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Challenges of COVID-19 Case Investigation and Contact Tracing in School Settings: An Initial Investigation

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Abstract

BACKGROUND: Case investigation and contact tracing (CI/CT) are important public health tools to interrupt COVID-19 transmission. Our study aims to understand how parents and school staff perceive COVID-19 CI/CT.

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Human Subjects Approval Statement

This study was approved by the UC San Diego Human Research Protections Program with approval number 201607.

Conflict of Interest

The authors have no conflicts of interest to disclose.

METHODS: Using a mixed methods approach, we distributed a community survey and conducted 15 focus group discussions (FGDs) in English and Spanish between December 2020 and March 2021 with 20 parents and 22 staff from schools in San Diego County ZIP Codes with COVID-19 rates in the top quintile as of August 2020.

RESULTS: One in 4 survey respondents reported that they would be reluctant to participate in CI/CT. FGDs revealed themes of mistrust in government authorities, overburdened institutions, unfamiliarity with CI/CT, and uncertainty about its reliability. School community members emphasized that parents trust schools to be involved in CI/CT efforts, but schools are overwhelmed with this added responsibility.

CONCLUSIONS: Investing in schools as community hubs is necessary so they can become important partners in prevention and mitigation in public health.

Keywords

contact tracing; school health; COVID-19; children; case investigation

The COVID-19 pandemic transformed K-12 learning as many schools rapidly pivoted to virtual or hybrid classrooms.¹ Although children are more likely to be asymptomatic or have milder symptoms of COVID-19 than adults,² they can still carry and transmit the virus even when asymptomatic.² Secondary attack rates within households in which young children are the index case can be significantly higher compared to attack rates in which the index case is an older child or young adult, likely because younger children require more high-contact care when they are ill.³

The pandemic has had severe effects on both the health and education of historically marginalized communities. In the pediatric population, Hispanic/Latino and Black children are significantly more likely to be diagnosed with COVID-19, and more likely to become seriously ill or die of the disease than their white, non-Hispanic counterparts.⁴ Given the disproportionately high rates of COVID-19 morbidity and mortality in racialized minority communities, they are also significantly more likely to have had a parent or caregiver die of COVID-19 or witnessed a household member with severe illness.⁵ A historic lack of investment in schools that serve predominantly low-income and/or racialized minority students resulted in more difficulties during the pivot to online learning, increased learning loss, and a likely increase in future school dropout.⁵

Case investigation and contact tracing (CI/CT) are important tools for mitigating the impact of COVID-19 on schools and communities.⁶ The goal of CI/CT is to identify, notify, and quarantine close contacts of new COVID-19 cases to prevent further transmission by separating people who unknowingly have (or may have) COVID-19 from people who do not.⁶ In the early days of the pandemic, the lack of sufficient CI/CT workforces hindered pandemic response.^{7,8} However, even as public health capacity expanded across the United States,⁹ significant socio-economic barriers to the thorough investigation and tracing of each exposure remained.¹⁰ Barriers included public mistrust in government, hesitancy to share private information with health officials, logistical challenges and fear of stigmatization.^{10,11} Since vaccines became widely available, CI/CT efforts have been further hampered by

confusion over susceptibility to infection. Understanding public perceptions and barriers to CI/CT is necessary to maximize the effectiveness of this pandemic mitigation strategy.¹²

Although the strategies adopted by school communities to mitigate the risk of viral spread vary considerably by state and local jurisdiction,¹³ many health departments in the United States rely on school staff to assist with the CI/CT process for school-aged children and other school personnel.¹⁴ School administrators and nurses often take on these new roles to support local health departments with CI/CT on school campuses. There is a growing body of research that recognizes the effectiveness of using schools as hubs to provide a wide range of social and health services to families and other community members.¹⁵ In fact, the state of California recently included \$3 billion in new funding to promulgate this approach statewide.¹⁶ Historically, however, these services have not extended to infectious disease mitigation efforts such as CI/CT.

Despite the rapid work that has been done to understand concerns related to CI/CT among the general public,¹² sparse data exist on the logistics, barriers, and facilitators related to using schools as a resource to conduct CI/CT. The goal of this study was to understand perceptions of school-based COVID-19 CI/CT in childcare, elementary, and middle schools.

METHODS

Quantitative and qualitative data for the present study were obtained from a community survey and focus group discussions (FGDs), respectively, that were conducted through the Safer at School Early Alert (SASEA) project. SASEA is based in San Diego County, a large, urban county in southern California.¹⁷ Study sites consisted of elementary, middle schools, and child care centers, which were eligible if they were located in a census tract with high levels of social vulnerability according to the California Healthy Places Index¹⁸ and in ZIP codes with COVID-19 infection rates in the top quintile as of August 2020. Eight public schools, one charter school and one private school serving elementary and middle school students and three childcare sites serving children ages 0 to 5 years participated in the project. The elementary schools all offered a combination of virtual and in-person learning options. Between December 2020 and March 2021, parents and school staff were invited to participate in FGDs. In February 2021, we invited all parents and staff affiliated with a SASEA site to participate in an online, self-administered survey.

