

1 **Title:** Implementation of SARS-CoV2 Monitoring and Screening test using RT-PCR in
2 Okinawa prefecture, Japan, 2021

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27

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31 **Abstract**

32 **Objectives:** To provide evidence on RT-PCR testing in order to implement effective RT-PCR
33 testing by demonstrating that the positivity rates of monitoring and screening tests vary
34 depending on the subject and the level of contact.

35 **Design:** Retrospective epidemiological analysis

36 **Setting:** RT-PCR monitoring projects and screening tests in School PCR Projects conducted
37 in Okinawa Prefecture.

38 **Participants:** Workers in high-risk work areas, local residents, and airline passengers to/from
39 Okinawa prefecture. School-aged children categorized into close contacts and contacts. RT-
40 PCR monitoring tests and screening tests are 656265 and 26000, respectively.

41 **Main outcome measures:** Percent positives in RT-PCR monitoring tests and a proportion of
42 the positives in close contacts among the positives in all contacts in screening tests in School
43 PCR Projects.

44 **Results:** The highest and second-highest positivity rates in RT-PCR monitoring tests were
45 3.65% (95%Confidence Interval: 3.25-4.10%) in Free inspection service for restaurant
46 employee project 2.67% (95%CI: 2.60-2.73%) in Inexpensive testing subsidy program,
47 respectively. The order of the highest percentage of the positives in close contacts among the
48 positive in all contacts by school type is as follows: 26.0% (95%CI: 16.6-37.2%) in after school
49 children's clubs, 17.0% (95%CI: 7.7-30.8%) in high school, 16.1% (95%CI: 7.6-28.3%) in

50 elementary school, 15.2% (95%CI: 5.1-31.9%) in junior high school, excluding special support
51 schools, nursery schools, and kindergarten, due to data scarcity.

52 ***Conclusion:***

53 Increasing access to testing for restaurant employees and residents who wish to be tested will
54 contribute to the efficient detection of infected individuals. Additionally, expanding these
55 testing spots can reduce the burden on medical institutions due to the visits to the emergency
56 room for testing. Secondary infection risks are much higher at after-school children's clubs,
57 whereas those at elementary school remain low even after summer vacations. To prepare for
58 a future outbreak, infection control measures should be placed on this school type.

59

60 **Strengths and limitations of this study**

- 61 ● This is the first study investigating several RT-PCR monitoring tests and screening tests
62 in School PCR Projects at the prefectural level in Japan.
- 63 ● Percent positives in RT-PCR monitoring tests and a proportion of the positives in close
64 contacts among the positive in all contacts in screening tests in School PCR Projects were
65 assessed.
- 66 ● A limitation of this study is to generalize our results that positive rates were high in some
67 specific monitoring projects and apply to the whole due to selection bias.

68 ● Developments in vaccination programs greatly impact positive rates, and vaccination
69 coverage has also changed dramatically. However, focusing on the most recent results of
70 positive rates will reveal which RT-PCR projects should be prioritized.

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72

73 **INTRODUCTION**

74 Since the first COVID-19 case was reported on February 14, 2020, Okinawa
75 Prefecture in Japan experienced five waves of COVID-19, and a total of 50314 cases and 398
76 deaths have been confirmed, as of November 30, 2021¹.

77 Several interventions against COVID-19 have been conducted in Okinawa prefecture.
78 Two of them are reverse transcription-polymerase chain reaction (RT-PCR) monitoring
79 projects and a combination of contact tracing and an RT-PCR screening test for contacts in
80 schools.

81 RT-PCR monitoring projects target high-risk work areas, local residents, and airline
82 passengers to/from Okinawa prefecture. On the other hand, in the school RT-PCR project, if
83 even one student or child tests positive, their contacts are identified and categorized into close
84 contacts and contacts by health/medical personnel for RT-PCR testing.

85 Differences in positive rates of RT-PCR monitoring and screening tests by target or
86 the level of contact are not understood well so far. The provisions of this evidence enable RT-
87 PCR monitoring and screening tests to be more efficient in controlling COVID-19 outbreaks
88 and cost-effective strategies. This study aims to provide evidence regarding RT-PCR tests to
89 conduct an effective RT-PCR test.

