

# Why Contact Tracing Efforts Have Failed to Curb Coronavirus Disease 2019 (COVID-19) Transmission in Much of the United States

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By late April 2020, public discourse in the United States had shifted toward the idea of using more targeted case-based mitigation tactics (eg, contact tracing) to combat coronavirus disease 2019 (COVID-19) transmission while allowing for the safe “reopening” of society, in an effort to reduce the social, economic, and political ramifications associated with stricter approaches. Expanded tracing-testing efforts were touted as a key solution that would allow for a precision approach, thus preventing economies from having to shut down again. However, it is now clear that many regions of the United States were unable to mount robust enough testing-tracing programs to prevent major resurgences of disease. This viewpoint offers a discussion of why testing-tracing efforts failed to sufficiently mitigate COVID-19 across much of the nation, with the hope that such deliberation will help the US public health community better plan for the future.

**Keywords.** COVID-19; SARS-CoV-2; contact tracing; pandemic; disease mitigation.

Many countries that have successfully mitigated the coronavirus disease 2019 (COVID-19) pandemic to date did so via stringent measures to limit personal movement and abate public interactions [1, 2], but these approaches are unlikely to be acceptable from an economic, legal, or sociocultural perspective in the United States. Partly for this reason, our nation rushed to espouse the idea of targeted, case-based COVID-19 management [3–6], focusing on expanded testing and contact tracing, although disregarding several major obstacles that set us apart from countries that succeeded in mounting a timely, targeted response. Indeed, expansive testing-tracing programs have largely succeeded in curtailing community spread in certain countries, most notably South Korea, which is commonly referred to as the archetype for controlling COVID-19 while avoiding strict lockdowns [1, 6, 7]. Arguments were made that the initial set of “stay at home” orders implemented in many regions of the United States were intended to prevent hospital overflow and to essentially buy time to plan out a more precise strategy that would have less impact on daily life [8], taking note of what worked best in other parts of the world that preceded us in the pandemic curve. Here we discuss some urgent public

health considerations related to why heavy reliance on expanded testing-tracing efforts were largely unsuccessful in many states in the US that are now experiencing record-breaking surges in case counts.

## A LACK OF NATIONAL COORDINATION

From the beginning of the pandemic, there has been a noticeable lack of unified national leadership and coordination, which has resulted in both the absence of a robust plan (or common goals) for local and state health departments and the dissemination of confusing mixed messages to the lay public [9, 10]. For the most part, the US Centers for Disease Control and Prevention (CDC) has remained uncharacteristically silent during this national crisis [9]. In May 2020, at a time when many jurisdictions had already started relaxing their “stay at home” mandates, the CDC released a watered-down version of the original guidance documents censored by the Trump administration [11, 12]. The resulting guidance allowed for the potential reopening of schools, restaurants, bars, and other institutions that were closed in many jurisdictions earlier in the pandemic, with limited specific direction for addressing sustained community transmission [11, 12]. Notably, joint White House and CDC benchmarks for reopening (described elsewhere [13]) were flouted by several states, including Texas, Georgia, and Florida [14]. Few states had come close to meeting even just one of the CDC benchmarks, when they started reopening under the impression that voluntary social distancing and expanded testing-tracing would be sufficient to curb the epidemic in regions with seemingly flattening rates of ongoing

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transmission [15–17]. Had states been encouraged to heed CDC benchmarks, it may have been possible to avoid the major surges now being observed in these states [16, 18].

### **INADEQUATE TESTING SUPPLY**

In addition to the lack of coordinated public health leadership, it has been surprising that, despite being a resource-rich nation, the United States still struggles to achieve adequate and consistent testing rates [19, 20]. In areas experiencing surges, there have been reports of long lines, test shortages, and over week-long turnaround times, even though the past 5 months since the start of the epidemic should have provided ample time to increase supply chains for testing materials [20, 21]. It is a fundamental concept that health departments cannot trace cases that remain undetected. Yet even prior to the current surges, many putative cases, even those who were symptomatic, were unable to obtain timely severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) testing and results, and very few jurisdictions had implemented widespread, freely available public surveillance testing [22, 23]. This ineptitude in deploying a cohesive testing strategy stems from many organizational and national leadership barriers, including an underfunded public health outpatient testing infrastructure, regional insufficiencies in testing supplies/reagents, and a lack of national guidance regarding the best strategy for implementing surveillance testing [24]. Reliable, widespread, no-cost surveillance testing should have been available nationwide early in the US epidemic, as it is the basis on which the other tools in the public health toolbox are predicated. Had widespread testing been available while community spread was still relatively low, contact tracing endeavors may have been able to quickly identify and eradicate hotspots and transmission chains within affected communities. However, that window of opportunity has passed, and sustained transmission has led to rapidly growing caseloads and inability to keep up with contact tracing in many jurisdictions, despite some efforts to scale capacity [15, 17, 18, 25–27].

