

COVID-19 Case Investigation and Contact Tracing Programs and Practice: Snapshots From the Field

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ABSTRACT

Between Fall 2020 and Spring 2021, the Association of State and Territorial Health Officials conducted 2 rapid queries to collect information from the field regarding the status of COVID-19 case investigation and contact tracing (CI/CT) programs and practice. These short surveys were distributed to senior deputies in state and territorial health agencies, yielding a response rate of 45.8% (November 2020) and 40.7% (April 2021). Findings indicated that CI/CT staff roles and assigned functions varied across jurisdictions, as did staffing levels/capacity, approaches for linking individuals to social supports, and program changes that were planned or underway. Agency-reported staffing levels/capacity and programmatic challenges changed over time, highlighting the dynamic nature of CI/CT program practice and implementation. While findings from the surveys cannot be generalized to the national level, they provide critical insights from the field on CI/CT program implementation, challenges, and changes in response to the evolving COVID-19 epidemic in the United States.

KEY WORDS: case investigation, contact tracing, COVID-19, public health programs

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The authors thank their colleagues from the Centers for Disease Control and Prevention Contact Tracing and Innovations Section and the Council of State and Territorial Epidemiologists for their contributions to survey instrument development and dissemination of findings to key stakeholders. This study would not have been possible without the participation of the state/territorial public health leaders who responded to the surveys. The authors are grateful to them and the public health staff supporting COVID-19 contact tracing programs throughout the United States.

Support for this effort was provided by a grant from the Robert Wood Johnson Foundation.

This study is exempt from the institutional review board as it includes only interactions involving survey procedures, and disclosure of the human participants' responses would not reasonably place the subjects in a position of liability legally, financially, or to their reputation. All information obtained from the participants was knowingly submitted to the ASTHO and all information was obtained through surveys with no interactions and no manipulations of the subjects' environments. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

The authors have indicated that they have no potential conflicts of interest to disclose.

Supplemental digital content is available for this article. Direct URL citations appear in the printed text and are provided in the HTML and PDF versions of this article on the journal's Web site (<http://www.JPHMP.com>).

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Case investigation and contact tracing (CI/CT) have been conducted for decades by state and local health agencies to suppress infectious disease outbreaks.¹⁻³ However, the coronavirus disease 2019 (COVID-19) required a rapid expansion of these strategies. As these established public health interventions are applied to COVID-19,⁴⁻⁸ data from the public health practice community are critical to characterize CI/CT program models, capacity, challenges, emerging practices, and changes over time. In November 2020 and April 2021, the Association of State and Territorial Health Officials (ASTHO) conducted a pair of rapid queries of its members to capture snapshots on the status of COVID-19 CI/CT programs and practice, support situational awareness, and leverage emerging evidence from the field.

Methods

The rapid queries were distributed to 59 health agency senior deputies in the states, US territories and freely

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DOI: 10.1097/PHH.0000000000001488

associated states, and the District of Columbia. These short electronic surveys were designed to reduce respondent burden and collect near real-time information from health agencies. The first rapid query was fielded from November 9 to 16, 2020, and the follow-up query was fielded from April 12 to 15, 2021. The survey instruments included 10 to 12 open- and closed-ended questions.

Results

Twenty-seven jurisdictions participated in the November 2020 survey and 24 participated in the April 2021 survey, representing a response rate of 45.8% (27/59) and 40.7% (24/59), respectively. In both surveys, the respondents were distributed across 9 of 10 HHS regions. Sixteen states (27.1%; 16/59) responded to both surveys.

Staff roles and functions

In April 2021, the respondents were asked to characterize how CI/CT job tasks⁹ aligned with discrete staff roles in their jurisdiction. The respondents were evenly split between approaches where CI/CT functions were performed jointly by 1 staff role (41.7%; 10/24) and those where the job tasks bifurcated between separate case investigator and contact tracer staff roles (41.7%; 10/24). Four jurisdictions indicated that they use a combination of both approaches (16.7%; 4/24).

Staffing levels and capacity

In November 2020, most respondents (70.4%; 19/27) reported that they did not have enough case investigators and contact tracers to investigate all COVID-19 cases and trace all contacts. In the April 2021 follow-up survey, CI/CT capacity was explored further, and respondents were asked to distinguish between CI and CT staffing capacity. Most jurisdictions (62.5%; 15/24) indicated that they had enough case investigators and contact tracers to investigate all COVID-19 cases and trace all contacts. A minority of jurisdictions (12.5%; 3/24) indicated that they had more case investigators and contact tracers than needed at that point in time; 12.5% (3/24) indicated that they did not have enough of either role; and 8.3% (2/24) indicated that they had enough contact tracers but not enough case investigators to meet their needs (see Supplemental Digital Content Figure 1, available at <http://links.lww.com/JPHMP/A905>).