90

91 **METHODS**

92 **Study setting and data sources:**

93 Okinawa Prefecture is located in the southwestern tip of the Japanese archipelago
94 with a population about 1.5 million. Several RT-PCR monitoring and screening projects have
95 been launched in Okinawa prefecture since 2021 May. Monitoring projects are intended to
96 monitor community- or population-level disease outbreaks or characterize the incidence and
97 prevalence of the disease². In contrast, screening projects aim for early identification,
98 isolation, and disease prevention by testing recent known or suspected exposure. Monitoring
99 projects are a) Essential Worker Regular Testing Project, b) Free Testing for Restaurant
100 Employees Project, c) Monitoring PCR Test project, d) Inexpensive Testing Subsidy
101 Program, e) Airport PCR Test Project (Table 1). The main differences between these projects
102 are their targets and the amount paid by the individual. Projects from a) to c) target specific
103 work areas. The target of a) are care providers, welfare workers for the disabled, and
104 childcare workers. The target of b) is restaurant employees, especially at restaurants with
105 entertainment, and the target of c) is workers in transportation, tourism, and vocational
106 schools. Amount paid by the individual for the above three projects are free of charge for
107 promotion. Whereas d) and e) targets residents. The project of d) target residents in the city,
108 and e) target passengers at the airport. The cost for these projects is various. The lowest price
109 is 2000JPY in d), and the highest price is 5000JPY for residents outside Okinawa prefecture.

110 The School-PCR projects have also launched in May 2021 at elementary school,
111 junior high school, high school, special support school, after school children's clubs. The
112 School-PCR projects' coverage has been expanded to include nursery schools and
113 kindergartens since September 2021; thus, no data was available from May 2021 to August
114 2021. Regarding the definition of close contacts and contacts in the School-PCR projects, if
115 even one student or child tests positive, their classmates are categorized into close contacts if
116 persons who have been in contact with a confirmed case for more than 15 minutes without
117 the necessary infection control measures within touching distance (approximately 1 meter)³,
118 and other classmates are categorized into contacts for RT-PCR testing.

119 In Japan, a type of school, "After school children's club," is existed. After school
120 children's clubs aims to provide children are attending elementary schools whose guardians
121 are not at home during the daytime due to work, etc. with appropriate places to play and live
122 by using spare classrooms and children's halls of the elementary schools after classes by the
123 provisions of the Child Welfare Law⁴.

124 All statistical analyses were conducted in R version 3.6.1 (R Foundation for Statistical
125 Computing, Vienna, Austria).

126 **Ethics approval statement**

127 The surveys were conducted in accordance with applicable Japanese law and Okinawa
128 Prefectural Government policy. Since this study was a secondary analysis using anonymized

129 data from Okinawa Prefecture, which contains no information that can directly or indirectly
130 identify an individual, the study was exempt from IRB review.

131 **Patient and public involvement**

132 Patients and/or the public were not involved in the design, or conduct, or reporting,
133 or dissemination plans of this research.

134

135 **RESULTS**

136 Table 1 presents the results of RT-PCR monitoring tests by projects, and the number
137 of RT-PCR tests and positives are 656265 and 6458, respectively. The overall positivity rate is
138 0.98% (95% confidence interval: 0.96-1.01%). The highest and the second-highest positivity
139 rates were 3.65% (95%CI: 3.25-4.10%) in b) Free inspection service for restaurant employee
140 project, and 2.67% (95%CI: 2.60-2.73%) in d) Inexpensive testing subsidy program,
141 respectively. The lowest positivity rate was 0.04 % (95%CI: 0.02-0.07%) among child care
142 workers in a) Essential worker regular testing project, next to 0.06 % (95%CI: 0.05-0.07%)
143 among care provider in a) Essential worker regular testing project and 0.06% (95%CI: 0.04-
144 0.07%) in c) Monitoring PCR test project.

145 **Table 1. Result of RT-PCR monitoring tests by type, 2021, Okinawa.**

146

Type	Duration	Target	Amount paid by the individual	Number of tests	Positive	%Positive (95%CI)
Total				656265	6458	0.98 (0.96 -1.01)

Essential Worker Regular Testing Project	Apr/26-Nov/19, 2021	Care provider	Free of charge	196407	118	0.06 (0.05-0.07)
		Welfare workers for the disabled	Free of charge	61594	41	0.07 (0.05-0.09)
		Childcare worker	Free of charge	40739	17	0.04 (0.02-0.07)
Free Testing for Restaurant Employees Project	Mar/27-Nov/19, 2021	Restaurant workers	Free of charge	7748	283	3.65 (3.25-4.10)
Monitoring PCR Test Project	Mar/29-Nov/14, 2021	Transportation, tourism, technical schools	Free of charge	80591	44	0.06 (0.04-0.07)
Inexpensive Testing Subsidy Project.	Feb/17-Nov/18, 2021	Residents in the prefecture	2000 (JPY)	211722	5642	2.67 (2.60-2.73)
Airport PCR Test Project	Aug/30-Nov/21,2021	Residents in the prefecture	3000 (JPY)	43490	313	0.55 (0.49-0.61)
		Residents outside of the prefecture	5000 (JPY)	13974		