### **CONTACT TRACING: MAJOR GOALS, CHALLENGES, AND POSSIBLE SOLUTIONS**

Currently, the goal of contact tracing is still to identify the maximal number of SARS-CoV-2 infected and exposed individuals in order to enable transmission mitigation through isolation and intervention [28]. However, contact tracing is usually most successful during troughs of the epidemic curve, when such efforts are more manageable. In these situations, theoretically, if nearly every case can be isolated quickly, and the majority of their contacts quarantined, then the local epidemic could be quelled enough by these targeted tactics to permit loosening of more stringent public health measures. However, loosening stricter social isolation measures *before* adopting the infrastructure prerequisite to allow for timely and thorough contact tracing

is generally unadvisable, especially in the context of our decentralized and fragmented public health and healthcare systems. In states where the virus is currently surging, implementation and sustainable management of testing-tracing efforts became virtually unfeasible as transmission increased, and capacity was exceeded in some jurisdictions [26, 27]. Indeed, CDC guidance states that contact tracing is not usually recommended in communities with “sustained ongoing transmission” [28]; however, “sustained ongoing transmission” has not been clearly defined for COVID-19. This confusion may have contributed to the development of ineffective policies in states that have now experienced dramatic increases in case counts and hospitalizations, like Florida and Texas [16, 18], both of which were depending on attempts to conduct contact tracing in the midst of high levels of sustained ongoing transmission [25, 27, 29].

Comprehensive testing and contact tracing plans require a high level of forethought, coordination, communication, and social acceptability to be effectively executed [7]. This is partly why many countries that have more synchronized public health systems with legal authority to provide strong oversight have generally fared better [1, 30, 31]. Robust plans, backed by considerable resources (ie, financial, personnel, legal, and technological), combined with high adherence to physical distancing and face covering recommendations, have been instrumental to COVID-19 mitigation in many countries, including ones with regions that have very high population densities [1, 7, 31]. For example, South Korea, which had prior experiences with both severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS), had modified legislation after prior outbreaks to allow for prompt responses to epidemics [7]. As a result, South Korea was able to integrate the following rich information sources into their contact tracing efforts: patient interview data, medical records data, global positioning system (GPS) data from mobile phones, closed-circuit television (CCTV) footage, and credit card transaction data. They also published the prediagnosis movements of confirmed COVID-19 cases [7]. Similarly, Taiwan merged data between health insurance records, medical records data, travel history, and data from both an app and a toll-free hotline set up for the public to report suspected cases [7, 30, 31]. Such methods are likely to be considered quite invasive and, therefore, neither legally nor culturally acceptable in the United States [32, 33], particularly during the current climate of civil unrest and the expanding backlash against public health measures that may be due partly to the politicization of certain recommendations [10, 34].

There are some comparatively less intrusive voluntary technologies that have been used to supplement contact tracing and augment local public health efforts in some countries [7, 35]. Generally, with voluntary technologies, users agree to data collection and sharing for contact tracing purposes, and the data are deleted once obsolete. In Europe, efforts are underway to develop and utilize general data protection regulation (GDPR)

compliant phone apps [36]. A voluntary app was used in Iceland to help mitigate COVID-19 spread, but successful solutions from small countries like Iceland may not be generalizable to other regions for many reasons beyond regulatory and socio-cultural differences [7]. It is not possible to infer exactly how effective voluntary technology use will be in the United States, especially without the aid of other major preventive tactics, given high levels of community spread in some parts of the country [18, 37]. Attempts to use opt-in mobile phone apps are ongoing in various parts of the United States (eg, Massachusetts, California, San Francisco) [35, 38]. Evaluating the success of such programs over time may be helpful in planning for future surges of COVID-19.

