

A descriptive study of COVID-19 cases in primary and secondary schools in the Maltese islands: a nationwide experience

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Background: As part of the measures to contain the initial cases of Coronavirus Disease (COVID-19) in 2020, all educational facilities were closed in March 2020 and remained so for the remainder of that scholastic year. When they reopened in October 2020, most educational facilities on the Maltese islands did so with various mitigation measures in place. **Methods:** A Schools Contact Tracing Team (SCTT) dedicated to the management of COVID-19 cases within schools was set up and networks established between the Ministries responsible for Health and Education to facilitate timely communication and, consequently, effective contact tracing. All cases pertaining to educational facilities, be they students, teaching or non-teaching staff were assessed and managed by this Team. **Results:** Between October 2020 and June 2021, the SCTT assessed 2603 COVID-19 cases within educational facilities in Malta. The highest rate of cases overall was observed in teaching staff (56.53/1000). In 72.45% of cases, no contacts were identified as high risk and thus nobody was placed in quarantine. In 3.07% of school cases >21 high-risk contacts were placed in mandatory quarantine together with their household members. Only 11% of the cases were epi-linked to another positive case within school. **Conclusions:** The strong collaboration between the health and education authorities combined with strict measures observed in schools ensured that schools remained open throughout most of this pandemic. This study describes the processes by which contact tracing for COVID-19 cases in Maltese schools was carried out and analyses the data collected throughout the scholastic year 2020–21.

Introduction

When the COVID-19 virus emerged at the end of 2019, causing a global pandemic that had not been experienced by many in their lifetime, countries world-wide acted to try to limit the spread of a new, unknown virus that was rapidly wreaking havoc among populations.¹

Countries went into lockdown, borders were closed off, travelling banned and shops, offices and streets were emptied of people. Among the numerous measures taken to limit the spread of COVID-19 was the closure of schools.² In many countries, education was transferred online, and students started facing the new reality that were online classes. Parents too had to learn to juggle teleworking, where possible, with home-schooling.³

In Malta, the first case of COVID-19 was identified on 7 March 2020, and on 13 March 2020, all educational facilities were closed.⁴ This closure was then extended further⁵ so that all schools remained closed for the 15 weeks that remained of that scholastic year (until the end of June 2020).⁶

While the measure was introduced as one of the ways to minimize the risk of transmission of the virus since children are known to be vectors for the transmission of respiratory infections, and with COVID-19 at the time being an unknown quantity,⁷ the Health and Education authorities within the country were aware of the negative consequences of keeping children away from the school benches for a prolonged period of time.^{8–10}

It was therefore decided that, upon the start of the new scholastic year in October 2020, all educational facilities were to reopen, albeit with various mitigation measures^{11,12} in place to ensure the safety of staff and students alike. These non-pharmaceutical interventions included:

- Use of mask in students—obligatory in students >5 years of age
- Physical distancing
- Alternative timetabling
- Cohorting/social bubbles
- Regular handwashing
- Promotion of respiratory etiquette
- Improved ventilation
- 'Stay-at-home when sick' policies
- Enhanced sanitizing and cleaning

This research study describes the processes by which contact tracing for COVID-19 cases in schools was carried out and analyses the data collected throughout the scholastic year 2020–21. Importantly, it looks at whether the schools were drivers of the pandemic, as feared by many, or not.

The role of the Schools Contact Tracing Team

In acknowledgement of the central role that contact tracing plays in the public health response to outbreaks of infectious diseases, one of

the initiatives introduced to address the management of positive cases for COVID-19 within schools was the setting up of a contact tracing team dedicated to the assessment and management of such cases. It was felt that having such an arrangement in place would minimize the risk of transmission occurring within schools, thus reducing the possibility of outbreaks occurring. Further still, the requirement to close schools, which was to be left as a last resort, would be avoided.

A team was therefore set up that comprised of health and educational professionals who, through the amalgamation of their areas of expertise, were best positioned to achieve the goals of this initiative.