147 A proportion of the positives in close contacts among the positive in all contacts by
148 school type and by month, May 31 – November 12, 2021, was shown in Figure 1 and Table 2.
149 The order of the highest percentage is as follows: 100% (95%CI: 29.2-100.0%) in special
150 support schools, 87.5% (95%CI: 47.4-99.7%) in nursery school and kindergarten, 26.0%
151 (95%CI: 16.6-37.2%) in after school children’s clubs, 17.0% (95%CI: 7.7-30.8%) in high
152 school, 16.1% (95%CI: 7.6-28.3%) in elementary school, 15.2% (95%CI: 5.1-31.9%) in junior
153 high school. Due to data scarcity, after-school children's clubs showed the highest proportion
154 of close contacts among all positives, excluding special support schools, nursery schools, and
155 kindergarten. This proportion remains zero in junior high school, or no positive case has been
156 reported since August 2021.

157 **Table 2. A proportion of the positives in close contacts among the positive in all contacts**
158 **by school type and by month in screening tests in School PCR Projects, May 31 –**
159 **November 12, 2021, Okinawa**

160

Time	School type					
	Elementary school	Junior high school	High school	Special support school	After school children's clubs	Nursery school, Kindergarten§
Total	16.1% (95%CI: 7.6-28.3%)	15.2% (95%CI: 5.1-31.9%)	17.0% (95%CI: 7.7-30.8%)	100.0% (95%CI: 29.2-100.0%)	26.0% (95%CI: 16.6-37.2%)	87.5% (95%CI: 47.4-99.7%)
Jun, 2021	12.5% (95%CI: 0.3-52.7%)	20.0% (95%CI: 0.5-71.6%)	14.3% (95%CI: 1.8-42.8%)	NA	100.0% (95%CI: 47.8-100.0)	NA
Jul, 2021	33.3% (95%CI: 4.3-77.7%)	23.5% (95%CI: 6.8-49.9%)	0.0% (95%CI: 0.0-28.5%)	100.0% (95%CI: 29.2-100.0%)	100.0% (95%CI: 2.5-100.0)	NA
Aug, 2021	0.0% (95%CI: 0.0-60.2%)	0.0% (95%CI: 0.0-52.2%)	36.4% (95%CI: 10.9-69.2%)	NA	13.2% (95%CI: 5.5-25.3)	NA
Sep, 2021	18.5%	0.0%	22.2%	NA	35.3%	100.0%

	(95%CI: 6.3-38.1%)	(95%CI: 0.0-45.9%)	(95%CI: 2.8-60.0%)		(95%CI: 14.2-61.7)	(95%CI: 15.8-100.0)
Oct, 2021	9.1% (95%CI: 0.2-41.3%)	NA	0.0% (95%CI: 0.0-84.2)	NA	100.0% (95%CI: 2.5-100.0)	100.0% (95%CI: 39.8-100.0)
Nov, 2021	NA	NA	NA	NA	NA	50.0% (95%CI: 1.3-98.7%)

161 §RT-PCR screening for nursery school/kindergarten started September 18, 2021, while
162 screening for other schools began April 26, 2021.

163 The results of screening tests in School PCR Projects by school type stratified by the level of
164 contact are shown in Figure 2 and Table 3. During about six months, RT-PCR screening tests
165 targeting contacts were conducted in 838 schools and clubs in total, and the number of RT-
166 PCR tests and positives were 260000 and 224, respectively. The positivity rates among all
167 contacts, close contacts and contacts except for close contacts are 0.86% (95%CI: 0.75-0.98%),
168 1.75% (95%CI: 1.31-2.29%) and 0.75% (95%CI: 0.64-0.87%), respectively. Among all
169 contacts, the highest positive rate was 2.08% (95%CI: 1.65-2.60%) in after-school children's
170 clubs, and the lowest positivity rate was 0.56% (95%CI: 0.38-0.78%) in junior high schools.

171 Among close contacts, the highest and the second-highest positivity rates were 3.68 % (95%CI:
172 0.76-10.32%) in special support schools and 2.78% (95%CI: 1.70-4.26%) in after-school
173 children's clubs, and the lowest positivity rate was 0.98% (95%CI: 0.32-2.26%) in junior high
174 schools. Among contacts except for close contacts, the highest positivity rate was 1.91%
175 (95%CI: 1.45-2.47%) in after-school children's clubs, and the lowest and the second-lowest
176 positivity rates were 0.00% (95%CI: 0.00-1.23%) in special support schools and 0.21%
177 (95%CI: 0.01-1.16%) in nursery school and kindergarten.

