

Contact Tracing: Essential to the Public Health Response and Our Understanding of the Epidemiology of Coronavirus Disease 2019

Keri N. Althoff,¹ Sally B. Coburn,¹ and Denis Nash^{2,3}

¹Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, USA, ²Department of Epidemiology, Graduate School of Public Health and Health Policy, City University of New York, New York City, New York, USA, and ³Institute for Implementation Science in Population Health, City University of New York, New York City, New York, USA

(See the Major Article by Rosenberg et al on pages 1953–9.)

Contact tracing, which includes information gathering, health communication around testing, and support for isolation and quarantine, is an important element of the coronavirus disease 2019 (COVID-19) public health response. Contact tracing can minimize the reproductive number, R_0 , by identification and testing of contacts of people diagnosed with symptomatic or asymptomatic severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection and by interrupting virus transmission with quarantine and isolation. In the study of the first 229 confirmed COVID-19 cases and their household contacts in New York State (outside of New York City), Rosenberg et al examined the data from contact tracing efforts and demonstrated widespread community and household transmission of SARS-CoV-2 in need of urgent public health intervention. As the pandemic in the United States continues to evolve, data from contact tracing can continue to inform our understanding of SARS-CoV-2 transmission and guide the public health response [1].

A key finding of Rosenberg et al was the statewide positivity rate

(proportion of molecular tests positive for SARS-CoV-2) of 33% in March, increasing from a daily minimum of 11% to 48% as the outbreak surged [1]. Although the first COVID-19 case was confirmed in New York on 1 March 2020, these positivity rates signaled that widespread community transmission was occurring in March.

The second key finding was the very high proportion of household contacts also infected with SARS-CoV-2, which suggests a high likelihood of transmission within households, corroborating findings from Wuhan, China [1, 2]. Although the Centers for Disease Control and Prevention (CDC) has guidance for how to care for ill household members with COVID-19, the guidance would be challenging to follow if the ill person is the only adult in a household with school-aged children or others who need care; if there is not a separate bedroom and bathroom for isolation (or a source to improve air circulation if a separate space is not available); or if the caretaker does not have access to gloves, disinfectants, and a washing machine [3]. These limitations are likely to be more common among people of lower socioeconomic status, who are also experiencing a disproportionate burden of COVID-19 illness and impact [4]. Contact tracers support individuals in isolation, and equipping them with the ability to send gloves, disinfectant, and fans may also help reduce household transmission.

Contact tracing can be extremely labor-intensive in part due to missing and incorrect information available to contact tracers [5]. The study by Rosenberg et al prompts the question: Can technology, electronic medical records, and other innovative strategies (such as at-home testing or self-collection of specimens) be leveraged alongside existing public health infrastructure to improve the efficiency, reach, and impact of larger-scale test-and-trace initiatives?

Rosenberg et al described that the contact tracing and testing associated with their investigation included “COVID-19 home testing teams and alternative specimen collection sites” that “enhanced community testing, improving individuals’ access to testing, and decreasing healthcare system burden” [1]. This raises important considerations for jurisdictions that are trying to rapidly expand testing as part of contact tracing efforts. Leaving home to get tested may increase the risk of SARS-CoV-2 acquisition among those seeking a test who are not infected and increase the risk of onward community transmission among those who are infected. Contact tracing that includes home-based molecular and/or serologic specimen collection to trigger isolation and quarantine may be especially critical when both testing and physical distancing are necessary to achieve the public health goals of epidemic control and mitigation of community transmission. As of this writing, there have been a handful of attempts to deploy at-home testing and/or self-collection and mailing of

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Correspondence: K. N. Althoff, 615 N Wolfe St, Rm E7142, Baltimore, MD 21093 (kalthoff@jhu.edu; @kerinalthoff).

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specimens for SARS-CoV-2 testing as part of public health efforts and research. However, the US Food and Drug Administration has recently halted a program in Seattle from returning results to those wishing to be tested [6–8]. Despite recent regulatory challenges, research to inform regulations that permit novel and effective public health approaches is urgently needed. Given the unprecedented nature of this pandemic and the response, the importance of generating evidence and learning from public health implementation activities such as those reported by Rosenberg et al cannot be overstated and must continue.

As the COVID-19 epidemic in the United States evolves, the “reopening” plans for many geographic regions include test-and-trace as essential to keeping transmission low. Contact tracing and testing of household members of those newly diagnosed with SARS-CoV-2 was possible with existing contact tracing resources in New York State when the number of new diagnoses was low. However, it becomes infeasible when widespread community transmission takes hold; the control strategies must rapidly shift to nonpharmaceutical interventions, especially physical distancing. Once these interventions succeed in reducing community transmission, physical distancing restrictions will be lessened (ie, reopening), and test-and-trace strategies will again be deployed to facilitate epidemic control and interruption of SARS-CoV-2 transmission via isolation and quarantine.

During this phase of the epidemic, using technology to aid contact tracing may reduce the number of days a potentially infectious person is not quarantined or in isolation. The North Dakota Department of Health created the Care19 app that uses the Global Positioning System (GPS) to track location via mobile phone, assigns users a random identification number, and requires consent from COVID-19 cases to use their information for contact tracing and forecasting [9]. Utah rolled out the Healthy Together app to use Bluetooth and GPS data connected

with individual identifiers [10]. If consent is provided, the contact tracer gains access to information about the contact’s movement and uses that information to reduce gaps in recollection, effectively reducing the time spent and maybe even improving the accuracy of the information. Apple and Google are reportedly developing technology that will not track users’ locations (to protect privacy) but will use Bluetooth technology to determine if someone has been in contact with a COVID-19 case [11]. The CDC has provided helpful guidance to understand the value of digital contact tracing and evaluate these tools regarding both case management and proximity tracking [12].

The demand for contact tracers is high as jurisdictions attempt to preserve the progress made in reducing R_0 through physical distancing interventions. The Johns Hopkins Bloomberg School of Public Health recently released the “COVID-19 Contact Tracing” Coursera course and has waived the fees for a certificate. On 16 May 2020, the first day the course was offered, there were more than 130 000 learners enrolled worldwide and 7 million page views.

Decisions must be made now to protect human health with the data available. As demonstrated by Rosenberg et al, data collected via contact tracing in the early phase of the US outbreak is important to understanding the epidemiology of COVID-19. Test-and-trace initiatives will yield equally important information in the current phase of the epidemic as communities begin to reopen. The contact tracers who will continue to log endless hours to protect the health of the population against COVID-19 and, subsequently, the stability of our healthcare systems should be supported and commended.

Notes

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