In addition to this, all educational facilities on the islands were allocated COVID-19 liaison officers—members of staff who were given training on the basic concepts of contact tracing and the protocols that the Schools Contact Tracing Team (SCTT) would use—so that they could be the focal points for issues regarding COVID-19 within their specific school. This training and protocols were based on evidence published by the European Centre for Disease Prevention and Control¹⁰ and updated depending on the local pandemic response situation and feedback collected from other European countries.

This initiative included all educational facilities within the Maltese islands, be they government, church, or independent schools.

In order to assess cases in as timely a manner as possible a dedicated helpline and email address were set up for all the school heads and liaison officers to have direct communication between the school and the SCTT.

The contact tracing process

Once a positive school-related case was identified the contact tracers within the SCTT contacted the positive person (or parents/guardians in the case of a minor) in order to obtain a brief history with the relevant details required to assess the case.

They would then contact the concerned school's COVID-19 Liaison Officer to collect further information which would enable them to assess the case accordingly.

Based on evidence-based protocols and flowcharts that take into consideration aspects such as measures observed (e.g. mask wearing, social distancing, avoidance of direct physical contact) and cumulative time of exposure to the positive case, a risk assessment for each named contact would then be carried out.

Anybody identified as high risk would then be placed in mandatory quarantine, together with all household members, as per Maltese regulations. All high-risk contacts would be contacted individually to be informed that they had been placed in mandatory quarantine and a Notification of Mandatory Quarantine sent to these individuals and their household members. Based on ECDC (European Centre for Disease Prevention and Control) guidance and modified to local scenario a high-risk contact was taken as:

- A person having had direct physical contact with a COVID-19 case (e.g. shaking hands).
- A person having unprotected direct contact with infectious secretions of a COVID-19 case (e.g. being coughed on, touching used paper tissues with a bare hand).
- A person having had face-to-face contact with a COVID-19 case within 2 m and >15 min.
- A person who was in a closed environment (e.g. classroom, meeting room, hospital waiting room, etc.) with a COVID-19 case for 15 min or more and at a distance of <2 m.¹³

No formal testing or screening strategy was adopted. Individuals would undergo a swab test of their own accord, either because they developed symptoms, or else because they were aware that they had been in contact with someone who resulted positive for COVID-19. There were also instances where individuals were required to swab

because of specific circumstances (e.g. travel abroad, admission to hospital, prior to medical interventions). The latter reasons for swabbing explain the finding of numerous asymptomatic positive individuals.

Throughout the whole process the contact tracers would have been in constant contact with the school's COVID-19 Liaison Officer who acted as the link person between the SCTT and the school and parents and who would then be informed of the final decisions taken.

Methods

The study population

The SCTT assessed and managed positive cases that arose within staff and students attending all educational facilities within the Maltese islands. These included childcare centres (0–3 years), kindergartens (3–5 years), primary (5–11 years) and secondary schools (11–16 years), and post-secondary and tertiary educational facilities, as well as other educational facilities dedicated to specific groups of students. This study analyses the findings of the data collected with regards to cases assessed and managed within kindergarten, primary and secondary educational facilities.

Therefore, the population concerned in this study involves teaching and non-teaching staff and all students aged between 3 and 16 years of age who were physically attending school. The students were grouped into 5-year age groupings while the school grades were grouped depending on whether the child attend kindergarten, primary or secondary school.

Staff members were divided into teaching staff (kindergarten assistants, teachers and playworkers) and non-teaching staff (learning support educators, senior management team, administrative and clerical staff, maintenance and cleaning staff and transport staff).

Data collection and analysis

Case and contact data were exported from the SCTT central database and anonymized. Simple, descriptive statistics were generated using Microsoft Excel for students and school staff attending kindergarten, primary and secondary school.

Other data that were analysed included the number of people placed in quarantine per case as well as the possible source of infection. These were grouped in clusters of 5 primary contacts, increasing until 21+. Where nobody was placed in quarantine this was classified as 'none'.

Data collected included the details of the school concerned including class and grade, status (student, teaching or non-teaching staff), number of primary school contacts quarantined and a brief case history that was collected from the positive case.

Results

Between October 2020 and June 2021, there were 2603 COVID-19 cases within primary (including kindergarten) and secondary schools in Malta (Supplementary table S1). There were 1801 student, 416 teaching staff and 386 non-teaching staff.