178

179

180 **Table 3. Result of screening tests in School PCR Projects by school type stratified by**
 181 **level of contact, May 31 – November 12, 2021, Okinawa**

School type	Number of schools/clubs	Close contacts			Contacts except for close contacts			All contacts		
		N	Positive	%Positive (95%CI)	N	Positive	%Positive (95%CI)	N	Positive	%Positive (95%CI)
Total	838	2967	52	1.75 (1.31-2.29)	23033	172	0.75 (0.64-0.87)	26000	224	0.86 (0.75-0.98)
Nursery school, Kindergarten [§]	32	413	7	1.69 (0.68-3.46)	477	1	0.21 (0.01-1.16)	890	8	0.90 (0.39-1.76)
Elementary School	275	735	9	1.22 (0.56-2.31)	7956	47	0.59 (0.43-0.78)	8691	56	0.64 (0.49-0.84)
Junior high school	173	512	5	0.98 (0.32-2.26)	5404	28	0.52 (0.34-0.75)	5916	33	0.56 (0.38-0.78)
High school	209	505	8	1.58 (0.69-3.10)	5921	39	0.66 (0.47-0.90)	6426	47	0.73 (0.54-0.97)
Special support school	16	82	3	3.68 (0.76-10.32)	297	0	0.00 (0.00-1.23)	379	3	0.79 (0.16-2.30)
After-school children's clubs	133	720	20	2.78 (1.70-4.26)	2978	57	1.91 (1.45-2.47)	3698	77	2.08 (1.65-2.60)

182 [§]RT-PCR screening for nursery school/kindergarten started September 18, 2021, while
 183 screening for other schools began April 26, 2021.

184

185 The results of screening tests in School PCR Projects during four weeks after summer
 186 vacation were summarized in Table S1. During four weeks after the summer holidays, RT-
 187 PCR screening tests targeting contacts were conducted in 275 schools and clubs in total, and
 188 the number of RT-PCR tests and positives were 8119 and 57, respectively. The positivity rates
 189 among all contacts, close contacts and contacts except for close contacts are 0.70% (95%CI:
 190 0.53-0.91%), 1.50% (95%CI: 0.75-2.68%) and 0.62% (95%CI: 0.46-0.83%), respectively.
 191 Among all contacts, the highest and the second-highest positive rates were 1.90% (95%CI:
 192 1.10-3.00%) in after-school children's clubs and 1.00% (95%CI: 0.60-1.40%) in elementary
 193 schools, and the lowest positivity rate was 0.00% (95%CI: 0.00-10.30%) in special support
 194 schools. Among close contacts, the highest and the second-highest positivity rates were 3.50%
 195 (95%CI: 1.30-7.40%) in after-school children's clubs and 1.60% (95%CI: 0.20-5.50%) in high
 196 schools, and the lowest positivity rates were 0.00% (95%CI: 0.00-2.50%) in junior high schools

197 and 0.00% (95%CI: 0.00-70.80%) in special support schools. Among contacts except for close
198 contacts, the highest positivity rate was 1.60% (95%CI: 0.80-2.70%) in after-school children's
199 clubs, and the lowest positivity rate was 0.00% (95%CI: 0.00-11.20%) in special support
200 schools.

201 Table S2 presents the means and standard deviations of the number of secondary
202 infections by the level of contact, type of school, and month in School PCR Projects, May 31-
203 November 12, 2021, in Okinawa Prefecture.

204

205 **DISCUSSION**

206 This study assessed the several RT-PCR monitoring projects and the screening tests
207 in School PCR Projects conducted in Okinawa Prefecture in Japan from February 2021 to
208 November 2021. Facing the delta variant epidemics, the secondary infection risks at elementary
209 school were not high, even after summer vacations. However, since secondary infection risks
210 are much higher at after-school children's clubs, where participants are elementary school-aged
211 children, infection control measures should be focused on this type of school. The positivity
212 rate of contacts except for close contacts at after-school children's clubs was higher than that
213 of close contacts in some cases. When the time comes to narrow down the target population
214 due to budgetary constraints, careful consideration should be taken.

215 Investing the RT-PCR monitoring projects and screening tests in School PCR projects
216 for contacts, we revealed that positivity rates vary largely between projects. Those rates are
217 high in free testing for restaurant employee's projects, mainly for restaurant workers with
218 entertainment and inexpensive testing subsidy projects for local residents in the prefecture. In
219 contrast, the positivity rates are low in essential worker regular testing projects for a care
220 provider, welfare workers for the disabled, and childcare workers.

