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Trustworthy Digital Contact Tracing

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ARTICLES

TRUSTWORTHY DIGITAL CONTACT TRACING

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INTRODUCTION

Two years into the COVID-19 pandemic, efforts to control coronavirus in the United States have undeniably fallen short. Making matters worse, infectious disease experts fear that the spread of diseases from animals to humans could become more common going forward.[1] One former public health official has warned: "This is not a once-in-a-century event. It's a harbinger of things to come."[2] Unfortunately, then, it seems that we will have ample

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1. *See* Kristen Rogers, *A Real Life 'Contagion': Humans May Be to Blame for Viruses Jumping from Animals to Us*, CNN, https://www.cnn.com/2020/04/07/health/mammal-human-virus-spillover-coronavirus-scn-wellness/index.html [https://perma.cc/C6ZJ-N36S] (Apr. 07, 2020, 7:07 PM) (noting that a key driver of zoonotic diseases is stress on wildlife's habitats from human activities or climate change).

2. Donald G. McNeil Jr., *A Viral Epidemic Splintering into Deadly Pieces*, N.Y. TIMES (Aug. 3, 2020), https://www.nytimes.com/2020/07/29/health/coronavirus-future-america.html [https://perma.cc/Q23Y-836V] (quoting former Centers for Disease Control and Prevention Director Julie Gerberding).

opportunity to learn from our current failures, and it is imperative that we do so.

As the increasing number of breakthrough COVID-19 infections demonstrates, one important lesson to note is that vaccinations alone may not be sufficient to fully eradicate a virus. This is especially true in places where vaccination rates remain low, and the burden on the health care system is more significant. Consequently, it may be necessary to deploy other nonpharmaceutical interventions.

Contact tracing is one of the most powerful weapons for controlling the spread of infectious diseases—and therefore one of the most promising complementary interventions available.[3] A familiar instrument in the public health toolkit, traditional contact tracing is implemented through public health authorities and involves four steps: reporting, investigating, identifying, and following up.[4] Yet traditional contact-tracing methods may fall short in the context of fast-moving, widespread outbreaks—especially with a virus that can be transmitted asymptomatically, such as COVID-19. As a result, early in the outbreak, many government officials turned to technological tools to augment their ability to track the spread of the disease. This Article focuses on one tool that was met with initial enthusiasm but ultimately failed to scale: digital contact tracing. Digital contact tracing seeks to approximate the process of analog contact tracing,[5] typically by employing smartphone apps,

3. Frances Stead Sellers & Ben Guarino, *Contact Tracing Is 'Best' Tool We Have Until There's a Vaccine, Health Experts Say*, WASH. POST (June 14, 2020), https://www.washingtonpost.com/national/contact-tracing-is-best-tool-we-have-until-theres-a-vaccine-say-health-experts/2020/06/13/94f42ffa-a73b-11ea-bb20-ebf0921f3bbd_story.html [https://perma.cc/4X83-XYVJ].

4. *See* CTRS. FOR DISEASE CONTROL & PREVENTION, CS317274, HEALTH DEPARTMENT CHECKLIST: DEVELOPING A CASE INVESTIGATION & CONTACT TRACING PLAN FOR CORONAVIRUS DISEASE 2019 (COVID-19) (2020), https://www.cdc.gov/coronavirus/2019-ncov/downloads/php/health-department-checklist-final.pdf [https://perma.cc/6SKA-BLMW].

5. Although we direct our attention here to digital contact tracing, many public health professionals caution that technology must complement and not replace manual contact-tracing efforts. I. Glenn Cohen, Lawrence O. Gostin & Daniel J. Weitzner, *Digital Smartphone Tracking for COVID-19: Public Health and Civil Liberties in Tension*, 323 JAMA 2371, 2371 (June 16, 2020), https://doi.org/10.1001/jama.2020.8570 [https://perma.cc/FM6Q-5ERT]; Sarah Holder, *Who Wants to Be a Contact Tracer?*, BLOOMBERG CITYLAB (May 12, 2020, 7:00 AM), https://www.citylab.com/solutions/2020/05/contact-tracing-coronavirus-cases-data-jobs-technology-apps/611119/ [https://perma.cc/ZJ2N-857R]; *see also* CTRS. FOR DISEASE CONTROL & PREVENTION, CS 316711-A, PRELIMINARY CRITERIA FOR THE EVALUATION OF DIGITAL CONTACT TRACING TOOLS FOR COVID-19, https://www.cdc.gov/coronavirus/2019-ncov/downloads/php/prelim-eval-criteria-digital-contact-tracing.pdf [https://perma.cc/4MGR-MUNB]; CRYSTAL WATSON, ANITA CICERO, JAMES BLUMENSTOCK & MICHAEL FRASER, JOHNS HOPKINS BLOOMBERG SCH. OF PUB. HEALTH CTR.

which use either geolocation or Bluetooth data to discern when an individual has been exposed to the disease.

This Article takes a closer look at digital contact tracing in the United States during the coronavirus pandemic and why it failed. It begins by explaining the shortcomings of traditional analog methods and the resulting need for digital contact tracing. It then turns to the norms regarding consent, the scope of the data collected, and the limits on subsequent use necessary for cooperative surveillance. We argue that any successful digital contact-tracing program must incorporate these elements. Yet while necessary, those strategies alone may not be sufficient. People justifiably lack trust in public health authorities, in new technologies, and in the tech industry itself.[6] Consequently, we conclude that public health authorities must do more than simply seek consent, minimize collection, and prohibit subsequent use. They must take proactive steps to establish public confidence in digital contact tracing.

I. WHY DIGITAL CONTACT TRACING?

One might ask why we should employ digital contact tracing tools in the first place. The answer is that traditional contact tracing is unlikely to operate at the necessary scale or with the necessary speed to contain a global pandemic. Manually tracking the spread of such a disease requires recruiting, educating, and dispatching what one author called "an army of public health workers."[7] On this scale, contact tracing is unprecedented and presents

FOR HEALTH SEC., A NATIONAL PLAN TO ENABLE COMPREHENSIVE COVID-19 CASE FINDING AND CONTACT TRACING IN THE US (2020) [hereinafter JOHNS HOPKINS PLAN].