Participants

We recruited school staff and parents who were affiliated with the school and childcare sites participating in SASEA. School staff consisted of teachers who taught either virtually or in-person, administrators, and staff, some of whom also identified as parents of students. Parents were eligible if their child was enrolled in either in-person or virtual learning at a SASEA site. We employed convenience sampling for both the survey and the FGDs by distributing flyers to approximately 2500 school and childcare staff and parents. School principals also sent email links to parents and staff to encourage survey participation.

Instrumentation

Focus-group discussions.—We facilitated semi-structured FGDs virtually with parents and school staff: FGDs were facilitated in Spanish or English depending on participant preference. In each FGD, a facilitator provided participants with descriptions of the CI/CT process, in accordance with Centers for Disease Control and Prevention guidelines contemporary to the study, and participants were asked to share their thoughts and experience on the process within the context of their child’s school. Questions were centered around participants’ thoughts on the CI/CT process and how they thought the CI/CT interviews should be conducted to make everyone feel as safe and comfortable as possible. FGDs were recorded and transcribed verbatim via Otter.ai¹⁹ and translated into English if needed. All identifying information was redacted; transcripts and recordings were reviewed by research staff for accuracy. The research team met bi-weekly to discuss initial impressions, revise the SASEA field guide, and evaluate if more FGDs were needed to reach theme saturation.

Community Survey

We used *preliminary results from the qualitative analysis to develop the community survey*. The community survey was a brief self-administered online survey built and distributed using Qualtrics software.²⁰ We asked parents to rate their familiarity with CI/CT and who they would trust to notify them if they were exposed to someone who tested positive for COVID-19. A Likert scale was used for questions that measured familiarity with and attitudes toward CI/CT. The survey was available in English, Spanish, Vietnamese, and Arabic—the four most common languages used at SASEA sites.

Procedure

At the beginning of each FGD, a facilitator from the research team informed respondents of the purpose of the study and their rights, obtained respondents’ consent to record the interview via Zoom, and conducted the interview with a notetaker present. Consent was treated as an ongoing process and participants were reminded that they were able to disengage or withdraw from the FGD or survey at any time. Survey participants provided informed consent via Qualtrics before beginning the online survey. FGD participants were compensated for their time with a \$25 gift card. All survey participants were eligible to participate in a raffle to win one of three \$250 gift cards. We shared preliminary study results with parents and staff through town halls and presentations.

Data Analysis

We analyzed qualitative data using an iterative, thematic process following a modified grounded theory approach. First, members of the research team independently reviewed transcripts and developed potential codes, then discussed these codes and grouped them into themes related to participants’ perceptions, attitudes, and perceived barriers to CI/CT. The team developed a finalized codebook based on the identified themes to code all transcripts. Qualitative analysis of FGD transcripts was used to guide quantitative analysis of the community survey. We conducted univariate descriptive analyses using the community survey data to estimate the prevalence of topics raised by FGD participants within the target

communities. Ten out of 102 total questions were pulled from the survey for supplementary analysis for our qualitative findings.

RESULTS

Demographics Characteristics

We conducted 15 FGDs—13 in English and 2 in Spanish—with 20 parents and 22 school staff members. Two-hundred and ninety-seven participants consented to participate in the online survey, which took approximately 15 to 30 minutes to complete (median 19.5 minutes). Just over half of the participants ($n = 135$) were parents/guardians, 47.7% ($n = 140$) were staff, and 6.5% ($n = 19$) were both. Four individuals declined to answer the question. The median age of respondents was 39 (interquartile range: 32–45.5) years. Most participants were female (85.8%), White (64.2%), Hispanic (52.9%), had health insurance (85.2%), and completed a high school education or higher (95.9%).

Across FGD and survey data, school community members consistently emphasized that parents trust schools to be involved in CI/CT efforts, but in FGD data, school staff shared that they are overwhelmed with this added responsibility. Parents and school staff expressed their general concerns, emphasizing trust as an important factor in CI/CT, and identifying their preferred messengers in the process of CI/CT.

General Concerns

Over a quarter (27.3%) of survey participants indicated that they were not familiar at all with the case investigation process and 19.8% indicated that they were not familiar at all with the contact tracing process. In FGDs, parents and staff shared their unfamiliarity with CI/CT, their uncertainty about how much information to disclose, and questioned how their personal information was obtained and used:

I don't know how the county gets access to that [personal] information, unless the family provides it ... These are the people I was in touch with, so I've definitely been curious about how you [...] get contact tracing.