The highest rate of cases overall was observed in teaching staff (56.53/1000), see [Figure 1](#) below. A significant difference was noted between the rate of cases observed in students and that in adult members of staff ([Figure 1](#)). There were 14.09% of teaching and non-teaching staff who were asymptomatic/presymptomatic when the swab test was taken while in the student population 29.69% were asymptomatic/presymptomatic when the swab was taken.

Among students the highest rate/1000 cases were observed in students aged 2–4 years of age ([Figure 2](#) below). A significant difference can be seen between the rate of cases in students of this age group when compared with the students in the other age groups.

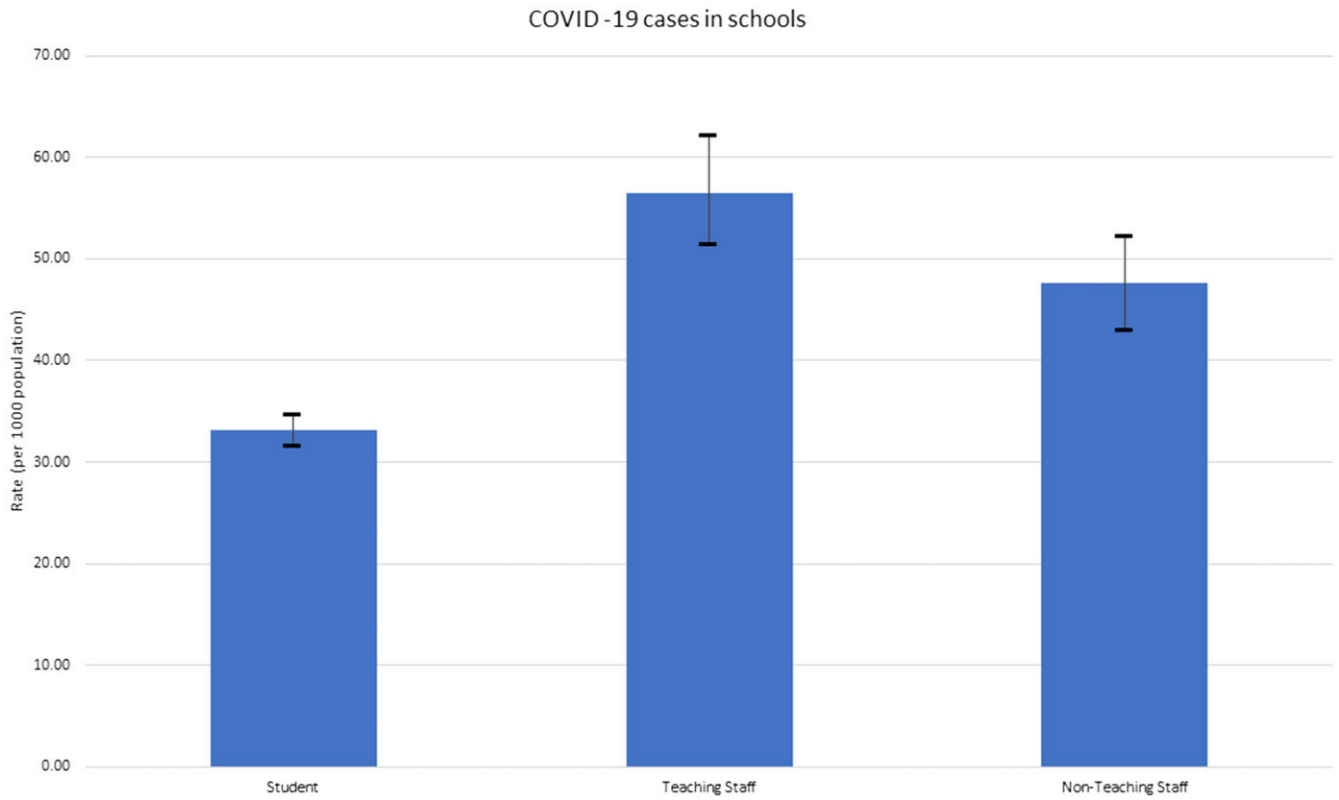


Figure 1 COVID-19 cases in schools (rate/1000 population) in students, teaching and non-teaching staff