6. *See* HARSHA PANDURANGA & LAURA HECHT-FELELLA, BRENNAN CTR. FOR JUST., GOVERNMENT ACCESS TO MOBILE PHONE DATA FOR CONTACT TRACING (2020), https://www.brennancenter.org/sites/default/files/2020-05/2020_05_21_ContactTracingPrimer_Final.pdf [https://perma.cc/NPW5-3RSN]; *see also* Alice Miranda Ollstein & Darius Tahir, *Contact Tracing Foiled by Conspiracy Theories, Lack of Federal Messaging*, POLITICO (Sept. 3, 2020, 7:55 PM), https://www.politico.com/news/2020/09/03/contact-tracing-conspiracy-theories-trump-messaging-408611 [https://perma.cc/FJ4Y-B2MP].

7. Casey Ross, *After 9/11, We Gave Up Privacy for Security. Will We Make the Same Trade-off After Covid-19?*, STAT NEWS (Apr. 8, 2020), https://www.statnews.com/2020/04/08/coronavirus-will-we-give-up-privacy-for-security/ [https://perma.cc/MNZ6-YJGH]. Johns Hopkins estimates that even approaching successful contact tracing of the novel coronavirus would require hiring approximately 100,000 paid or volunteer contact tracers, at an estimated cost of over $3.6 billion. JOHNS HOPKINS PLAN, *supra* note 5, at 10. Former Centers for Disease Control and Prevention Director Tom Friedan puts the number of hires as high as 300,000. Dan Goldberg & Alice Miranda Ollstein, *Tracking the Virus May Require 300,000 Workers. We're Nowhere Close.*, POLITICO (Apr. 21, 2020, 4:30 AM), https://www.politico.com/news/2020/04/21/tracking-coronavirus-workforce-does-not-exist-197622 [https://perma.cc/QQ4Z-JCPF].

a Herculean task for a public health system that has faced inadequate and ever-decreasing budgets for over a decade.[8] But even setting lack of resources aside, the nature of COVID-19 presents challenges to traditional analog contact tracing for at least two reasons: "[t]he number of secondary infections generated by each new infection and the proportion of transmission that occurs before symptom onset."[9]

A. *The Need for Digital Contact Tracing*

First, COVID-19 is easily transmissible. Traditional contact tracing relies on an individual's ability to identify the people that they may have infected. It works best when transmission requires close, sustained contact with known individuals. For example, contact tracing is particularly useful for tracking the spread of sexually transmitted diseases. It is less effective when an infectious disease can spread through respiratory particles that can infect strangers in public places who are impossible to identify after the fact.[10] Thus, a successful COVID-19 contact-tracing program would have to include information about more than just intimate contacts. Under these circumstances, even the most skilled contact tracers and most cooperative contacts will be unable to identify all the potentially exposed individuals.

Second, individuals with COVID-19 can spread the disease without any accompanying symptoms.[11] This infectious-but-

8. Lauren Weber, Laura Ungar, Michelle R. Smith, Hannah Recht & Anna Maria Barry-Jester, *Hollowed-Out Public Health System Faces More Cuts Amid Virus*, KAISER HEALTH NEWS (Aug. 24, 2020), https://khn.org/news/us-public-health-system-underfunded-under-threat-faces-more-cuts-amid-covid-pandemic/ [https://perma.cc/2XAF-N9UD].

9. Joel Hellewell et al., *Feasibility of Controlling COVID-19 Outbreaks by Isolation of Cases and Contacts*, 8 LANCET GLOB. HEALTH e488, e489 (2020), https://doi.org/10.1016/s2214-109x(20)30074-7 [https://perma.cc/XJR3-46WT]; *see also* W. Joost Wiersinga, Andrew Rhodes, Allen C. Cheng, Sharon J. Peacock & Hallie C. Prescott, *Pathophysiology, Transmission, Diagnosis, and Treatment of Coronavirus Disease 2019 (COVID-19): A Review*, 324 JAMA 782, 783 (2020), https://doi.org/10.1001/jama.2020.12839 [https://perma.cc/BKF3-PH9B]; CTRS. FOR DISEASE CONTROL & PREVENTION, 89980, INTERIM CLINICAL GUIDANCE FOR MANAGEMENT OF PATIENTS WITH CONFIRMED CORONAVIRUS DISEASE (COVID-19) (2020), https://stacks.cdc.gov/view/cdc/89980 [https://perma.cc/M4VK-34LV].

10. Sellers & Guarino, *supra* note 3; Ken T. D. Eames & Matt J. Keeling, *Contact Tracing and Disease Control*, 270 PROC. ROYAL SOC'Y LONDON B 2565, 2569–70 (2003), https://dx.doi.org/10.1098%2Frspb.2003.2554 [https://perma.cc/VU2N-NJDW].

11. Monica Gandhi, Deborah S. Yokoe & Diane V. Havlir, *Asymptomatic Transmission, the Achilles' Heel of Current Strategies to Control Covid-19*, 382 NEW ENG. J. MED. 2158, 2158–59 (2020), https://doi.org/10.1056/nejme2009758 [https://perma.cc/J2HV-WWBR].

asymptomatic, or presymptomatic, period could span several days.[12] An individual without any identifiable symptoms is less likely to take precautions against spreading the disease or reduce activity due to feeling unwell. The need to identify everywhere that someone went and each person they encountered over a two-week stretch presents enormous challenges.

Given these realities, even the most efficient analog contact-tracing programs may not be fast enough to outpace COVID-19.[13] Members of the tech industry—including behemoths like Apple and Google as well as lesser-known startups—happily adopted this narrative[14] and jumped in to offer their services in COVID-19's early days.[15] In fact, Apple and Google joined forces in an unprecedented effort to create a contact-tracing application programming interface ("API") designed to work across their otherwise intentionally incompatible operating systems.[16]

B. *How Digital Contact Tracing Works*

The most well-known exposure tracking and notification technology arose out of a joint effort on the part of Google and Apple. The Apple/Google API worked in conjunction with approved public health authorities' programs, meaning that Apple and Google made digital contact tracing possible by providing the technological tools.[17] However, public health authorities had to either develop and deploy their own apps or support the API's app-less Exposure Notifications Express function.[18] If there was an app, users had to download it. However, whichever method public health authorities employed, users had to consent to its terms of service[19] and then

12. *Id.* at 2158.