—Staff Participant

Many respondents reported a significant time lag between a COVID-19 exposure and being contacted by case investigators or contact tracers. Several participants were concerned about the reliability of recalling close contacts.

I think it's [CI/CT] necessary, but it's only as good as [...] what you remember. So, where you were, who you were around, and all of those little details. [...]It's only going to be as reliable as that.

—Staff Participant

Parents of minors are responsible for being proxy CI/CT interviewees when their child is exposed or tests positive for COVID-19. However, parents noted that young children can be unreliable narrators and may not accurately provide needed information as exemplified by the following statement:

So, my concern with contact tracing, my daughters are four and six. I don't think they could give me names of who they met or who they were in contact with ..., but then if she was in a room, only two kids are allowed, but who was the other kid? She couldn't give me that name. [...] I really don't know how efficient, I really don't know if it works.

—Staff Participant

Trust.—Many participants shared that CI/CT calls came unexpectedly from unknown phone numbers, which some people avoided entirely given the volume of scam calls Americans received during the pandemic²¹:

I purposely have my voicemail full because [...] I was getting solicitations [...], we just finished a political cycle. I was getting 20, 30 calls from random numbers all over the world. So I don't trust any phone call comes in. It's all solicitation. So it's kind of sad.

—Parent Participant

General mistrust in the government from parents and staff also raised concerns for sharing data about recent contacts, and many, regardless of immigration status, expressed trepidation about government surveillance.

There definitely should be laws so that [...] the government can't see who we hang out with, which, you know, if we're doing contact tracing, we are then showing exactly who we hang out with all the time.

—Staff Participant

Surveillance fears existed at the community, not just the individual level. Respondents described how their community's fear of government surveillance impacted the reliability of CI/CT. One staff member pointed out that undocumented immigrants may be hesitant to share actionable information with government agencies about themselves or their networks due to concerns over arrest or deportation.

I know a lot of our families have mistrust of like, authoritarian figures, that's, because, you know, perhaps they're not here legally, or perhaps they have other things to hide.

—Staff Participant

Preferred Messengers

Although public schools and public health officials are government entities, many participants did not perceive public health and educational sectors as government related. As a result, parents and school staff explained that they preferred CI/CT activities to be conducted by school staff as opposed to the more nebulous idea of "government." Given the option to select all entities that participants trust to notify them if they were exposed to someone who is infected with COVID-19, most survey participants reported that they trust public health officials (67.7%) and school administrators (58.5%) to conduct CI/CT. Only a third (33.1%) participants reported that they trust government officials. Similarly, in FGDs, staff participants reported that parents do not feel comfortable speaking to government

officials but do feel comfortable speaking to someone from their child's school regarding their child's CI/CT process.

There are many reasons why [...] especially our families would shy away from, like being talked to by somebody that they don't necessarily know, or are already on the fence about what their role is in their lives, right? So, I think at the very least, if there is a situation where somebody has gone through this, that having the ability to [...] have myself or my principal, be involved with that [...] portion of the situation would be significantly more useful and helpful.

—Staff Participant

Participants shared that they trust their school principal and staff, as school staff have established relationships with students and parents and are perceived as trustworthy individuals to conduct CI/CT interviews:

I know a lot of our families ... they have formed some really close connections with some of our staff. So, I would definitely say for our families, a staff member [should conduct CI/CT]. However, I think choosing that staff member would be a very important job just to ensure the fidelity of things for sure.

—Staff Participant

Participants expressed the view that case investigators/contact tracers should be people who are already trusted within the school community but are also properly trained to conduct interviews.

I think it should be the administration, ..., or [...] if they train a specific staff member, being able to answer all the questions that follow that ... I would be more comfortable if it was the principal or, um, somebody else, in admin. Um, but if it is another staff member, just as long as that person is able to answer all the questions about it.

—Staff Participant

Overwhelmed Institution.—Although school involvement in CI/CT would dissolve many of the barriers to current CI/CT efforts in schools, staff participants reported being overwhelmed and overburdened from the amount of extra work resulting from the pandemic.

Our school attendance clerk and our nurse, I mean- they are so busy. One case causes them so much paperwork and so much- it's a trigger effect, and just- to even do the attendance about who's where and what and everything else, they can't put that on a school employee again. You know, that's not their job.

—Staff Participant

In addition, school staff shared that they do not have the resources to properly conduct CI/CT:

My concern is that the person who may be in charge of the COVID response ... may not have a certain protocol and might not have the training ... it's such

an important role that I would be concerned about who would have that role on campus.

—Staff participant.