221 Although the predominant Delta variant in Okinawa prefecture is more contagious
222 among children than previous variants^{5,6} and the number of confirmed cases among children
223 has been increasing, this study showed that secondary infection risks at elementary school are
224 not high compared with secondary infection risks at other types of schools. This low rate of
225 secondary infection risks at elementary school is consistent with the epidemiological
226 investigation report that the transmission route in elementary school constitutes only 6%, while
227 household transmission constitutes 61%⁷.

228 Since secondary infection risks are much higher at after-school children's clubs, where
229 participants are elementary school-aged children, infection control measures should be focused
230 on this type of school. Secondary infection risk at after-school children's clubs can be at high
231 risk because many after-school children's clubs in Okinawa Prefecture are privately run, and
232 the utilization rate of public facilities, e.g., school facilities, is low⁴. In addition, after-school
233 children's club is home-based, such as cooking meals together, so it is suggested that there are

234 many opportunities for intense contact leading to infection. After-school children's clubs are
235 an essential part of the social infrastructure that allows dual-earner families and single-parent
236 families to continue working. Therefore, it is necessary to take measures together to ensure that
237 appropriate infection control measures are taken, rather than closing them down during an
238 epidemic because of the high risk of secondary infection. The coverage of the School PCR
239 project was expanded to include nursery schools and kindergartens since September 2021,
240 although those secondary infection risks are not high.

241 The positivity rate of contacts except for close contacts at after-school children's clubs
242 was higher than that of close contacts in other types of school. Besides, the actual number of
243 test-positive with non-close contact is higher than that with close contacts. Depending on the
244 type of school, the importance of RT-PCR testing for non-close contacts may be increased.
245 When the time comes to narrow down the target population due to budgetary constraints,
246 careful consideration should be taken.

247 Outbreaks in school after the summer vacation were expected to occur, similar to
248 seasonal influenza^{8,9}. During four weeks after summer vacation (August 29, 2021-September
249 24, 2021), 275 index cases were reported at schools. However, secondary infection risks
250 remained low. This suggests that the current infection control measures in schools are working
251 and that the children are cooperative.

252 In the RT-PCR monitoring projects, regular testing is being conducted for nursing care,
253 welfare, and childcare workers, and the positive rate is not high. This suggests the individual
254 commitments to infection prevention, including vaccination. In these types of working place,
255 there is a high risk of causing health problems to a large number of people if even one person
256 tests positive, so even if the positive rate is low, it is worthwhile to implement it as long as the
257 positive rate does not drop to zero. On the other hand, the positive rate in the Free Testing for
258 Restaurant Employees Project and the Inexpensive Testing Subsidy Project is high. In
259 restaurants with entertainment, it is customary for customers and female employees to sit side
260 by side and have drinks while talking. If they get intimate, they sometimes go out together for
261 a drink at a different restaurant. These services have a high risk of infection, and since many
262 business travelers and tourists from outside the prefecture use them, they are considered to have
263 a high possibility of becoming a gateway to a citywide epidemic. Therefore, establishing an
264 environment where those employees can easily get tested will contribute not only to early
265 diagnosis but also to preventing mass infection in the workplace. It should be noted that a
266 negative test result may be used to serve customers without wearing a mask. Since the
267 widespread use of the test can be enhanced high infection risk behaviors as above, it is still a
268 prerequisite to provide sound guidance on infection control. Regarding the inexpensive testing
269 subsidy project available at laboratories throughout the city, Okinawa Prefecture is subsidizing
270 it here so that people can take the test for 2,000 yen. Between February 17, 2021, and October

271 7, 2021, 192,532 people have been tested, and 4,824 infections have been confirmed. Suppose
272 residents are willing to come for testing. In that case, it is recommended for the local
273 government to establish such a system and to increase accessibility by, for example, offering
274 free testing to groups that are found to have a high number of positive employees, such as
275 restaurant employees.

276 Several limitations should be listed. It is hard to generalize our results that positive
277 rates were high in some specific monitoring projects and apply to the whole, as our results are
278 not free from selection bias. Those who took RT-PCR tests were not selected randomly but
279 based on voluntary will. In addition, developments in vaccination programs greatly impact
280 positive rates, and vaccination coverage has also changed dramatically. However, focusing on
281 the most recent results of positive rates will reveal which RT-PCR projects should be
282 prioritized.

283

284 **CONCLUSION**

285 This study revealed that increasing access to testing for restaurant employees and
286 residents who wish to be tested will contribute to the efficient detection of infected individuals.
287 Additionally, expanding these testing spots can reduce the burden on medical institutions due
288 to the visits to the emergency room for testing. It may be desirable to work on further expansion.
289 We have shown that secondary infection risks are much higher at after-school children's clubs,

290 whereas those at elementary school remain low even after summer vacations. To prepare for a
291 future outbreak, infection control measures should be placed on this school type. Besides, the
292 positive rate of contacts except for close contacts at after-school children's clubs was higher
293 than that of close contacts in some cases. When the time comes to narrow down the target
294 population, careful attention to the selection of the target should be paid.