13. Luca Ferretti, Chris Wymant, Michelle Kendall, Lele Zhao, Anel Nurtay, Lucie Abeler-Dörner, Michael Parker, David Bonsall & Christophe Fraser, *Quantifying SARS-CoV-2 Transmission Suggests Epidemic Control with Digital Contact Tracing*, 368 SCI. 619, 619–20 (2020), https://dx.doi.org/10.1126/science.abb6936 [https://perma.cc/Z3G6-HVZ8].

14. *See* APPLE & GOOGLE, EXPOSURE NOTIFICATIONS: FREQUENTLY ASKED QUESTIONS 2 (2020), https://covid19-static.cdn-apple.com/applications/covid19/current/static/contact-tracing/pdf/ExposureNotification-FAQv1.2.pdf [https://perma.cc/W34T-98FX].

15. Franklin Foer, *What Big Tech Wants out of the Pandemic*, ATLANTIC (July/Aug. 2020), https://www.theatlantic.com/magazine/archive/2020/07/big-tech-pandemic-power-grab/612238 [https://perma.cc/SSQ3-Y78D].

16. *Id.*; APPLE & GOOGLE, *supra* note 14, at 2.

17. APPLE & GOOGLE, *supra* note 14, at 3.

18. *Supporting Exposure Notifications Express*, APPLE DEV. DOCUMENTATION, https://developer.apple.com/documentation/exposurenotification/supporting_exposure_notifications_express [https://perma.cc/UQT8-YFC5].

19. APPLE & GOOGLE, *supra* note 14, at 3.

opt in by enabling the contact-tracing function on their phones.[20] This API not only formed the basis of many contact-tracing programs implemented or contemplated by various U.S. states but also employed privacy advocates' preferred methodology—decentralized data storage.[21] That this mechanism consciously designed to win public support nevertheless failed to do so renders it a particularly interesting case study.

The API used Bluetooth technology to detect a contact event between two different devices. Once a user enabled the technology, the user's device would send out a "beacon" that included "a random Bluetooth identifier," which the companies described as "a string of random numbers that aren't tied to a user's identity and change every 10–20 minutes for additional protection."[22] Other people's phones also using the technology would be "listening" for those beacons, as well as broadcasting beacons of their own.[23] When two devices came within a certain proximity of one another, they recorded each other's beacons and stored those identifiers securely on their respective devices.[24] The Bluetooth technology used signal strength to approximate physical distance.[25] However, the individual public health authorities could decide how they wanted to define what constituted a contact event for the purposes of their individual program, such as the amount of time the devices were in contact or their approximate distance from one another.[26] A person who tested positive for COVID-19 would enter that diagnosis into the system, which would then upload their set of identifier codes to a server.[27] At least once daily, the API would download a list of the beacons belonging to people who uploaded positive diagnoses.[28] The exposure notification system then matched those positive codes to the codes stored on individual devices.[29] In the event

20. *Id.* While all updated operating systems now contain the contact-tracing software, the default setting opts users out of digital tracking. A user must first enable the technology, then the user's device would send out a "beacon" that included "a random Bluetooth identifier." *Id.*

21. *See* Tim Starks, *Early Covid-19 Tracking Apps Easy Prey for Hackers, and It Might Get Worse Before It Gets Better,* POLITICO (July 6, 2020, 7:00 AM), https://www.politico.com/news/2020/07/06/coronavirus-tracking-app-hacking-348601 [https://perma.cc/AB5G-P7MD].

22. APPLE & GOOGLE, *supra* note 14, at 3.

23. *Id.*

24. *Id.*

25. *Id.* at 7.

26. *Id.* at 6–7.

27. *Id.* at 3.

28. *Id.*

29. *Id.*

of a match, a user's phone would inform her that she had been exposed and would advise her on next steps.[30]

As an alternative to the Bluetooth system, digital contact tracing can also use geolocation data. Rhode Island developed its contact-tracing app, CRUSH COVID-RI, with Infosys, an Indian tech company with an office in Providence, using GPS location data.[31] It recorded anywhere a user had been for ten minutes or more and stored that information on the user's phone for twenty days.[32] North and South Dakota worked with Fargo startup ProudCrowd to create Care19 Diary, using GPS location data.[33] To be sure, contact-tracing programs that use geolocation data rather than Bluetooth beacons may be more effective because location data tends to be more reliable.[34] However, they also have limitations. For example, GPS technology may not account for certain types of topography in rural environments or multistory structures in urban environments.[35] They are also more prone to concerns about invasions of privacy and violations of civil liberties because GPS location information is both captured and stored in a database and individually identifiable.[36]

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30. *Id.*

31. Tom Mooney, *Raimondo Unveils 'CRUSH COVID' Contact-Tracing App for R.I.*, PROVIDENCE J., https://www.providencejournal.com/story/news/coronavirus/2020/05/19/raimondo-unveils-crush-covid-contact-tracing-app-for-ri/1167698007/ [https://perma.cc/8VWP-B8N9] (May 20, 2020, 7:20 AM); Rolfe Winkler & Patience Haggin, *America is Reopening. Coronavirus Tracing Apps Aren't Ready,* WALL ST. J. (June 22, 2020), https://www.wsj.com/articles/america-is-reopening-coronavirus-tracking-apps-arent-ready-11592845646 [https://perma.cc/2VYA-DE89].

32. Mooney, *supra* note 31.

33. Laurie Sullivan, *North Dakota Readies Apple, Google COVID-19 Tracing App—How They Did It*, MEDIAPOST (May 20, 2020), https://www.mediapost.com/publications/article/351509/north-dakota-readies-apple-google-covid-19-tracin.html [https://perma.cc/F5LE-VV2Y].

