19.6 |
| ASL 10 | 822 | 5,955 | 13.8 |
| ASL 11 | 535 | 2,696 | 19.8 |
| ASL 12 | 868 | 2,655 | 32.7 |
| Missing | 20 | | |
| Total | 15,318 | 78,689 | 19.5 |

The mother-child pair was reconstructed for 12,330 of the 15,318 students who underwent at least one screening swab test. The level of education of these mothers was compared with that of the other mothers who have a child in 2007-2008. The analysis highlights an unbalanced distribution towards the high level of education of participants' mothers (20.7% for "Scuola Sicura" mothers vs 14.9% for the rest of the mothers); the p-value of the chi-square test is much lower than the 0.05 threshold.

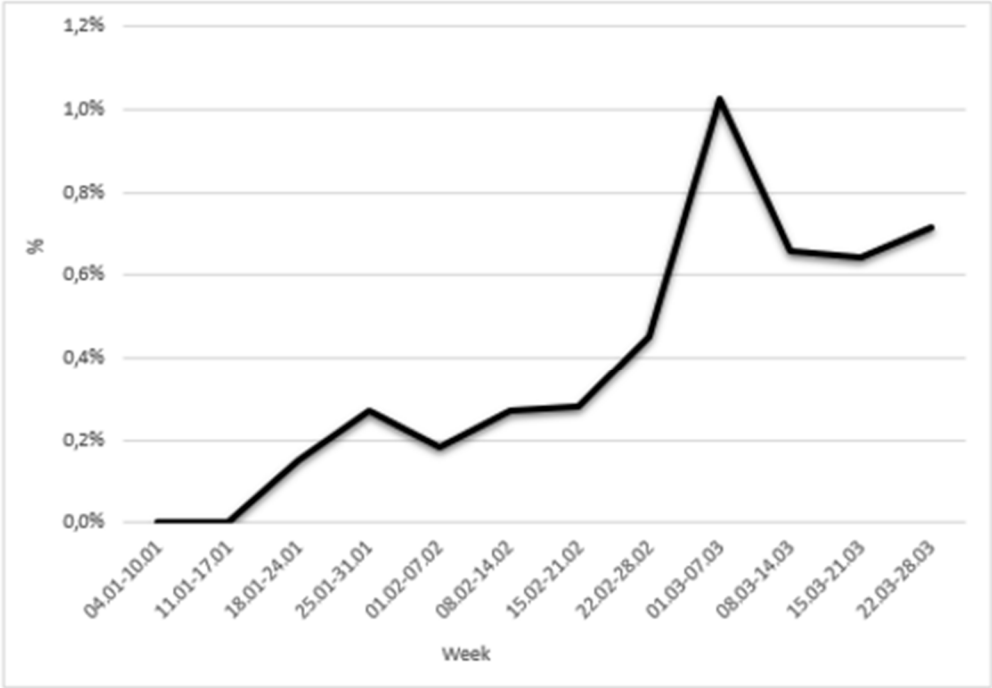
The program did not start at the same time in all jurisdictions: testing began the week of 11 to 17 January 2021; by the week of 8 to 14 February 2021 it had been rolled out in all local health Departments of the region. One thousand swab tests were performed the week of 25 January 2021 and 3500 tests the week of 22 February 2021. A total of 22,128 tests were performed during the study period, 114 of which resulted positive for SARS-CoV-2 in asymptomatic students, yielding a prevalence of 0.52% (95% confidence interval (CI) 0.42-0.61). Figure 1a presents the weekly trend for positive cases among the total number of tested students within the program. The joint point model showed a significant reversal from a rising to a falling curve at week 9.