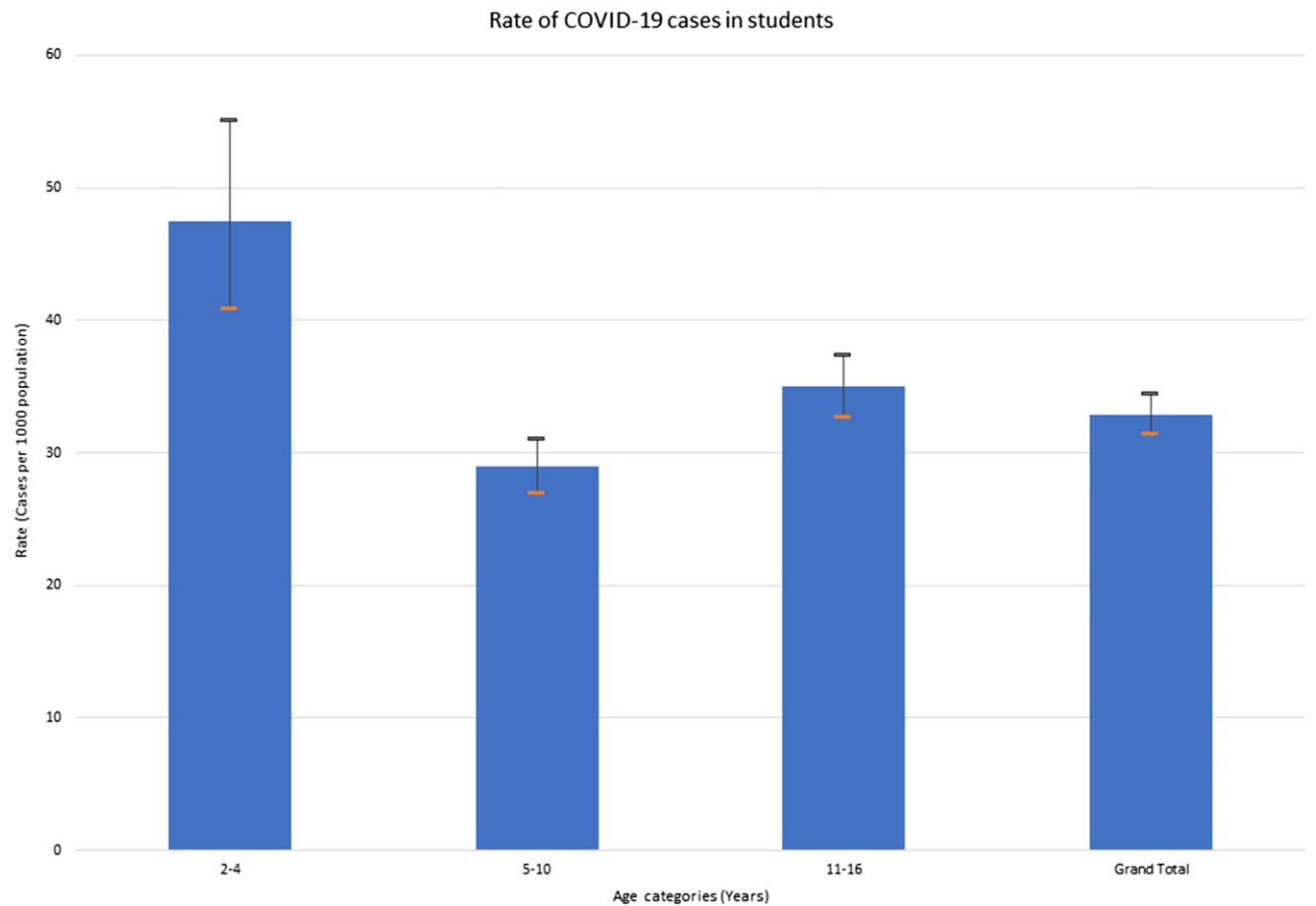


Figure 2 Rate of COVID-19 cases in students by age

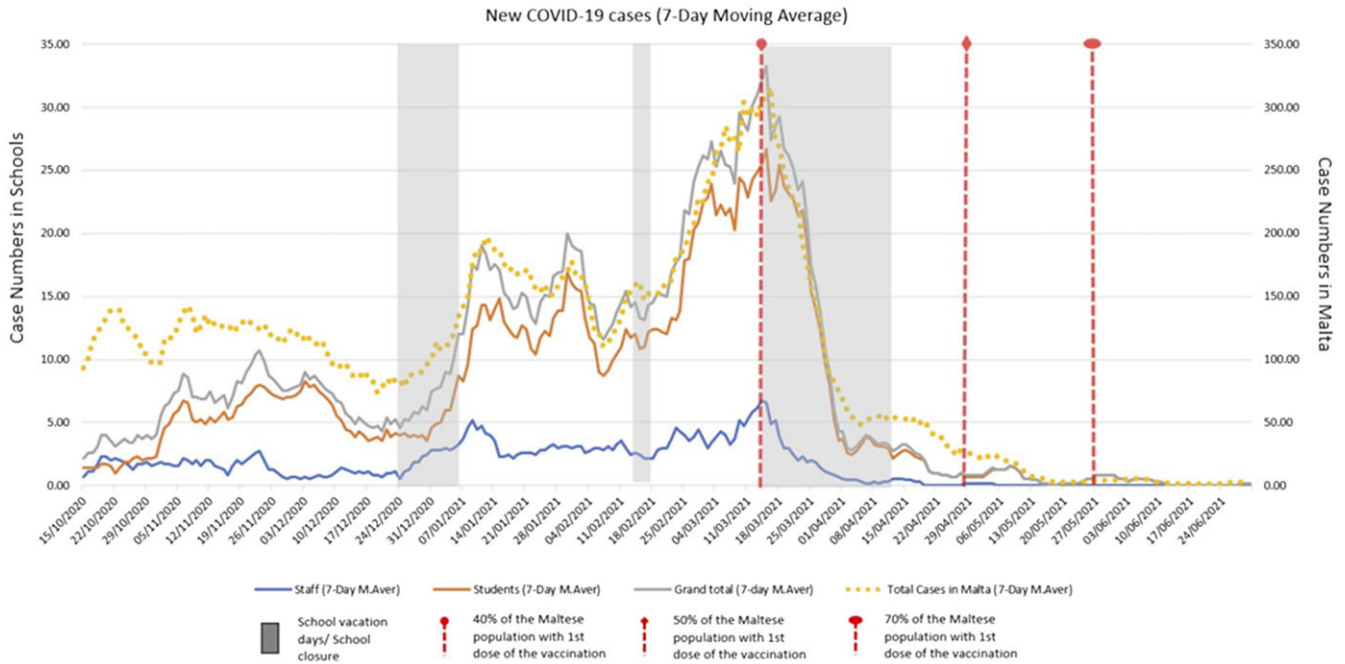


Figure 3 Trend by 7-day moving average of COVID-19 cases within the community, within students and within school staff members, between October 2020 and June 2021

Number of school contacts placed in quarantine

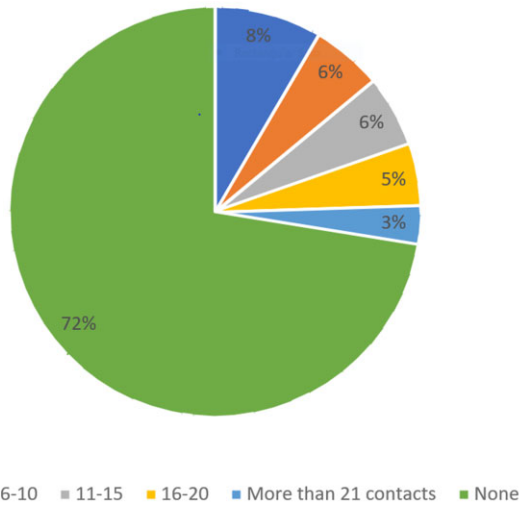


Figure 4 Number of school contacts placed in quarantine due to cases of COVID-19 in schools

Figure 3 below shows 7-day moving average, of the cases observed in schools, as compared with the 7-day moving average within the community. It can be observed that, in fact, the trend of cases within schools followed the trend observed within community cases. Peaks in the number of cases can also be seen within the 10 days following school closure for the Christmas and mid-term/carnival holidays. This figure also clearly highlights a noticeable drop in the number of cases observed when community restrictions were tightened and schools closed in March 2021, which drop continued as more members of the population were vaccinated by April 2021.