295

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300

301 **Contributors**

302 YT conceptualized this study. KM and YT wrote the first draft with equal contribution. KM

303 conducted the analysis. TY and RO gave additional feedback on the first draft. Then all

304 edited and finalized the manuscript.

305

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315 **Competing Interests**

316 The authors indicated no potential conflicts of interest.

317 **Ethical approval**

318 The surveys were conducted in accordance with applicable Japanese law and Okinawa

319 Prefectural Government policy. Since this study was a secondary analysis using anonymized

320 data from Okinawa Prefecture, the study was exempt from IRB review.

321 **Data availability statement**

322 The data that support the findings of this study are available from the corresponding author (Dr.

323 Kenji Mizumoto) and Okinawa Prefecture Government but restrictions apply to the availability

324 of these data, which were used under license for the current study, and so are not publicly
325 available. Data are however available from the authors upon reasonable request and with
326 permission of Okinawa Prefecture Government.
327

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358 **Figure legends**

359 **Figure 1. Temporal distribution of the number of tested schools and secondary**
360 **infections by school type stratified by level of contact, May 31 – November 12, 2021,**
361 **Okinawa**

362 (A) Temporal distribution of the number of tested schools

363 (B) Temporal distribution of the number of secondary infections among close contacts by
364 school type

365 (C) Temporal distribution of the number of secondary infections among contacts except for
366 close contacts by school type

367 (D) Temporal distribution of the number of secondary infections among all contacts by
368 school type

369

370 **Figure 2. Result of PCR school-screening tests by school type stratified by level of**
371 **contact, May 31 – November 12, 2021, Okinawa**

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374 **Supplementary data**

375 **Additional files**

376 **Additional file 1:**

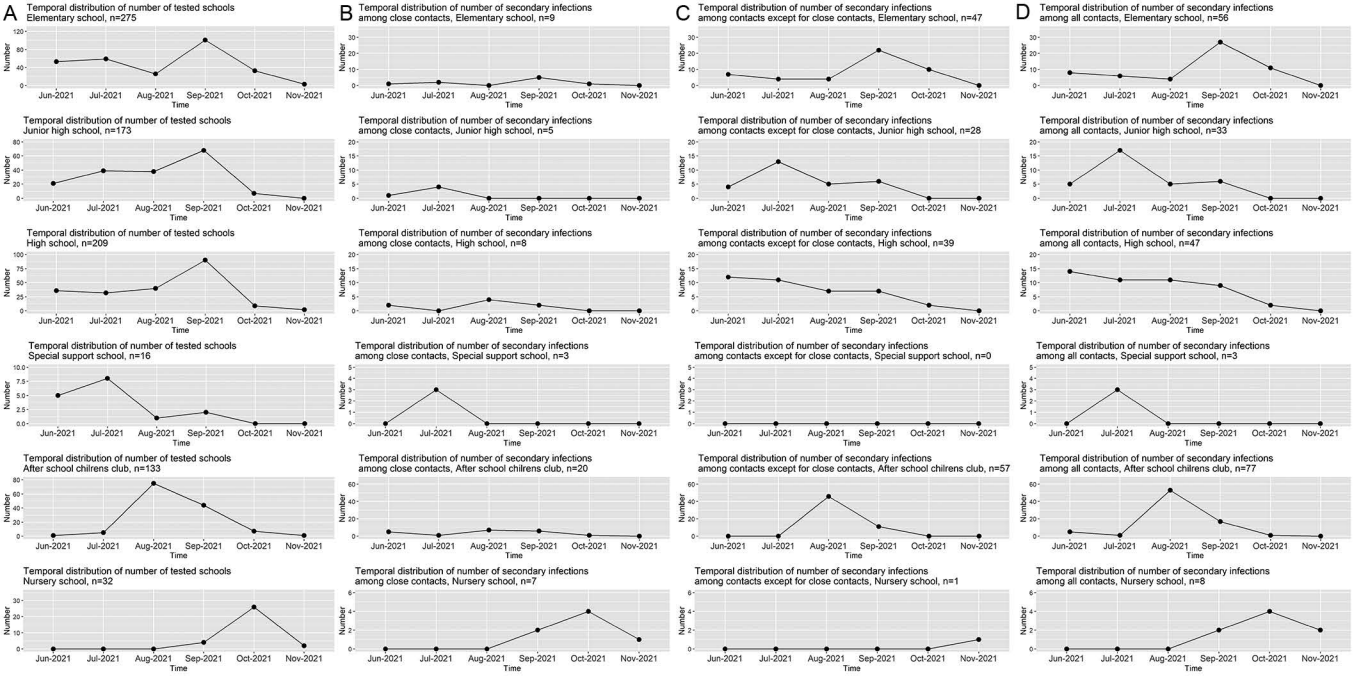
377 Table S1. Result of screening tests in School PCR Projects targeting contact by school type
378 and by contact type, August 28 – September 24, 2021, Okinawa