The health Departments could choose which type of swab test to administer: seven administered only antigen swab tests, three only molecular swab tests, and two administered both types. In all, 79% were antigen swab tests; in 67 cases the positive antigen swab tests were retested by confirmatory molecular testing (38 of which were confirmed positive and 29 negative). The positive predictive value of the antigen swab tests was 56.7%, which means a 43.3% probability of obtaining a false positive antigen test. The overall frequencies of positive cases detected among the tested

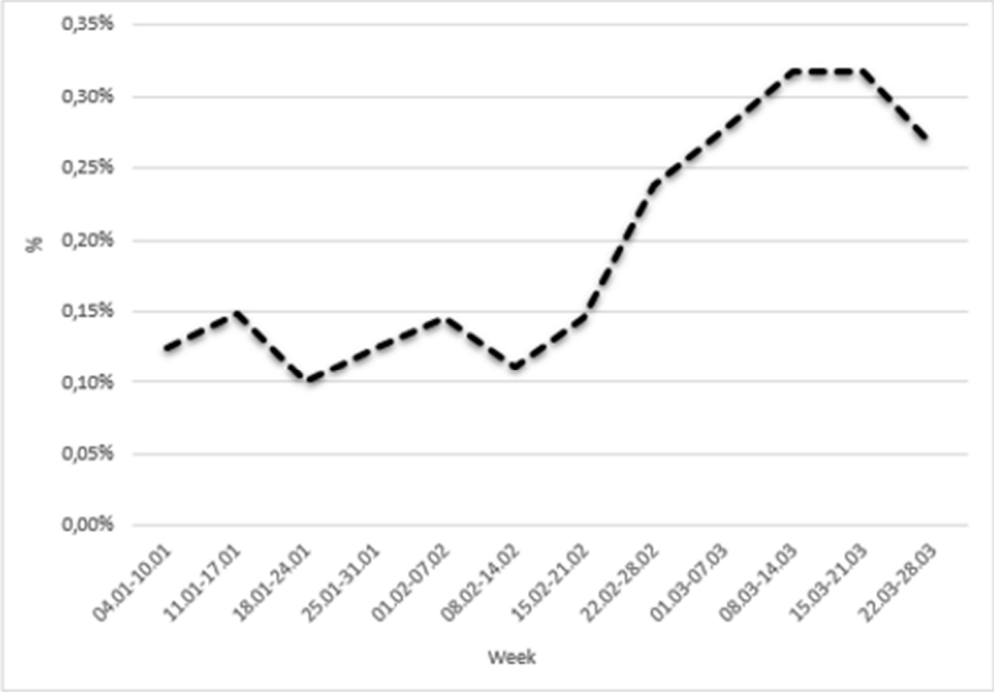
were 1.31% when the molecular swab test was used in the first instance and 0.28% when the antigen swab test was used in the first instance.

During the study period, the number of positive cases in the 2007 and 2008 birth cohorts outside the “Scuola Sicura” program was 1,823 which leads a prevalence of 2.32% (95%CI 2.21-2.42) when calculated for the total number of students of the 2nd and 3rd grades of first-level secondary schools in Piedmont. Figure 1b presents the weekly trend of this indicator. The joint point model showed a rise in prevalence at week 6 and a decline beginning at week 10.

**Figure 1** – Weekly trend of the prevalence of positive students within the "Scuola Sicura" project [a] and outside the project [b].




**a**




**b**

[a] The denominator is the number of students tested for screening (N total in the Region: 22,128)
[b] The denominator is the total number of students in the 2nd and 3rd grades of Lower Secondary Schools (N total in the Region: 78,689)

Before school closure and the start of remote learning (8 March 2021), 69 of the 114 asymptomatic students testing positive for the virus were detected, resulting in the activation of 67 quarantines. Within the participant classes, testing among symptomatic students and those with close contact with infected persons identified an additional 191 students before 8 March 2021, 152 of which were quarantined. Moreover, a total of 260 positive cases (0.6% of students) were identified; asymptomatic cases identified at screening accounted for 26.5% of the total number of cases (Table 3).

**Table 3** – Positive cases identified in the classes participating in the "Scuola Sicura" program.

| | Positive cases identified by the program (% of total positive cases identified) | Positive cases identified with Contact Tracing procedures | Total of positive cases |
|---|---|---|---|
| In-class learning (January 7 –March 7) | 69 (26.5) | 191 | 260 |
| Remote learning (March 8-28) | 45 (38.4) | 72 | 117 |
| Total | 114 (30.2) | 263 | 377 |

The mother-child pair was identified in 61 of the 69 cases (88%) detected positive at screening before 8 March 2021; 46 (75%) mothers had undergone antigen or molecular swab testing within 21 days of the test date of their child and 11 mothers (24%) resulted positive for the virus.

