

Letters

RESEARCH LETTER

SARS-CoV-2 Positivity on or After 9 Days Among Quarantined Student Contacts of Confirmed Cases

Schools reopened during the fall of 2020 with various approaches to mitigate severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection. At that time, the US Centers for Disease Control and Prevention (CDC) recommended a 14-day quarantine without testing for close contacts of anyone diagnosed with coronavirus disease 2019 (COVID-19).

However, data indicated that the incubation period for SARS-CoV-2 infection is 4 to 5 days from exposure in adults and is 6 to 7 days from exposure in children,¹⁻³ suggesting that most infected students should test positive by day 9. Therefore, Alachua County, Florida, implemented SARS-CoV-2 testing on day 9 and return to school on day 10 for student contacts of confirmed COVID-19 cases. We evaluated test positivity rates for SARS-CoV-2 infection among these student contacts.

Methods | The project was reviewed by the University of Florida and the Florida Department of Health institutional review boards and was determined to meet the criteria for a public health surveillance activity exclusion. Signed informed consent was obtained from parents before sample collection. Alachua County has 49 schools serving a population of 26 456 kindergarten through 12th grade students. A hybrid model of virtual and in-person instruction was offered; 49% of students were enrolled for in-person instruction.

The Alachua County Health Department provided reverse transcriptase-polymerase chain reaction (RT-PCR) test-

ing of nasopharyngeal swabs for symptomatic students (suspected cases) and contact tracing for COVID-19-positive confirmed cases; RT-PCR and rapid antigen results from private physicians were included for case confirmation. The methods for genetic testing of isolates have been described.⁴ Student contacts of confirmed COVID-19 cases were quarantined and offered RT-PCR testing at day 3 (to exclude students who might have been infected at the same time as the confirmed case) and at day 9; testing was sometimes delayed to days 10 to 14. Asymptomatic students who tested negative on days 9 to 14 could return to school on the day following their negative test. If no testing was administered, a 14-day quarantine was required.

The percentage of student contacts who tested positive on days 9 to 14 was determined. Students who returned to school after a negative test result were monitored for symptoms through day 14. The percentage of COVID-19-positive contacts among elementary and middle school students vs high school students was compared using the Fisher exact test with statistical significance set at $P < .05$ (2-sided) using R version 3.4.1 and R Studio version 1.1.0153 (R Foundation for Statistical Computing for both). Instructional days missed were compared with days that would have been missed if all student contacts of confirmed COVID-19 cases had been quarantined for 14 days.

Results | Between August 1 and November 30, 2020, when the Alachua County SARS-CoV-2 test positivity rate was 4.9%, 495 suspected student cases were tested and 257 (51.9%) were positive for SARS-CoV-2 infection. For these 257 confirmed cases of SARS-CoV-2 infection, 2189 contacts were quarantined,

Table. SARS-CoV-2 Positivity Rates Among Quarantined Student Contacts of Confirmed COVID-19 Cases

	Quarantined student contacts of confirmed COVID-19 cases, No./total (%)		
	Elementary and middle school	High school	All grades
Positive test result for SARS-CoV-2 by test day			
3	0/80 ^{a,b}	14/54 (25.9) ^{b,c}	14/134 (10.4)
9	6/257 (2.3)	14/222 (6.3)	20/479 (4.2)
10	1/76 (1.3)	15/128 (11.7)	16/204 (7.8)
11	0/105	1/31 (3.2)	1/136 (0.7)
12	1/11 (9)	1/2 (50) ^d	2/13 (15.4)
13	0/1	0/3	0/4
14	0/1	1/2 (50) ^e	1/3 (33.3)
Cumulative: days 9-14	8/451 (1.8) ^b	32/388 (8.2) ^b	40/839 (4.8)

Abbreviations: COVID-19, coronavirus disease 2019; SARS-CoV-2, severe acute respiratory syndrome coronavirus 2.

^a There were 33 student contacts of confirmed COVID-19 cases with negative test results on day 3 who were retested on day 9 (or thereafter). None had positive test results.

^b The comparisons between elementary and middle school vs high school for the positivity rates were significantly different ($P < .001$ using the Fisher exact test).

^c There were 24 student contacts of confirmed COVID-19 cases with negative test results on day 3 who were retested on day 9 (or thereafter). One had a positive test result.

^d There was 1 asymptomatic SARS-CoV-2-positive contact who had not been previously tested on day 3 or day 9.

^e There was 1 contact who received a negative test result on day 9 but became symptomatic on day 14 and had a positive SARS-CoV-2 test result.

134 (6.1%) were tested on day 3, and 839 (38.3%) were tested on days 9 to 14. Of the 134 student contacts tested on day 3, 14 (10.4%) were positive for SARS-CoV-2 infection. Of the 839 student contacts tested on days 9 to 14, 40 (4.8%) were positive for SARS-CoV-2 infection. Of the 388 student contacts in high school who were tested, 32 (8.2%) were positive for SARS-CoV-2 infection on days 9 to 14 compared with 8 (1.8%) of 451 student contacts in elementary and middle school who tested positive ($P < .001$; **Table**).

Among 799 student contacts of confirmed COVID-19 cases with a negative test result on days 9 to 14, only 1 student became symptomatic after returning to school and had a positive SARS-CoV-2 test result on day 14 after an initial negative test result on day 9. The virus from this student was genetically distinct from the virus isolated from the confirmed COVID-19 case to which the student had been exposed (GenBank confirmed case: [MW307809](#); GenBank 9-day student contact: [MW308137](#)). Loss of instruction decreased by 3649 days with the 9-day testing protocol (8097 days missed) compared with a theoretical 14-day quarantine without testing (11 746 days missed).

Discussion | In this study of a 9-day testing protocol for student contacts of confirmed COVID-19 cases in 1 Florida county, a reduction in loss of instructional time was found that was less than what would have occurred with 14-day quarantine. There was no evidence that an earlier return to school with a negative test result was linked with subsequent symptomatic illness. Had students returned to school before day 14 without testing on day 9 or thereafter, 8.2% of high school contacts would have returned to school with SARS-CoV-2 infection. These findings should be considered when evaluating the December 2020 CDC recommendation for a 10-day quarantine without testing or a 7-day quarantine with testing.⁵

Limitations of this study include (1) contact testing ranging from days 9 to 14; (2) lack of testing for students who quarantined for 14 days; and (3) use of symptomatic illness alone for follow-up of negative test results.

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