



COVID-19 Case Investigation and Contact Tracing in Central Washington State, June–July 2020

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Abstract

Objective To evaluate participation in COVID-19 case investigation and contact tracing in central Washington State between June 15 and July 12, 2020.

Methods In this retrospective observational evaluation we combined SARS-CoV-2 RT-PCR and antigen test reports from the Washington Disease Reporting System with community case investigation and contact tracing data for 3 health districts (comprising 5 counties) in central Washington State. All 3 health districts have large Hispanic communities disproportionately affected by COVID-19.

Results Investigators attempted to call all referred individuals with COVID-19 ($n = 4,987$); 71% were interviewed. Of those asked about close contacts ($n = 3,572$), 68% reported having no close contacts, with similar proportions across ethnicity, sex, and age group. The 968 individuals with COVID-19 who named specific contacts (27% of those asked) reported a total of 2,293 contacts (mean of 2.4 contacts per individual with COVID-19); 85% of listed contacts participated in an interview.

Conclusions Most individuals with COVID-19 reported having no close contacts. Increasing community engagement and public messaging, as well as understanding and addressing barriers to participation, are crucial for CICT to contribute meaningfully to controlling the SARS-CoV-2 pandemic.

Keywords Case investigation · Contact tracing · Participation · Community engagement · COVID-19

Introduction

Case investigation and contact tracing (CICT) represents one strategy to limit the spread of infectious diseases and is part of the nationwide approach to decrease community transmission of SARS-CoV-2, the virus causing coronavirus disease 2019 (COVID-19) [1]. To be effective, CICT programs must quickly reach most individuals diagnosed with COVID-19,

ensure they isolate themselves, and promptly identify and quarantine their close contacts to prevent further transmission [1]. Community trust and participation are essential to successful CICT.

Methods

We examined participation in CICT in 3 health districts (comprising 5 counties) in central Washington State with large Hispanic populations that were experiencing a disproportionate burden of Washington's COVID-19 epidemic [2]. In the state's community CICT program, investigators made up to 4 phone calls to individuals with lab-confirmed COVID-19 and up to 3 phone calls to identified contacts (using an interpreter if needed), with a text message reminder following each phone call if the individual did not answer. For individuals under 18 years old, investigators could interview their parent/guardian. When possible,

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individuals with COVID-19 who did not respond were sent an online form containing case investigation questions. Individuals were referred to the community CICT program if they resided in a community setting (rather than in a long-term care facility, correctional/detention facility, or other institutional setting) and if a phone number was available.

We combined SARS-CoV-2 RT-PCR and antigen test results from the Washington Disease Reporting System with CICT data, which were stored in Research Electronic Data Capture (REDCap) databases [3], using Stata Version 15 (Statacorp, College Station, TX). Cases were defined as SARS-CoV-2 infection diagnosed by positive RT-PCR or antigen test, and were eligible for inclusion if the individual resided in one of the 3 included health districts and their first positive test was collected between June 15–July 12, 2020. Close contacts (hereafter “contacts”) were defined as individuals who had been within 6 feet of a person with COVID-19 for at least 15 min. We assessed demographic information, the proportion of individuals with COVID-19 called by case investigators, individuals’ participation in interviews, the proportions of individuals reporting and not reporting contacts (with stratification by ethnicity, age, sex, and employment status), and contacts’ participation in interviews. This activity was reviewed by CDC and was conducted consistent with applicable federal law and CDC policy.

Results

The 3 included health districts have a combined population of 651,281 people [4]. Between June 15–July 12, 2020, 4,987 individuals with COVID-19 were referred for community CICT (Table 1). The mean age of these individuals was 37 years; 52% reported female birth sex ($n=4,706$; information on gender was not consistently available). Of individuals who reported ethnicity and race ($n=3,591$), 77% listed Hispanic, 18% listed non-Hispanic White, and less than 6% reported another race/ethnicity or reported their race/ethnicity as unknown. Of those who reported a preferred language ($n=3,654$), 27% preferred Spanish. Among the 2,293 reported contacts, 79% were household contacts; mean age was 28 years, with 36% under 18 years old.

Case investigators attempted to call 100% ($n=4,987$) of referred individuals with COVID-19; 71% participated in an interview, 9% refused interview, 4% had no working phone number available, and 16% did not respond to calls or text messages. Investigators sent an online case investigation form to 705 individuals (out of 785 who did not respond); 14% of those receiving the form completed at least part of it (2% of total individuals with COVID-19). Of those asked about their recent contacts in an interview or the online form ($n=3,572$), 68% reported having no contacts; an additional

5% initially stated they had or might have had contacts but did not provide specific contacts for contact tracing. The proportion of individuals with COVID-19 reporting no contacts was equivalent for Hispanic and non-Hispanic individuals (68% for both groups) and was also similar when stratified by age group, birth sex, employment status, and health district (Table 1).

Overall, 968 individuals with COVID-19 (27% of those asked) reported a total of 2,293 contacts, for a mean of 2.4 contacts per individual with COVID-19 (mean of 1.9 household contacts and 0.5 non-household contacts). Of listed contacts, 85% participated in an interview, 3% refused an interview, 4% had no working phone number available, and 8% did not respond to calls or text messages (Table 1).