**Discussion**

During the first quarter of 2021 a region-wide screening study involved students attending second and third grades of first-level secondary schools in Piedmont. Screening was offered in addition to other mitigation strategies against the spread of SARS-CoV-2 in schools. The organization of screening was based on simulations and designed to maximize efficiency and outcome[14] and to reduce the number of rhino-pharyngeal swab tests that each child could undergo. This is in line with recommendations by the U.S. Centers for Disease Control that school screening may be useful in containing spread of the virus when community transmission is high or moderate, when offered frequently, when the test results are obtained rapidly, and measures for response to identification of positive cases are clearly defined.[15]

*Program adherence and process indicators*

Although 70% of the schools in Piedmont participated in the program, student adherence, which was on a voluntary basis, was 19.5% of the total number of those enrolled, lower than expected. While there were no differences by age and sex, adherence rates differed widely by geographical area of the region. This finding cannot be compared with previous studies in which adherence was obligatory for all students of schools participating in similar programs.[10, 9]

The high geographic variability suggests that barriers to participation may be linked to the local organizational context and the active role of schools in stimulating adherence and participation. The imbalance towards the high level of education of the mother of the students who underwent at least one test further highlights the importance of conveying correct messages during the enrollment phase.

We have analyzed these results together with the local health Departments. One possible explanation for the low adherence is a communication issue, i.e., the difficulty the school and the

health offices had in clearly informing students' families in a timely manner about the program objectives, identifying the criticalities, and devising ways to resolve them. The program began when the schools reopened after Christmas break; the second and third grade students of the first-level secondary schools returned to class after a period of remote learning that had begun in November 2020 and coincided with the second wave of the pandemic. Some families which had trouble in managing family life during the previous months of the pandemic were worried about the organizational and financial consequences of continued remote learning if their child or their classmates tested positive at screening and were quarantined. The offices of the school principals, which were responsible for liaising with the families, worked differently in their districts, reaching different levels of communicative efficacy, also based on the collaborative relationship between the offices of the school district and the health Departments. Communication with the students' families, which is a key component of voluntary screening like that envisaged by the program, needs to be revised and strengthened if the program is repeated, also to counteract the imbalance towards the high levels of education of the mothers of the participants.
Another potential reason for the low adherence was the difficulty of families to arrange for their children to come to the test centers. Testing once a month per student was insufficient to ensure greater adherence to the program. In other countries, screening was performed at the school[10, 9] or by means of at-home self-test kits.[16] Before the program can be repeated, the feasibility of such methods will need to be evaluated.

*Test accuracy*
The health Departments were free to choose the type of swab test and were responsible for ensuring test accuracy (higher for molecular tests) and obtaining prompt results (faster for antigen tests). The positive predictive value of the antigen tests (56.7%), that is quite low, may have caused inconvenience to students and their families (false positive result of the antigen test would have meant that the entire class remained at home and attended school remotely until the molecular test resulted negative for the virus). Furthermore, as supported by the results of this work, molecular swab test are able to identify a greater number of asymptomatic children with SARS-CoV-2, because they have a higher sensitivity and consequently, they reduce the impact of false negatives on the efficacy of the screening.
Our study findings indicate that the type of swab test should be the same for all schools in the region and, taking into account the community level of risk of transmission, when antigen swab tests are used, those with high sensitivity should be chosen.

*Trends in weekly prevalence*
Comparison of weekly prevalence showed that the slope of the curve began to decline one week earlier in March for the students participating in the program than for those not participating in the program; this was not observed between the groups for the rising slope of the curve. A plausible explanation for the difference is that very few cases were detected among the students participating in the program in the first weeks, resulting in very low prevalence and almost no change from week to week. More robust data might have revealed an earlier upward slop of the curve.