34. The creators of the Apple/Google API may have sacrificed accuracy for privacy. *See* Zak Doffman, *Forget Apple and Google: Contact-Tracing Apps Just Dealt Serious New Blow*, FORBES (May 12, 2020, 4:31 AM), https://www.forbes.com/sites/zakdoffman/2020/05/12/forget-apple-and-google-contact-tracing-apps-just-dealt-serious-new-blow/?sh=46adc35b2172 [https://perma.cc/D46V-H7VX]; Stewart Baker, *The Problem with Google and Apple's COVID-19-Tracking Plan*, LAWFARE (Apr. 14, 2020, 12:14 PM), https://www.lawfareblog.com/problem-google-and-apples-covid-19-tracking-plan [https://perma.cc/T3R6-69AF]; Jennifer Daskal & Matt Perault, *The Apple-Google Contact Tracing System Won't Work. It Still Deserves Praise.*, SLATE (May 22, 2020, 12:11 PM), https://slate.com/technology/2020/05/apple-google-contact-tracing-app-privacy.html [https://perma.cc/82J3-3K36].

35. Winkler & Haggin, *supra* note 31.

36. *See Bahrain, Kuwait and Norway Contact Tracing Apps Among Most Dangerous for Privacy*, AMNESTY INT'L (June 16, 2020, 6:40 AM), https://www.amnesty.org/en/latest/news/2020/06/bahrain-kuwait-norway-contact-tracing-apps-danger-for-privacy/ [https://perma.cc/QBA7-BGCL]. North Dakota, South Dakota, Wyoming, Rhode Island, and Utah have adopted apps that employ GPS. Laura Hecht-Felella & Kaylana Mueller-Hsia, *Rating*

Apple and Google tried to assure the public that their API was trustworthy.[37] They built multiple features into their technology, such as the ability of users to opt in—and opt out—of participation at any time; the absence of GPS location or other potentially identifying data; user control over whether to share data; the changing identifier numbers to prevent tracking; private and personal notifications on users' devices; the anonymity of users, even when reporting a positive test; the limiting of access to approved public health programs; and the promise to disable the notification system regionally once it is no longer needed.[38] In fact, while we do not weigh in on the Apple/Google API's effectiveness as a disease tracker here,[39] some public health officials and commentators concluded that the system was so solicitous of individual privacy that it was destined to fail to adequately track the disease.[40]

At least on its face, the API appears to conform to the norms of public health data collection. It was consent-based, requiring users to consent to tracking and promising that "the choice to use this technology rests with the user, and they can turn it off at any time."[41] Moreover, Apple and Google barred institutions, such as several universities that encouraged students to use Bluetooth-based apps when they returned to campus, from making app use mandatory.[42]

Like traditional analog contact tracing described in section I.A, the Apple/Google API limited the scope of collection to conceal individuals' identities. The design precluded the ability to link the "beacons" back to a single person's phone, making aggregation of data about that person's movements, activities, or social contacts over time nearly impossible.[43] The companies promised not to share users' identities with other users or with the companies

the Privacy Protections of State Covid-19 Tracking Apps, BRENNAN CTR. FOR JUST. (Nov. 5, 2020), https://www.brennancenter.org/our-work/research-reports/rating-privacy-protections-state-covid-19-tracking-apps [https://perma.cc/SKY7-JX36].

37. *See* Hecht-Felella & Mueller-Hsia, *supra* note 36.

38. *See* Daskal & Perault, *supra* note 34.

39. Effectiveness should, of course, be a threshold question before digital contact tracing is considered.

40. *See* Daskal & Perault, *supra* note 34.

41. *See* APPLE & GOOGLE, *supra* note 14, at 5.

42. Dave Paresh, *University of Alabama System to Push Contact Tracing App, Require Online Health Checks*, REUTERS (May 21, 2020, 7:54 PM), https://www.reuters.com/article/us-health-coronavirus-alabama-apps/university-of-alabama-system-to-push-contact-tracing-app-require-online-health-checks-idUSKBN22X2WX [https://perma.cc/JP4K-A2EZ].

43. *See* APPLE & GOOGLE, *supra* note 14, at 3.

themselves.[44] Additionally, Apple and Google vowed to disable the exposure notification system on a regional basis as the COVID-19 threat subsided, so collection would theoretically stop when it was no longer needed.[45]

Apple and Google also appeared to limit subsequent use. Recall that the API would only operate in conjunction with a public health authority's program—either by developing an app or by supporting Exposure Notifications Express.[46] Apple and Google promised to screen these programs "based on a specific set of criteria designed to ensure" that they operate solely for public health purposes.[47] The companies assured potential users that government agencies would never have direct access to individual data.[48] Instead, all relevant data would be stored on individual devices, not collected into a database that could be repurposed for other kinds of searches.[49] And finally, Apple and Google explicitly stated that "there will be no monetization from this project by Apple or Google."[50]

* * *

In sum, while contact tracing has been essential to disease control in the past, traditional analog methods may be unable to successfully track the spread of novel, highly infectious pathogens. Consequently, public health authorities may need to turn to digital tools for COVID-19 and other novel diseases presenting similar challenges. However, unlike other forms of government surveillance using technology, digital contact tracing relies on the cooperation of the people being tracked. The following Part explains why.

II. DIGITAL CONTACT TRACING AS COOPERATIVE SURVEILLANCE

Digital contact tracing offers a potentially transformative capability to fight infection. To succeed, however, it requires consent and cooperation. No matter how scientifically sound a public health policy is, it will still need buy-in from the public, who may

44. *See id.*
45. *See id.* at 5.
46. *Supporting Exposure Notifications Express*, *supra* note 18.
47. *See* APPLE & GOOGLE, *supra* note 14, at 6.
48. *Id.* at 5.
49. *Id.* at 5–6.
50. *Id.* at 6. Apple and Google likely already possess much of the information that contact tracing requires in other forms from other sources, such as GPS location data.

view it as an intrusion into their private lives.[51] In our other work on government data collection, we discuss the need for individuals to cooperate with surveillance efforts.[52] Cooperative surveillance, like that used in public health initiatives, requires the individuals being surveilled to be willing, active participants in the program. As such, cooperative surveillance is consensual and respects individual rights and liberties by limiting the kinds of data that the government collects and its ability to repurpose that information. In this Part, we argue that digital contact tracing must proceed under the cooperative model to succeed, even—and perhaps especially—if it uses tools more readily associated with coercive models, like digital data collection.