The number of primary contacts placed in quarantine due to school cases can be seen in Figure 4. In 72.45% of school cases no contacts were identified as high risk and thus nobody was placed in

quarantine. In only 3.07% of school cases more than 21 high-risk contacts were placed in mandatory quarantine together with their household members.

Only 11% of the cases were epi-linked to another positive case within school. In the 2–4-year age group 13.13% [95% confidence interval (CI) (9.59%, 17.86%)] of cases were epi-linked to another case in school, while in the 5–10 and 11–16 year age groups 9.94% [95% CI (7.82%, 12.53%)] and 9.36% [95% CI (7.51%, 11.62%)] were linked to other positive cases within the school environment respectively. A total of 7953 high-risk contacts (staff and students) were placed under mandatory quarantine, 275 of these high-risk contacts in quarantine eventually tested positive for COVID-19. The rest of the cases had contact with another positive case within their household or came into contact with a case during social or extracurricular activities.

Discussion

The issue of whether schools should have remained opened or not during the COVID-19 pandemic and whether they would play a crucial role in the transmission of the COVID-19 virus has been the topic of many a heated debate. While initially there were a lot of unknown factors so that decisions had to be taken with best interests in mind,⁷ we now know much more about COVID-19.

Did schools drive transmission within the community?

One of the main concerns in countries where schools opened for on-site learning was that cases within schools would drive community transmission and contribute to further spread of the virus. In fact, just as has been evidenced in our own findings, the observations from various countries including the UK, Australia, Norway, the USA and Ireland, among others indicate that, during this pandemic, schools were not a high-risk setting for transmission of the COVID-19 virus.^{14–21} Indeed, they have actually followed transmission within the community, further strengthening the argument that this is not the case.

In addition to this, it was observed that when schools opened and the mitigation practices (11 April until beginning of May 2021) were still in place, the numbers of positive cases within schools did not

increase, all pointing towards the fact that the schools were not the major source of transmission. Similarly, it was observed that certain peaks in school cases were observed around 10 days after school holidays (e.g. Christmas, carnival/mid-term holidays), thus indicating that transmission was occurring during social events outside of school, rather than the other way around.

Studies in Canada and France have in fact shown that in most cases transmission occurred within the household, where most infections in children are generally transmitted from an older family member.^{22,23} In the majority of cases involving students encountered by the SCTT, the students had contact with a positive household member before they resulted positive themselves.

The importance of mitigation measures

The results of this study clearly show a significant difference between the rate of infections in kindergartens as opposed to primary and secondary schools. The most likely reason for this is the fact that the mitigation measures could not as easily be observed within kindergartens due to the young age and dependability of the students within this cohort. This indicates that these measures all contributed to minimizing transmission of the virus and, where these could not be properly observed, more cases were noted. The effect of mask-wearing, in particular, and its effect on minimizing risk of transmission has been amply documented in studies carried out in the USA.^{24–26} Such information can be important to inform decisions such as which educational facilities should be closed first in a pandemic situation, and which can continue operating.

The effects of the COVID-19 vaccine on prevention of infection

By the 13 April 2021, 40% of the Maltese population that was at the time eligible for vaccination had been given the 1st dose of one of the COVID-19 vaccines. By the 28 April 2021, this had risen to 50% and by the 25 May 2021, 70%. One of the measures adopted in order to protect schools further was that teachers were among the first groups to be vaccinated. Indeed, once most of the teaching staff had been given the first dose of the vaccine by the end of March 2021, a drop in the number of cases within school staff was observed. This difference was also noted when comparing the rate of staff and students that resulted positive in the first two terms as opposed to the rate in the third term.