Performance and prioritization criteria

When asked about CI/CT performance, participants in the April 2021 survey estimated, on average, that they were able to investigate 80.2% (range, 26.0%-100%) of reported COVID-19 cases and trace 80.8% (range, 25.0%-100%) of contacts identified via case investigation. A quarter (25.0%; 6/24) indicated that they were able to both investigate and trace 100% of cases and contacts.

Those who indicated ability to investigate or trace less than 100% of all cases or contacts were asked about the criteria used to prioritize cases and contacts. Recentness of cases and contacts was the most frequently identified criterion (81.3%; 13/16). Considerations about exposure/transmission setting and individual case/contact characteristics were also used to prioritize case investigations and contact tracing efforts (see Supplemental Digital Content Figure 2, available at <http://links.lww.com/JPHMP/A906>).

Connecting to resources and social supports

In both surveys, the ASTHO asked participants how they were connecting clients to additional resources (eg, housing, food, childcare, or mental health services) during isolation and quarantine. The most common approaches involved case investigators and contact tracers providing individuals with contact information of external support agencies (November 2020: 72.7% [16/22]; April 2021: 62.5% [15/24]) or placing referrals to these agencies on their client's behalf (November 2020: 31.8% [7/22]; April 2021: 41.7% [10/24]) (see Supplemental Digital Content Figure 3, available at <http://links.lww.com/JPHMP/A907>).

Contact tracing program challenges

In November 2020, the participants identified the following top challenges facing their jurisdiction's COVID-19 CI/CT program: expanding workloads due to disease resurgence (85.2%; 23/27), technology and data systems (63.0%; 17/27), public trust and acceptance (63.0%; 17/27), long-term/sustainable funding (59.3%; 16/27), and program protocols and workflows (40.7%; 11/27). In April 2021, the most frequently selected challenges included public acceptance/trust (73.9%; 17/23); evaluating impact and effectiveness (60.9%; 14/23); technology and data systems (43.5%; 10/23); workforce retention (39.1%; 9/23); long-term/sustainable funding (30.4%; 7/23); and delays or incomplete reporting of test results to the health agency (30.4%; 7/23). Participants from

TABLE**COVID-19 Case Investigation and Contact Tracing Program Challenges: Qualitative Responses from Health Agency Staff, November 2020 and April 2021**

Themes	Select Quotes From Respondents ^a
Public acceptance	<p>"Pandemic fatigue and concerns over sharing personal health information continue to plague 100% participation with our contact tracing process." —November 2020 respondent</p> <p>"As the pandemic has gone into its second year, we have far fewer people thanking us for our work and more people . . . frustrated and fatigued with our isolation and quarantine guidelines." —April 2021 respondent</p>
Technology and data systems	<p>". . . our older systems have had to be modified and we are moving to a new system for case investigation to ensure we don't bog down the older system further." —November 2020 respondent</p> <p>"Leveraging this very complex data set successfully, especially as it is not integrated with any of our surveillance systems, is a tremendous challenge." —April 2021 respondent</p>
Long-term and sustainable funding	<p>"All of us . . . need longer-term, sustainable funding in order to recruit and hire state/local positions instead of trying to only redirect local/state staff or contract short-term assignments." —November 2020 respondent</p> <p>"Without additional funds, we will not be able to sustain this [contact tracing] model for the long term." —April 2021 respondent</p>
Workforce needs and staffing plans	<p>"Because these positions are considered 'temporary,' turn-over can occur as people look for more stable employment." —November 2020 respondent</p> <p>"At times we have had too many staff and during surges we did not have enough. [Predicting] future needs has been most challenging because as soon as we think we have our staffing plan figured out something new happens (variants, holiday surges, vaccines, college outbreaks, schools reopening)." —April 2021 respondent</p>
Program implementation in an evolving response	<p>"With the rapidly increasing burden of new cases, all areas of infrastructure are now stretched, lacking computers, supervisors, and [quality assurance] oversight." —November 2020 respondent</p> <p>". . . with frequent guidance changes and unknowns (variant strains, case counts, breakthrough cases . . .), it has been difficult to establish future planning and direction." —April 2021 respondent</p>

^aQuotes edited for length and clarity.

both surveys expanded on CI/CT program challenges via open-text responses (Table).

Programmatic changes

In the April 2021 survey, most jurisdictions (95.8%; 23/24) reported some type of adjustment to their COVID-19 CI/CT program that was planned or currently underway (see Supplemental Digital Content Figure 4, available at <http://links.lww.com/JPHMP/A908>). The top 2 reported programmatic adjustments included training or retraining staff on CI/CT protocols (58.3%; 14/24) and incorporating additional protocols for cases to self-notify their own contacts (58.3%; 14/24). Other reported changes included redeploying CI/CT staff to support COVID-19 vaccination efforts (50.0%; 12/24); enhancing CI/CT services for minority and at-risk populations (45.8%; 11/24); planned or in-progress efforts to scale down the CI/CT workforce (41.7%;

10/24); integrating vaccine campaign efforts such as vaccine education and appointment scheduling into CI/CT workflows (25.0%; 6/24); and planned or in-progress efforts to scale up the workforce (8.3%; 2/24).