A. *Role of Consent*

A critical mass of people must adopt the technology for digital contact tracing to be effective. Some researchers claim that certain technologies could slow the spread of COVID-19 with only partial uptake,[53] while others have been less optimistic.[54] One study estimates that eighty percent of all smartphone users (fifty-six percent of the total population in the study) would need to use an app to successfully suppress the spread.[55] Still others argue that any use of digital contact tracing will have some beneficial effect on reducing the virus's spread.[56] Yet whether Americans would be willing

51. Gene Matthews, Scott Burris, Sue Lynn Ledford, Gary Gunderson & Edward L. Baker, *Crafting Richer Public Health Messages for a Turbulent Political Environment*, 23 J. PUB. HEALTH MGMT. & PRAC. 420, 421 (2017), https://doi.org/10.1097/phh.0000000000000610 [https://perma.cc/4HBV-DYF6].

52. Emily Berman, Leah R. Fowler & Jessica L. Roberts, *Cooperative Surveillance* (work-in-progress) (on file with authors).

53. Ferretti et al., *supra* note 13.

54. Amy Taxin & Adam Beam, *California Releases Smartphone Virus Tool as Cases Soar*, ASSOCIATED PRESS (Dec. 7, 2020), https://abcnews.go.com/Business/wireStory/california-unveils-smartphone-tool-trace-virus-cases-74587255 [https://perma.cc/R9MU-X3VE] (quoting University of California, Irvine, public health professor Andrew Noymer as saying, "In a purely epidemiological perspective, uptake is everything. If about 10% of people do it, it's useless").

55. ROBERT HINCH ET AL., EFFECTIVE CONFIGURATIONS OF A DIGITAL CONTACT TRACING APP: A REPORT TO NHSX (Apr. 16, 2020), https://cdn.theconversation.com/static_files/files/1009/Report_-_Effective_App_Configurations.pdf?1587531217 [https://perma.cc/UZU7-3DP4]. Eighty-five percent of Americans own smartphones. *Mobile Fact Sheet*, PEW RSCH. CTR. (Apr. 7, 2021), https://www.pewinternet.org/fact-sheet/mobile [https://perma.cc/79JF-EB8W].

56. Matthew Abueg et al., *Modeling the Combined Effect of Digital Exposure Notification and Non-Pharmaceutical Interventions on the COVID-19 Epidemic in Washington State*, NPJ DIGIT. MED., Mar. 12, 2021, at 1, 4–5, https://doi.org/10.1038/s41746-021-00422-7 [https://perma.cc/RS6Y-EH6N].

to opt in to digital contact tracing at the necessary rates is a source of much concern.[57] Many remain unsure and reluctant to participate.[58]

Due to this hesitance, some commentators have called for mandatory participation. Unlike analog contact tracing, digital contact tracing could theoretically occur without express user consent, much like what occurs in adversarial surveillance. The government could enlist tech companies like Apple and Google to embed programs that automatically convey the relevant information to public health authorities in the software of their cellphone operating systems. Some experts advocate following that path. Professor Alan Rozenshtein, a national security scholar, has stated that "[i]f bending the curve is the highest priority, then participation in effective disease-surveillance programs should be mandatory."[59]

A less draconian—yet potentially still effective—possibility would be to allow individuals to opt out of digital contact tracing.[60] Instead of depending on individuals to agree to surveillance, public health authorities could use embedded technology to track people, as in mandatory digital contact tracing, but give them the ability to disenroll from the program. Put simply, they could change the default. Defaults are famously sticky because people are prone to inertia.[61] All things held equal, when faced with a difficult choice, people will often do nothing. Opting people in by default—yet with a choice to opt out—has been a policy suggestion for other kinds of public health interventions[62] because it arguably promotes

57. *See* Craig Timberg, Drew Harwell & Alauna Safarpour, *Most Americans Are Not Willing or Able to Use an App Tracking Coronavirus Infections. That's a Problem for Big Tech's Plan to Slow the Pandemic.*, WASH. POST (Apr. 29, 2020), https://www.washingtonpost.com/technology/2020/04/29/most-americans-are-not-willing-or-able-use-an-app-tracking-coronavirus-infections-thats-problem-big-techs-plan-slow-pandemic/ [https://perma.cc/HN38-LW4V].

58. *See* Baobao Zhang, Sarah Kreps, Nina McMurry & R. Miles McCain, *Americans' Perceptions of Privacy and Surveillance in the COVID-19 Pandemic*, 15 PLOS ONE, Dec. 23, 2020, at 1, 13–14, https://doi.org/10.1371/journal.pone.0242652 [https://perma.cc/88Y9-KRHW].

59. Alan Z. Rozenshtein, *No One Should Have the Right to Opt Out of Coronavirus Surveillance*, LAWFARE (May 19, 2020, 9:00 AM), https://www.lawfareblog.com/no-one-should-have-right-opt-out-coronavirus-surveillance [https://perma.cc/9ABE-NWJP].

60. Michelle M. Mello & C. Jason Wang, *Ethics and Governance for Digital Disease Surveillance*, 368 SCI. 951, 954 (2020), https://doi.org/10.1126/science.abb9045 [https://perma.cc/S2KJ-XUTX] .

61. *See, e.g.*, Cass R. Sunstein, *Deciding by Default*, 162 U. PA. L. REV. 1, 17 (2013); RICHARD H. THALER & CASS R. SUNSTEIN, NUDGE: IMPROVING DECISIONS ABOUT HEALTH, WEALTH, AND HAPPINESS 83 (2008).