It is clear that public buy-in and engagement are crucial to ensuring cooperation with, adherence to, and sustainability of expanded testing-tracing programs [32, 35]. The United States has substantial regulations that preclude enforcement of compliance with contact tracing [33]. This implies that the public's participation will be voluntary [33, 35] and, therefore, less likely to provide accurate and comprehensive information, limiting the effectiveness of these endeavors. Besides legal hurdles related to civil liberties, there are also relevant ethical considerations about access to and use of data about people's contacts and whereabouts that need to be weighed [35, 39]. Vulnerable individuals, such as immigrants and victims of crime or domestic violence, may not be comfortable with sharing such information, even with health departments [39, 40]. Because some corporations have decided to conduct testing and tracing of their employees [41], individuals may be concerned that hiring or termination decisions will be based on test results. Therefore, public messaging about expanded testing-tracing must clarify how the data can legally be used and how they will be managed and protected, especially if private companies will be contracted to aid with data collection efforts [39]. Potential for misuse by law enforcement, immigration enforcement, and for-profit companies should be addressed unequivocally [40]. Many of these urgent considerations necessitate national-level guidance and leadership.

At present, most local health departments are left to manage the public health concerns of their own jurisdictions with little support, and most lack the resources needed to adequately fulfill this responsibility [7, 42]. Despite the fact that there is a pandemic roughly every decade, contact tracing systems run by health departments are generally not designed to handle rapidly transmissible, pandemic-scale diseases. Taking over a week to conduct contact tracing may be effective for some communicable illnesses (eg, syphilis, tuberculosis), but this timeline is not suitable for tracing SARS-CoV-2 infection [43]. According to the Association of State and Territorial Health Officials (ASTHO), the enormous scope of conducting contact tracing for SARS-CoV-2 is most closely exemplified by the US response to the West African Ebola outbreak, which was the largest

contact tracing endeavor ever implemented here [7]. During this response, 30°000 individuals were actively monitored, but there were *no* reported cases [7, 44]—by contrast, almost 4 million COVID-19 cases already exist on US soil to date [16]. Even for Ebola contact tracing, there were significant operational barriers including: resource limitations, barriers in coordination and communication between jurisdictions, challenges in quarantine enforcement, and difficulties related to provision of isolation housing [7]. COVID-19 has logarithmically amplified these obstacles.

The size of the public health workforce required to adequately implement SAR-CoV-2 testing-tracing efforts depends upon many factors, such as the catchment area population size and the true incidence and prevalence. Larger numbers of staff may be necessary as social distancing measures are loosened (or public adherence decreases) and case counts increase, or if technologic tools are not used for augmentation. Smaller numbers of staff would likely be necessary if local, state, and national public health agencies were able to communicate and coordinate effectively. Creation of a *national contact tracing system* could eliminate geographic restrictions for hiring and would increase procedural standardization. ASTHO and other organizations have been advocating for a coordinated, national approach for expansion of contact tracing, and requests were made for support from the federal government to acquire an additional 100 000–300 000 contact tracers [7, 42]. Such a national resource would reduce the burden on the current public health workforce and, ultimately, could also set the stage for a more strategic and effective national system for responding to current and future pandemics.

## CONCLUSIONS

Since the beginning of the COVID-19 outbreak in the United States, a paucity of timely, national guidance and strategic planning, in combination with an overwhelmed public health system, has served as a substantial obstacle to rapid disease mitigation [9]. In just a few months, the COVID-19 crisis has exposed the deficiencies in our public health infrastructure and has led us to mull over the palpable changes that would have prevented the current tug-of-war between epidemiologic, political, and economic sacrifices. Largely due to these deficits, we missed a pivotal opportunity to curtail the spread of this epidemic in much of the United States. However, the course of an epidemic is dynamic, and if tough, decisive, and critically needed policy decisions are made in the upcoming months to curb transmission, we may, once again, find ourselves in a *relatively* better position to consider effective strategies, although the disease may become endemic. At the very least, public health practitioners and scientists must acknowledge the complexities of real-world testing-tracing efforts and promote new policies aimed at both mitigating sustained community transmission

and bolstering contact tracing capacity in their jurisdictions. Although this type of resource is worthy of investment for the longer term, if contact tracing is to be considered the principal solution across the nation under current circumstances, then indicators for when social distancing can be relaxed (or needs to be strengthened) should include actionable thresholds around local contact tracing capacity [45]. These thresholds are particularly relevant because of the sparse capacity that is the reality for many jurisdictions at this time [7, 27].

Overall, this is a crucial moment for our public health system to reassess its unmet needs, to evaluate and address the reasons behind its shortcomings, and to cultivate change before public momentum fades and we fall back into a national complacency, abandoning the opportunity for rehauling and reimagining a politically independent, well-resourced, and innovative public health system.

## Note

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