Discussion

Investigators attempted to call 100% of individuals with COVID-19 referred for investigation and reached over 70%. However, most individuals reported no contacts—a higher proportion than in some prior evaluations [5, 6] but similar to another recent report [7]. Based on input from local partners, as well as experience from other states [8] we initially hypothesized that Hispanic individuals might be less willing to report contacts because of concerns about immigration status and job security. However, there was no difference in reporting of contacts by ethnicity, and minimal differences by age group, sex, and employment status.

Although we cannot assess the true proportion of individuals with COVID-19 who had close contacts, available United States Census Bureau data for 4 of the 5 counties show that 18–30% of households consist of one person living alone [9]. The limited reporting of contacts (68% of individuals reported having no contacts and only 27% reported actionable contacts) suggests reluctance to participate in this part of CICT. Additionally, it seems unlikely that 69% of individuals under 18 years old truly had no contacts. CICT programs should measure and focus on increasing the proportion of individuals reporting contacts to maximize the impact of prospective CICT in decreasing community transmission. Potential approaches to increase trust and participation in CICT include developing locally relevant messaging to encourage participation and offer reassurance about confidentiality, partnering with locally trusted groups such as healthcare organizations to conduct CICT, high-quality training for investigators, offering incentives for participation, increasing use of text messaging, and implementing policies that support individuals with COVID-19 and exposed contacts to stay home from work without experiencing financial hardship or job loss [10–12]. Targeted community engagement can also be considered for immigrant and migrant populations [11].

Table 1 Demographic information and participation in COVID-19 case investigation and contact tracing—central Washington State, June 15–July 12, 2020

Measure	n or mean*	% or range*
Individuals with COVID-19 referred for case investigation [†]	4987	–
Age in years (mean)	37	0–100
Female sex**	2,454	52
Hispanic	2,751	77
Non-Hispanic white	641	18
Other or unknown race/ethnicity	199	6
Spanish preferred	986	27
Employed	1,942	54
Individuals called by an investigator	4,987	100
Individuals interviewed	3,534	71
Individuals unable to be interviewed	1,453	29
Refused	460	9
Non-working phone number	208	4
No answer or response to phone calls	785	16
Individuals later completing the online investigation form [‡]	100	2
Individuals with COVID-19 reporting no contacts	2,441	68
Hispanic individuals	1,870	68
Non-Hispanic individuals	547	68
0–17 years	307	69
18–22 years	293	68
23–44 years	1,098	68
45–64 years	605	71
≥ 65 years	138	64
Female sex**	1,184	66
Employed	1,263	66
Not currently employed	1,166	71
Health district A	278	75
Health district B	1,109	72
Health district C	1,054	63
Individuals with COVID-19 listing contacts	968	27
Total contacts elicited***	2293	–
Age in years (mean)	28	0–87
< 18 years	825	36
Household contact	1,799	79
Mean number of contacts per individual with COVID-19 who listed contacts	2.4	1–16
Mean household contacts per individual	1.9	0–9
Mean non-household contacts per individual	0.5	0–15
Contacts interviewed	1,941	85
Contacts unable to be interviewed	350	15
Refused	61	3
No working phone number available	101	4
No answer or response to phone calls	188	8

*Denominators are not consistent due to different data sources (lab reports vs. case investigations and contact interviews) as well as missing data. Due to rounding percentages may not add to 100%

**Information on sex is reported because information on gender was not reliably available

***If multiple individuals with COVID-19 share a household then their shared household contacts will only be listed under one individual, so contact metrics should not contain duplicate household contacts

COVID-19 coronavirus disease 2019

[†]Individuals who reside in long-term care facilities or other institutional settings are investigated separately

[‡]One individual started the online investigation form but then spoke with an investigator by phone instead

This evaluation has several limitations. First, we relied on routine data from a newly-implemented COVID-19 CICT system, which might affect data quality. Second, we relied on race and ethnicity information provided by individuals reached for investigation, limiting our ability to characterize individuals not reached. In the future, more consistent reporting of race and ethnicity on lab test reports would allow for more complete program evaluation. Third, from the available data we cannot assess individuals' reasons for not participating in interviews or not reporting contacts, individuals' willingness to isolate or quarantine, or contacts' subsequent SARS-CoV-2 test results. Fourth, local cultural, economic, and political factors may influence individuals' decisions on participation in CICT, limiting the generalizability of these results.

Conclusions

Overall, this evaluation revealed that most individuals with COVID-19 reported having no contacts, with minimal differences by age, sex, or ethnicity. Increasing community engagement and public messaging, as well as understanding and addressing barriers to participation, are crucial for CICT to contribute meaningfully to controlling the SARS-CoV-2 pandemic.

Authors Contributions RRL, PKM, JEO, RAB, and JSM conceived and designed the study. JSM and RAB led data acquisition and initial analysis. All authors contributed to study hypotheses and interpretation of results. JSM drafted the initial version of the manuscript, after which all authors provided input and approved the manuscript.

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Data Availability Data may be requested from the corresponding author, though any data sharing will need to be approved to ensure individuals' personal privacy is maintained.

Code Availability Statistical code is available from the corresponding author upon reasonable request.

Declarations

Conflict of Interest The authors have no conflicts of interest to declare.

Ethical Approval This activity was reviewed by CDC and was conducted consistent with applicable federal law and CDC policy. See e.g., 45 C.F.R part 46, 21 C.F.R. part 56; 42 U.S.C. §241(d); 5 U.S.C. §552a; 44 U.S.C. §3501 et seq.

Informed Consent This evaluation relied solely on routinely collected public health data.

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