62. *See, e.g.*, Haoyang Yan & J. Frank Yates, *Improving Acceptability of Nudges: Learning from Attitudes Towards Opt-in and Opt-out Policies*, 14 JUDGMENT & DECISION MAKING

participation in socially valuable conduct (through the default) while simultaneously respecting individual autonomy (through the option to opt out). However, some—including one of the authors—have challenged defaults and similar nudging tactics as failing to provide meaningful choices, particularly for certain disadvantaged populations.[63]

That being said, both mandatory digital contact tracing and its gentler cousin, opt-out digital contact tracing, will be ineffective on their own. The whole point of digital contact tracing is to track and stop the spread of disease. On their own, neither mandatory nor opt-out digital contact tracing can accomplish these goals. Even if every individual had COVID-19 tracking tools automatically embedded in their cellphones, public health authorities would still need people to buy into the contact-tracing system voluntarily for several reasons.[64]

First, the information collected by any digital contact-tracing tool will be incomplete. Neither geolocation nor Bluetooth proximity data—the two primary technologies used in COVID-19-tracking apps—take into account the use of personal protective equipment—like masks and face shields—or even walls.[65] Relying on digital contact information alone could therefore over-identify the number of individuals who would need to self-isolate or self-quarantine.[66] Reliance on geolocation data also risks being

26, 29, 35 (2019) (organ donation); Christian M. Simon, Jamie L'Heureux, Jeffrey C. Murray, Patricia Winokur, George Weiner, Elizabeth Newbury, Laura Shinkunas & Bridget Zimmerman, *Active Choice But Not Too Active: Public Perspective on Biobank Consent Models*, 13 GENETICS MED. 821, 821 (2011) (genetic material), https://doi.org/10.1097/GIM.0b013e31821d2f88 [https://perma.cc/VW8L-Z35K]; David Kaufman, Juli Bollinger, Rachel Dvoskin & Joan Scott, *Preferences for Opt-in and Opt-out Enrollment and Consent Models in Biobank Research: A National Survey of Veterans Administration Patients*, 14 GENETICS MED. 787, 793 (2012) (longitudinal study), https://doi.org/10.1038/gim.2012.45 [https://perma.cc/5G9S-JC6A]; Wendy Netter Epstein, *Nudging Patient Decision-Making*, 92 WASH. L. REV. 1255, 1301 (2017) (medical treatments).

63. *See, e.g.*, Jessica L. Roberts, *Nudge-Proof: Distributive Justice & the Ethics of Nudging*, 116 MICH. L. REV. 1045, 1047–48 (2018) (book review).

64. *See* David Wallace-Wells, *People Don't Trust Public Health Experts Because Public Health Experts Don't Trust People*, N.Y. MAG. (June 20, 2020), https://nymag.com/intelligencer/2020/06/american-public-health-experts-coronavirus-masks.html [https://perma.cc/4YZ7-Q7HE] (suggesting that messaging on both ends of the extremes prevented America from responding to the pandemic with a more moderate approach, which has proven effective in countries like Japan).

65. *See supra* section I.B.

66. *See* Douglas J. Leith & Stephen Farrell, *Coronavirus Contact Tracing: Evaluating the Potential of Using Bluetooth Received Signal Strength for Proximity Detection*, 50 ACM SIGCOMM COMPUT. COMMC'N REV. 66 (2020), https://doi.org/10.1145/3431832.3431840 [https://perma.cc/AYY6-HK2N]; Casey Newton, *Why Bluetooth Apps are Bad at Discovering New Cases of COVID-19*, VERGE (Apr. 10, 2020, 6:00 AM), https://www.theverge.com/inter

underinclusive, particularly in rural areas or areas with challenging topography or multilevel structures.[67] Public health authorities need access to more information than digital devices can provide if they are to make informed recommendations. Any digital contact-tracing efforts must be undertaken alongside, not in lieu of, more traditional methods.

Second, any contact-tracing program's success requires that tests be available and that individuals get tested in the first place. Absent confirmed diagnoses, there is no way to know who should be contacted and advised to self-quarantine. Under existing digital contact-tracing proposals, most individuals must take it upon themselves to get tested and share that information with the app.

Third, people must be willing to follow the app's recommendations. Merely tracking spread is not enough to slow a pandemic. Individuals exposed to COVID-19 must then take the necessary precautionary measures and self-quarantine. Even though the government can impose involuntary quarantines, they are not self-enforcing, and they are subject to a certain amount of process, which means delay.[68] In the case of COVID-19, the disease spreads so quickly that if a person does not get tested quickly or elects not to follow control measures even temporarily, a significant outbreak may occur.

And finally, a mandatory contact-tracing system perceived as too intrusive or draconian could potentially backfire by inspiring people to resist being tested, withhold necessary information, or fail to comply with recommendations. Likewise, people may prefer opting in,[69] so a program that allows individuals to opt out could also result in distrust and subsequent noncompliance. Thus, developing a cooperative digital contact tracing regime based on trust and enjoying widespread public buy-in is essential to success. While adversarial surveillance is central to certain government functions, like national security and law enforcement, it may be fatal to public health in certain circumstances. Successful digital contact

face/2020/4/10/21215267/covid-19-contact-tracing-apps-bluetooth-coronavirus-flaws-public-health [https://perma.cc/KU6C-E6AL].

67. Winkler & Haggin, *supra* note 31.

68. *See, e.g.*, 42 C.F.R. §§ 70.15–.16 (2021). *See generally State Quarantine and Isolation Statutes*, NAT'L CONF. ST. LEGISLATURES (Sept. 24, 2021), https://www.ncsl.org/research/health/state-quarantine-and-isolation-statutes.aspx [https://perma.cc/4XQM-42LE].

69. *See, e.g.*, Kaufman et al., *supra* note 62.

tracing must then follow a cooperative model and operate based on consent.

B. *Scope of Collection*

Because of the massive data collection capabilities of the technology, digital contact tracing threatens to expand the scope of collection beyond typical disease tracking activities. Any such program must therefore devise a mechanism to minimize data collection and to preserve users' privacy by concealing individual identities.