379

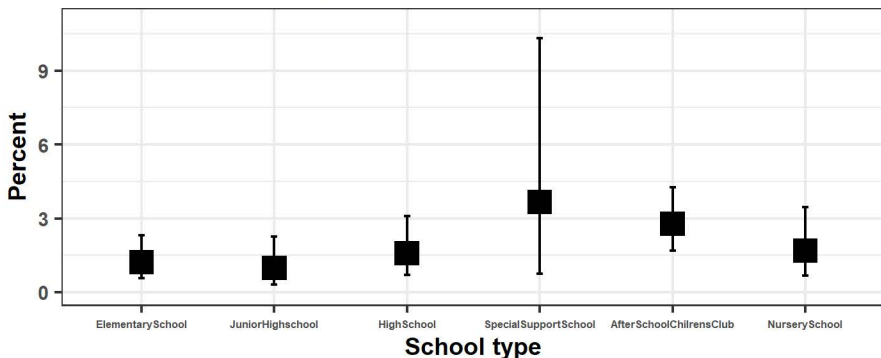
380 Table S2. Summary statistics of the number of secondary infections by the level of contact,
381 school type, and month in School PCR projects, May 31 – November 12, 2021, Okinawa

382

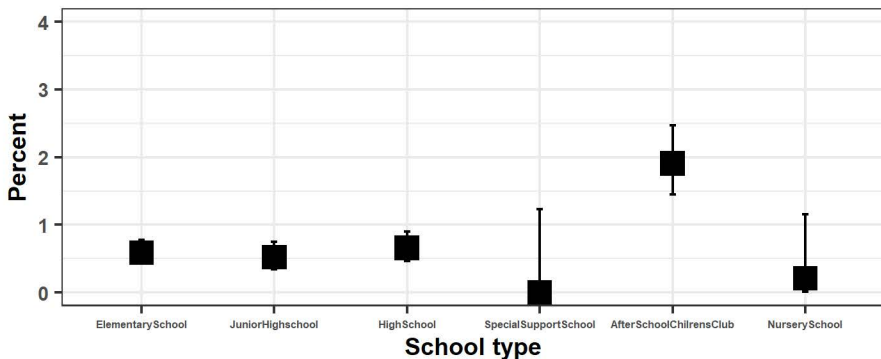
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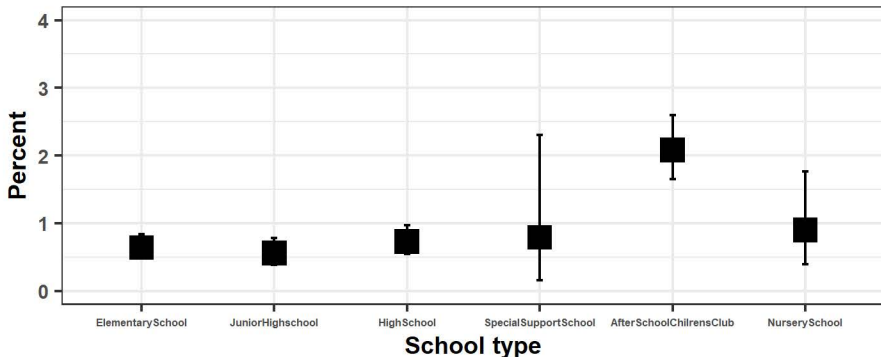
Positive rate among close contacts by school type, May 31-Nov 12, 2021, Okinawa



Positive rate among contacts except for close contacts by school type, May 31-Nov 12, 2021, Okinawa



Positive rate among all contacts except for close contacts by school type, May 31-Nov 12, 2021, Okinawa



Additional file 1:

**Implementation of SARS-CoV2 Monitoring and Screening test using RT-PCR in
Okinawa prefecture, Japan, 2021**

1. Table S1

2. Table S2

Table S1. Result of screening tests in School PCR Projects targeting contact by school type and by contact type, August 28 – September 24, 2021, Okinawa