*Preventive capacity*
The third wave of the pandemic struck Italy during the study period. The community incidence of new cases in Piedmont was 161 per 100,000 (6989 cases, Rt. 1.09) in the week of 4 to 10 January 2021 and 344 (14,830 cases, Rt 1.16) in the week of 15 to 21 March 2021, when the wave peaked. The Minister of health issued an order for remote learning for second and third graders in first-level secondary schools starting on 8 March 2021 nationwide. Evaluation of the preventive capacity of

the program was limited to the period of in-class learning (7 January to 7 March 2021). Screening led to the detection of 26.5% of the positive cases identified in the adherent classes: contact tracing procedures have lost a substantial percentage of cases. This observation is shared by Denny and all.[12] In their study on screening at Duke University (testing at the start of the semester and then twice weekly) identified 55% of all cases reported during the study period. If all students attending second and third grade in first-level secondary schools throughout Piedmont had participated in the program and one quarter of the student population had been tested weekly for 9 weeks, then about 450 additional cases might have been detected. These results underline the importance of coupling school screening with contact tracing.
Nearly all cases detected by screening led to quarantine for the entire class (67/69). The procedures carried out following the detection of a positive case at screening seem to have been more efficient than quarantining of positive cases detected outside the program (97% vs. 79.6%). During the in-class learning period, the frequency of positive cases (total number of students adhering or not to the "Scuola Sicura" program) among those in classes took part in the program was 0.63%. During the same period, the frequency of positive cases among those in classes not adhering to the program (birth cohorts 2007 and 2008) was 2.99%. The low frequency for the students adhering to the program from one hand could be due to a higher students participation in area with low levels of virus circulation; on the other hand suggests that screening plus the other mitigation measures may have helped keep the prevalence of infection low in the classes participating in the program.

*Strengths and limitations*
This is one of the few studies (and the first in Italy) to describe the functioning and predictive capacity of school screening testing for COVID-19 in a real-world situation. Despite considerable geographic variability and the imbalance towards the high level of education of the mother of the tested students, the program involved thousands of school students throughout the region, unlike most previous studies which reported on programs conducted at single schools.
We were unable to estimate the real preventive capacity of screening in school setting because Ministry of health protocols do not include testing of the classmates of students found positive for the virus. We estimate, however, that another 50-60 asymptomatic students in the class were positive based on the mean secondary attack rate (3.8%) reported in a study conducted in Reggio Emilia during the second wave of the pandemic[17] and given the average class size of 20-23 students. Moreover, we were unable to estimate the preventive capacity for the households. Though the ministerial procedure foresees quarantining and testing of household members of students testing positive for the virus, the regional data platform does not allow for complete construction of households. Nonetheless, we know that family members of students testing positive at screening also contracted COVID-19. Although we were unable to reconstruct the exact dynamics of household transmission, 11 mothers of students who tested positive during in-class lessons tested positive within 21 days of notification of their child's test results.

**Conclusions**
Our findings provide data-driven suggestions for government agencies when planning large-scale school screening testing programs. When well organized and implemented jointly with other transmission prevention measures and contact tracing, school screening may be a viable strategy to keep schools open when high levels of the virus are circulating in the community.
The regional government has decided to continue the "Scuola Sicura" program until the end of the 2020-2021 school year. Further analysis of data is planned for a period of low prevalence of COVID-19 in the general population. The program may be repeated when schools reopen in September 2021 after the summer break, depending on the epidemiological circumstances in general and the

situation in the region's schools in particular. Though a greater number of teachers and students will probably have been vaccinated by September, some members of the school community may not. Furthermore, we know little about the risk of asymptomatic transmission among the vaccinated, particularly as a high prevalence of the delta variant is expected in the coming months and is likely to spread in school settings.[18] In this new scenario, test types and strategies different from those used in the present study will can taken into account. In fact saliva tests have been approved for use in Italy and studies on screening testing using a pooling strategy in schools are currently under way.

**Conflict of interest:** none declared.

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