Once 60% of the population had been given the first dose of the vaccine there was a marked drop in the number of cases observed, further strengthening the evidence that the vaccines were effectively preventing infections and further transmission of the virus.

Efficient and effective contact tracing breaks the chain of transmission

The data presented clearly indicates that the implementation of mitigation measures within schools together with efficient, evidence-based contact tracing carried out by trained personnel ensured that only those people identified as high risk were placed in quarantine thus allowing all other individuals to attend school in-person. Non-pharmaceutical interventions such as those listed earlier led to less contacts being identified as high risk. The concept behind the classroom 'bubble' was that, where possible, students and staff should remain within the same classroom/cluster/group whose composition would remain constant, with limited mixing of different groups by staggering playground times, keeping groups separate for special activities and avoiding having staff working in different childcare centres or institutions.²⁷

In addition, in circumstances where high-risk contacts were quickly quarantined the chain of transmission was broken so that, in many situations, no other students or staff members resulted positive.

Strengths and limitations

The strength of this study is that it is a national study and analyses all COVID-19 cases related to schools that occurred in the described time-period.

Since surveillance testing on a random sample of students was not conducted at any point during the observation period, it was not possible to fully quantify asymptomatic transmission within the school setting and secondary attack rate.

Conclusion

There has been no evidence of widespread transmission of COVID-19 by children, especially within schools,¹⁰ even more so when mitigation measures were in place.²⁸ Evidence has also shown that school closures by themselves, particularly in the absence of other measures, are not enough to reduce the transmission of COVID-19 within the community¹⁰ and should only be instituted as a last resort after all methods for prevention in the community have been resorted to¹⁰; Moreover, schools should be the first to reopen once it is safe to do so.²⁹ Malta was required to take such action when the number of community cases rose drastically and ITU (Intensive Therapy Unit) admissions due to COVID-19 were high, and schools were closed during a 4-week period between 15 March and 11 April 2021 as one of numerous measures introduced to curb this increase in cases.^{27,30}

The decision to include educational staff within the first groups to be given the COVID-19 vaccine further assisted in protecting the individuals and the school environment, contributing further to ensuring that schools continued functioning as normal. It is of course still possible that transmission of COVID-19 will occur, especially for individuals who are not vaccinated. In addition, with the emergence of COVID-19 variants, such as the Delta (B.1.617.2) and the various Omicron variants, the risk of transmission may be increased. Despite this it is still recommended that, with what is now known about low rates of transmission in schools when proper prevention measures are used, together with the availability of effective vaccines for those age 5 years and up, the benefits of in-person learning far outweigh the risks, and should remain the ultimate goal when policies for schooling are being considered³¹ while at the same time maintaining a high level of preparedness.¹⁰

Evidence suggests that a 'precision public health approach' be used when reopening schools. Such an approach benefits from cross-sector collaborations and makes use of real-time data to be able to assess the effectiveness of certain approaches and make any necessary adjustments.⁹

This was the premise behind the setting up of a trained contact tracing team dedicated to the rapid assessment of positive cases within Maltese schools once they reopened in October 2020. And, indeed, the collaboration between the Maltese Health and Education departments made for effective teamwork that ensured that schools remained open throughout most of this pandemic.

Supplementary data

Supplementary data are available at *EURPUB* online.

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Ethical approval

This study is an audit of surveillance data collected by the Superintendence of Public Health (CG) of the Ministry for Health in Malta carried out by the lead team in charge of schools' surveillance (LC). For the purpose of this audit, anonymized data only has been used.

Conflicts of interest: None declared.

Data availability

Data cannot be shared for ethical/privacy reasons. The data underlying this article cannot be shared publicly due to the privacy of the individual cases and GDPR issues. The aggregate anonymized data may be shared on reasonable request to the corresponding author after necessary permissions are sought and obtained.

Key points

- In Malta schools were not the drivers of COVID-19 transmission. Cases at schools mirror the situation within the community, not vice versa.
- This nation-wide study showed that with measures in place, and with efficient contact tracing, educational facilities could function throughout the pandemic without any impact on the COVID-19 spreading in Malta.

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