School type	Number of schools/clubs	Close contacts			Contacts except for close contacts			All contacts		
		N	Positive	%Positive (95%CI)	N	Positive	%Positive (95%CI)	N	Positive	%Positive (95%CI)
Total	275	731	11	1.50 (0.75-2.68)	388	46	0.62 (0.46-0.83)	8119	57	0.70 (0.53-0.91)
Elementary School	85	279	3	1.10 (0.20-3.10)	2181	21	1.00 (0.60-1.50)	2460	24	1.00 (0.60-1.40)
Junior high school	60	147	0	0.00 (0.00-2.50)	1883	6	0.30 (0.10-0.70)	2030	6	0.30 (0.10-0.60)
High school	85	129	2	1.60 (0.20-5.50)	2530	7	0.30 (0.10-0.60)	2659	9	0.30 (0.20-0.60)
Special support school	2	3	0	0.00 (0.00-70.80)	31	0	0.00 (0.00-11.20)	34	0	0.00 (0.00-10.30)
After-school children's clubs	43	173	6	3.50 (1.30-7.40)	763	12	1.60 (0.80-2.70)	936	18	1.90 (1.10-3.00)

§RT-PCR screening for nursery school/kindergarten started September 18, 2021, while screening for other schools began April 26, 2021.

Table S2. Summary statistics of the number of secondary infections by the level of contact, school type, and month in School PCR projects, May 31 – November 12, 2021, Okinawa

Close contacts												
School type	Elementary school		Junior high school		High school		Special support school		After school children's clubs		Nursery school, Kindergarten§	
Time	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
All period	0.03	0.20	0.03	0.17	0.04	0.22	0.19	0.54	0.15	0.60	0.22	0.66
Jun 2021	0.02	0.14	0.05	0.22	0.06	0.23	0.00	0.00	5.00	NA	NA	NA
Jul 2021	0.03	0.18	0.10	0.31	0.00	0.00	0.38	0.74	0.20	0.45	NA	NA
Aug 2021	0.00	0.00	0.00	0.00	0.10	0.38	0.00	NA	0.09	0.44	NA	NA
Sep 2021	0.05	0.26	0.00	0.00	0.02	0.15	0.00	0.00	0.14	0.41	0.50	1.00
Oct 2021	0.03	0.17	0.00	0.00	0.00	0.00	NA	NA	0.14	0.38	0.15	0.61
Nov 2021	0.00	0.00	NA	NA	0.00	0.00	NA	NA	0.00	NA	0.50	0.71
Contacts except for close contacts												
School type	Elementary school		Junior high school		High school		Special support school		After school children's clubs		Nursery school, Kindergarten§	
Time	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
All period	0.17	0.74	0.16	0.49	0.19	0.73	0.00	0.00	0.43	1.30	0.03	0.18
Jun 2021	0.13	0.39	0.19	0.40	0.33	1.07	0.00	0.00	0.00	NA	NA	NA
Jul 2021	0.07	0.25	0.33	0.77	0.34	1.29	0.00	0.00	0.00	0.00	NA	NA
Aug 2021	0.15	0.61	0.13	0.41	0.18	0.45	0.00	NA	0.61	1.63	NA	NA
Sep 2021	0.22	1.06	0.09	0.33	0.08	0.31	0.00	0.00	0.25	0.72	0.00	0.00
Oct 2021	0.30	0.68	0.00	0.00	0.22	0.44	NA	NA	0.00	0.00	0.00	0.00
Nov 2021	0.00	0.00	NA	NA	0.00	0.00	NA	NA	0.00	NA	0.50	0.71
All contacts												
School type	Elementary school		Junior high school		High school		Special support school		After school children's clubs		Nursery school, Kindergarten§	
Time	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
All period	0.20	0.76	0.19	0.57	0.22	0.77	0.19	0.54	0.58	1.40	0.25	0.67
Jun 2021	0.15	0.41	0.24	0.44	0.39	1.10	0.00	0.00	5.00	NA	NA	NA
Jul 2021	0.10	0.30	0.44	0.97	0.34	1.29	0.38	0.74	0.20	0.45	NA	NA
Aug 2021	0.15	0.61	0.13	0.41	0.28	0.64	0.00	NA	0.71	1.66	NA	NA
Sep 2021	0.27	1.09	0.09	0.33	0.10	0.34	0.00	0.00	0.39	0.84	0.50	1.00
Oct 2021	0.33	0.69	0.00	0.00	0.22	0.44	NA	NA	0.14	0.38	0.15	0.61
Nov 2021	0.00	0.00	NA	NA	0.00	0.00	NA	NA	0.00	NA	1.00	0.00

§RT-PCR screening for nursery school/kindergarten started September 18, 2021, while screening for other schools began April 26, 2021.