While theoretically anonymous, digital contact-tracing data—especially if combined with other kinds of information—could actually reveal intimate details about a person. Some digital contact-tracing apps, for example, use geolocation to assess whether an individual has come near an infected person.[70] However, even anonymized information remains identifiable when it comes to location data because a person's movements are often unique to them.[71] Digital contact tracing built on geolocation combines two incredibly sensitive kinds of user information: location data and health data.[72] In testimony to the Senate Committee on Commerce, Science, and Transportation, Professor Ryan Calo told members that he had "no doubt that abuse of location and health status information by governments or corporations would have significant negative impacts on citizens and consumers."[73] Digital contact-tracing data could reveal any number of circumstances an individual may prefer to keep private, such as whether one is getting treatment for addiction or mental health problems, whether and where someone attends religious or political gatherings, or whether someone visited an abortion clinic.

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70. *See* Jennifer Valentino-DeVries, Natasha Singer & Aaron Krolik, *A Scramble for Virus Apps that Do No Harm*, N.Y. TIMES, https://www.nytimes.com/2020/04/29/business/coronavirus-cellphone-apps-contact-tracing.html [https://perma.cc/EL47-NZ2D].

71. *See, e.g.*, Stuart A. Thompson & Charlie Warzel, Opinion, *Twelve Million Phones, One Dataset, Zero Privacy*, N.Y. TIMES (Dec. 19, 2019), https://www.nytimes.com/interactive/2019/12/19/opinion/location-tracking-cell-phone.html [https://perma.cc/6GKY-PB3P]; Paul Ohm, *Broken Promise of Privacy: Responding to the Surprising Failure of Anonymization*, 57 UCLA L. REV. 1701, 1703–04 (2010); *Enlisting Big Data in the Fight Against Coronavirus: Paper Hearing Before the S. Comm. on Com., Sci., & Transp.*, 116th Cong. (2020) [hereinafter *Paper Hearing*], https://www.commerce.senate.gov/services/files/79F1B51D-8C8D-407E-965A-F5520B32403A [https://perma.cc/U5Q3-GKWF] (statement of Ryan Calo, Law Professor, University of Washington).

72. *Paper Hearing*, *supra* note 71.

73. *Id.*

Comprehensive location data collection, moreover, could go well beyond revelations of private or potentially embarrassing information. It could also include information indicating that someone was in the vicinity of a crime when it was committed, violated the terms of her visa, or other information that could lead to consequences unrelated to public health.

To avoid unwanted intrusions, public health officials must limit the scope of the information collected in digital contact tracing. As a public health initiative, any digital contact-tracing program must have a clear, scientifically justified purpose for collecting data.[74] This mandate includes several elements. As an initial matter, it means that before any program is implemented, there must be some indication that it will be effective. Moreover, it must be narrowly tailored to achieve its public health goal. Thus, some experts emphasize ensuring that the data collection—including its use of digital tools—is truly necessary in the first place.[75] If, for example, the nation lacks the testing capacity or the resources required to render digital contact tracing efficacious, there is no need to begin collecting information in the first place. Similarly, if the technology itself cannot function as designed, that alone should preclude its use.[76]

Second, if the collection is justified, developers must tailor any new technologies they create to the program's specific goals.[77] At the bare minimum, digital contact-tracing apps should abide by the public health norm of collecting the minimum amount of data needed to achieve the articulated purpose.[78] Public health authorities, not technology companies, must decide which data digital

74. *Id.*; Marcello Ienca & Effy Vayena, *On the Responsible Use of Digital Data to Tackle the COVID-19 Pandemic*, 26 NATURE MED. 463, 463–64 (2020), https://doi.org/10.1038/s41591-020-0832-5 [https://perma.cc/Q3PM-HTCS].

75. Jennifer Daskal, *Digital Surveillance Can Help Bring the Coronavirus Pandemic Under Control – But Also Threatens Privacy*, CONVERSATION, https://www.theconversation.com/digital-surveillance-can-help-bring-the-coronavirus-pandemic-under-control-but-also-threatens-privacy-135151 [https://perma.cc/TM8N-JUGV] (Apr. 13, 2020, 6:08 PM).

76. *See* Chas Kissick, Elliot Setzer & Jacob Schulz, *Whatever Happened to Digital Contact Tracing?*, LAWFARE (July 21, 2020, 1:36 PM), https://www.lawfareblog.com/what-ever-happened-digital-contact-tracing [https://perma.cc/G79W-55Q5]; Natasha Lomas, *NHS COVID-19: The UK's Coronavirus Contacts-Tracing App Explained*, TECHCRUNCH (May 5, 2020, 2:08 PM), https://techcrunch.com/2020/05/05/nhs-covid-19-the-uks-coronavirus-contacts-tracing-app-explained/ [https://perma.cc/F86T-WNYL].

77. Daskal, *supra* note 75.

78. *Paper Hearing*, *supra* note 71 (statement of Professor Ryan Calo); Joint Statement of Scientists and Researchers on Contact Tracing, (Apr. 19, 2020), https://www.kastel.kit.edu/downloads/Joint%20Statement.pdf [https://perma.cc/RPT4-UHPC].

contact-tracing tools collect.[79] In other words, public health officials should design digital contact-tracing programs based on public health needs, not technological capabilities.

And finally, contact tracing itself should stop after the pandemic has subsided. Many commentators have argued that any digital contact-tracing program must include clear sunset provisions to ensure that it comes to an end when the crisis is over.[80] Providing clear rules about when to discontinue the program can also help mitigate concerns about mission creep. It is important to prevent ongoing health surveillance of this type and magnitude from becoming a post-pandemic norm.[81] Sunsets could be imposed by date, allowing for extensions as necessary, or they could be pegged to real-world conditions, such as dropping below a particular rate of infection or the wide uptake of effective vaccines. Similarly, data should be destroyed when it is no longer useful in contact tracing—data regarding contacts, for example, can be deleted when the infection period has passed—and all related data should be destroyed when the program is discontinued.

C. *Subsequent Use*

Finally, the government's collection of data through digital contact tracing raises the possibility that such information could be employed for purposes beyond that of contact tracing, such as enabling law enforcement or immigration officials to track an individual's movements or associations.[82] As explained above, geolocation

79. Unfortunately, at present, public health authorities are not telling tech companies what they need to fight the pandemic, but instead are asking tech companies what they can develop. This pattern is the inverse of the usual requirement that public health needs dictate the nature of surveillance. *See Paper Hearing*, *supra* note 71 (statement of Professor Ryan Calo).