Discussion and Conclusion

Findings from the rapid queries describe how COVID-19 CI/CT programs are evolving over time. Changes in COVID-19 incidence over time, in addition to process adaptations that streamlined or focused CI/CT efforts (eg, CI/CT prioritization, case-driven notification), may have influenced self-reported staff capacity between November 2020 and April 2021. Although April 2021 responses suggest that some jurisdictions may have reached an equilibrium between their staffing levels and the volume of cases and contacts, this equilibrium was not consistently reported by all respondents. Identification of flexible staffing models

that can scale appropriately in response to changes in local disease transmission may support CI/CT programs moving forward. In addition, as 41.7% of April 2021 respondents were planning or in the process of scaling down their CI/CT workforce, ongoing assessment of workforce staffing levels and capacity will be critical.

Our April 2021 survey found variation across jurisdictions with regard to how COVID-19 CI/CT job tasks were distributed across staff but high self-reported performance overall, with an estimated 80.2% of cases investigated and 80.8% of contacts traced. While these performance findings were self-reported estimates, they fall within the ranges reported from previous assessments of COVID-19 CI/CT outcomes.^{4,5,8} Further evaluation is needed to assess how joint or bifurcated staffing approaches may have impacted CI/CT timeliness and effectiveness. Jurisdictions unable to investigate and trace all cases and contacts reported using prioritization criteria that aligned with the Centers for Disease Control and Prevention's guidance.¹⁰

Challenges encountered by CI/CT programs also changed over time, though 3 of the top challenges—public acceptance and trust, technology and data systems, and long-term/sustainable funding needs—were consistent across both surveys. Concerns around public mistrust, misinformation, and pandemic fatigue underscore some of the challenges around acceptance of public health interventions.^{11,12} Other items that were considered top challenges in November 2020, such as heavy workloads due to high case numbers and program protocols and workflows, were selected less frequently in April 2021, suggesting some stabilization in both the development and implementation of program protocols and staffing levels available to meet the current volume of cases/contacts. Evaluating impact and effectiveness, workforce retention, and delays or incomplete reporting of test results to the health agency emerged as new top challenges in April 2021, which may point to areas for additional guidance and technical assistance from federal and other national partners.

Findings from the April 2021 survey also highlight future directions for CI/CT programs, including efforts to keep staff current on evolving CI/CT protocols, reduce burden on public health programs through case-driven notification of contacts, and focus services for minority and at-risk populations. COVID-19 vaccine campaign activities were also having an impact on CI/CT programs, with half of the responding jurisdictions indicating that they were redeploying CI/CT staff to support COVID-19 vaccination efforts and a quarter integrating vaccine campaign efforts into CI/CT workflows.

Implications for Policy & Practice

- State and territorial COVID-19 CI/CT programs are dynamic and evolving in response to the changing COVID-19 pandemic.
- There is variation across programs with regard to CI/CT staff roles and assigned job tasks, staffing levels and capacity, approaches for linking individuals to social supports, and programmatic changes that are planned or underway.
- Three of the top challenges identified across both surveys—public acceptance and trust, technology and data systems, and long-term/sustainable funding needs—may inform future considerations around program investments and areas where further research is needed to identify evidence-based practices.
- Although findings from the rapid queries should not be overgeneralized, these snapshots from the field provide insights to COVID-19 CI/CT program implementation, challenges, and changes over time.
- As COVID-19 CI/CT programs prepare and respond to emerging and evolving challenges (eg, in-person school reopenings and surges in cases due to viral variants), situational awareness from the practice community obtained, when possible, through low-burden data collection methods will continue to be critical. Findings from these rapid data collection efforts may complement longer-term studies and inform programming and implementation of current and future investments in pandemic response and public health infrastructure.

Limitations

This study has several limitations. First, the response rate was less than 50% for each survey, likely due in part to the short time the surveys were fielded and competing priorities at state/territorial health agencies. Furthermore, only 1 US territory responded to either survey. For these reasons, generalizing the findings to a national level is not recommended. Second, respondent groups were not identical across surveys. Because these groups were not representative samples, changes in findings between the 2 surveys could be partially attributable to the difference in responding agencies. Third, variations in local public health governance structure and organization of CI/CT programs may have limited survey respondents' ability to fully represent the status of CI/CT at both the state and local levels. Finally, findings related to CI/CT staffing levels, capacity, and performance were agency-reported estimates and have not been validated.

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