DISCUSSION

Our findings highlight several barriers preventing successful CI/CT in schools while simultaneously indicating a high level of community trust for school administrators and staff. Despite parent preferences for dealing primarily with school staff to address COVID-19 exposures in school, staff members emphasized a lack of time and resources to conduct CI/CT. Respondents described a general lack of awareness, logistical challenges, and hesitation to participate. Many participants expressed that their mistrust in the government and the people conducting CI/CT at their schools was a major factor in their hesitation to participate. We found that parents and school staff trusted their schools to guide them through the process of CI/CT because they have already established frequent contact and trust the school principal to bridge communication between the public health department and families. Furthermore, parent FGD participants pointed out that it is difficult for them to cooperate with contact tracers because children in school spend most of their day away from their parent's direct supervision; therefore, teachers and school staff are better equipped to aid the process of CI/CT than parents. Though our FGDs were conducted during a surge of COVID-19 in the region and the health department was overwhelmed with an increase in positive cases to trace, other studies have found that these early perceptions of CI/CT persisted regardless of fluctuations in COVID-19 cases and local health department preparedness.¹²

Consistent with other studies conducted in the United States,^{10,11} we found that fear and distrust of the CI/CT process were major barriers to participation, especially for undocumented individuals and for those living in a household of mixed documentation status,^{8,22} as San Diego shares with Mexico the world's busiest international land crossing and is home to a large binational Hispanic and refugee population. This may be due to previous incidents in the region in which records from the California Department of Motor Vehicles were purportedly shared with Immigration and Customs Enforcement officials. At approximately the same time as data collection began for this study, a local news outlet had also run a story with the headline "County distributes COVID patients' addresses to police agencies", although the San Diego County Health and Human Services Agency (SDHHS) sought to clarify that the information sharing was extremely limited and consistent with guidelines from the US Department of Health and Human Services Office of Civil Rights.^{23–25} These experiences and narratives likely contributed to mistrust in the CI/CT process, and may have the potential to exacerbate existing health disparities for immigrant communities that already have elevated COVID-19 risk.²⁶ It is important to note that participants often disassociated schools as government entities. Therefore, CI/CT led by the public health department in collaboration with schools have the potential to garner community trust and participation.

IMPLICATIONS FOR SCHOOL HEALTH

Because CI/CT are specialized skills that require both social and cultural awareness of the local communities,²⁷ collaboration between public health sectors and schools is necessary to maximize its effectiveness. A community hub model, in which schools are supported to build on community assets by linking people to networks and services that provide an opportunity to improve community health,^{28,29} may be an appropriate strategy to address this need. In California, many schools have already functioned as community hubs.¹⁶ By leveraging these existing structures, schools could be a valuable adjunct to assist local public health agencies with school-related COVID-19 CI/CT. Providing schools with the necessary financial and technical resources to function as a community hub would support and improve participation in CI/CT.³⁰ This would also support a broader ecosystem of public health and public-school cooperation, benefiting communities that have been hard-hit by the pandemic beyond simply stopping infection chains. By encouraging more schools to function as a community hub, schools can disseminate resources that are tailored to the local concerns and needs of their specific community to bridge the gap between the public health system and its community.

Limitations

This was a cross-sectional analysis that utilized a convenience sample of parents and staff affiliated with schools enrolled in the SASEA pilot project. Causality cannot be inferred from the quantitative data we report; however, our qualitative findings do highlight potential directionalities and mechanisms.³¹ The self-administered online nature of the survey and focus groups likely over-emphasized reporting by those with better internet access. Some of our FGDs were unusually small ($n = 2$ or $n = 3$). However, the methodological literature suggests that very small focus groups (VSFGs) are primarily problematic only if the small nature of the group inhibits inter-participant discussion,³² which did not appear to be the case during our data collection. Moreover, VSFGs may in fact generate richer data through providing more time for each participant to discuss. Additionally, VSFGs provide space for participants who might typically be excluded or have difficulties with scheduling and participation, especially low-income immigrant and/or non-English speaking parents with school-aged children during a global pandemic.³³ Additionally, although CI/CT are two distinct processes, many FGD participants often refer to both more generally as “contact tracing.”

Conclusions

Without implementation of proper COVID-19 prevention measures, CI/CT, and information dissemination, infection may spread and schools may be forced to close and return to a virtual classroom environment. Our findings show that parents and school staff trust schools to be involved in CI/CT efforts, but school staff reported being overwhelmed with this added responsibility. These findings suggest that schools and childcare centers can be a valuable resource to assist health departments in effectively carrying out CI/CT activities during a pandemic; however, there is a need for government and school districts' support to build capacity and resources necessary for schools to perform this function. Continuing the current approach will likely further strain school resources and lead to ineffective CI/CT.

Investing in schools as community hubs is necessary so they can become important partners in prevention and mitigation in public health.

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