80. Daskal, *supra* note 75; Natalie Ram & David Gray, *Mass Surveillance in the Age of COVID-19*, J.L. & BIOSCIS., May 8, 2020, at 1, 6, https://doi.org/10.1093/jlb/lsaa023 [https://perma.cc/PJ6P-M67D]; Joint Statement of Scientists and Researchers on Contact Tracing, *supra* note 78.

81. Michael Kleinman & Charanya Krishnaswami, Opinion, *Why Are We Trusting a Company with Ties to ICE and Intelligence Agencies to Collect Our Health Information?*, WASH. POST (May 21, 2020), https://www.washingtonpost.com/opinions/2020/05/21/why-are-we-trusting-company-with-ties-ice-intelligence-agencies-collect-our-health-information [https://perma.cc/M6DF-5YLM].

82. *See, e.g.*, Robert Chesney, *COVID-19 Contact Tracing We Can Live With: A Roadmap and Recommendations*, LAWFARE, (Apr. 14, 2020, 12:29 PM), https://www.lawfareblog.com/covid-19-contact-tracing-we-can-live-roadmap-and-recommendations [https://perma.cc/V39G-96CT]. Technology companies might also want access to the data for a variety of reasons, such as improving their other products or services, mining for advertising, or selling to third parties, thus giving it commercial value. *See Paper Hearing*, *supra* note

data could reveal whether someone violated her visa or broke her parole. Even the record of a single contact could be of potential interest, say if an individual's phone was near a crime victim's device when the crime occurred. Moreover, relying on technology generated by private companies raises its own set of concerns beyond the scope of this Article because Big Tech is notorious for finding creative ways to commercialize its users' data.

Thus, barring "mission creep" is essential.[83] Clear rules should limit the use of the information to the purpose for which it was collected and nothing more.[84] Moreover, if data is deleted promptly, as recommended above, subsequent use will be less of a concern. These use limits should be combined with bars on sharing data with other government agencies, whether state or federal. Data security—particularly for identifiable data—must be incorporated into program design. No limits on data use can be enforced if data is not secure. To the extent possible, programmers and public health authorities should refrain from storing data, and any data that is stored should be de-identified or anonymized whenever possible.[85] At times, tracking the spread may require storing identifiable data. In such circumstances, data should be kept on a secure platform and, when the data is no longer necessary, destroyed in a timely and secure way.[86]

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Due to the nature of the technology, public health authorities could theoretically collect contact-tracing data without the knowledge or the consent of the people being tracked. However, contact tracing is necessarily a cooperative endeavor. Individuals must take tests, provide additional information about contact

71 (statement of Professor Ryan Calo). Companies in China that assisted with contact tracing laid claim to the resulting data after the initial crisis there abated. *See* Laura Bradford, Mateo Aboy & Kathleen Liddell, *COVID-19 Contact Tracing Apps: A Stress Test for Privacy, the GDPR, and Data Protection Regimes*, J.L. & BIOSCIS., May 28, 2020, at 1, 11, https://doi.org/10.1093/jlb/lsaa034 [https://perma.cc/M7XQ-RDLA].

83. Ram & Gray, *supra* note 80, at 15; *see also* Matthew Guariglia, *The Dangers of COVID-19 Surveillance Proposals to the Future of Protest*, ELEC. FRONTIER FOUND. (Apr. 29, 2020), https://www.eff.org/deeplinks/2020/04/some-covid-19-surveillance-proposals-could-harm-free-speech-after-covid-19 [https://perma.cc/58T8-Z8WW].

84. *See Paper Hearing*, *supra* note 71 (statement of Professor Ryan Calo).

85. *See id.*

86. ANN CAVOUKIAN, INT'L ASS'N OF PRIV. PROS., THE 7 FOUNDATIONAL PRINCIPLES: IMPLEMENTATION AND MAPPING OF FAIR INFORMATION PRACTICES 3 (2011), https://iapp.org/media/pdf/resource_center/pbd_implement_7found_principles.pdf [http://perma.cc/HPX2-WQDF].

events, and follow quarantine or isolation recommendations for digital contact tracing to effectively combat the spread of disease. Successful digital contact tracing is, therefore, necessarily a form of cooperative surveillance. As a result, digital contact-tracing programs should conform to the norms of cooperative surveillance by obtaining consent, limiting collection, and minimizing subsequent use. Yet while including these elements is essential, it may not be enough to cultivate the necessary trust for individuals to participate in the program.

III. DIGITAL CONTACT TRACING AND DISTRUST

The preceding Part argues that digital contact tracing should operate as a form of cooperative surveillance. But this may not be enough. The most well-known exposure tracking and notification technology—the joint effort on the part of Apple and Google—seeks to adhere to the values described in Part II.[87] Yet, despite these efforts, people in the United States have remained wary of digital contact tracing.[88] This Part explores why Americans may still distrust digital contact-tracing programs, even when those initiatives obtain consent, minimize collection, and limit subsequent use.

Despite all the assurances about user privacy and data security, the public did not want to participate in digital contact tracing. Many people simply did not believe those promises. Indeed, almost three out of five Americans indicated that they would not use the Apple/Google API.[89] While Google and Apple may have sought to

87. Berman et al., *supra* note 52.

88. *See* Zhang et al., *supra* note 58; Jennifer Valentino-DeVries, *Coronavirus Apps Show Promise but Prove a Tough Sell*, N.Y. TIMES (Dec. 7, 2020), https://www.nytimes.com/2020/12/07/technology/coronavirus-exposure-alert-apps.html [https://perma.cc/VKA6-98KN]. As it turns out, people's willingness to download apps is correlated with the apps' levels of accuracy and privacy protections. GABRIEL KAPTCHUK, DANIEL G. GOLDSTEIN, ESZTER HARGITTAI, JAKE M. HOFMAN & ELISSA M. REDMILES, HOW GOOD IS GOOD ENOUGH FOR COVID19 APPS? THE INFLUENCE OF BENEFITS, ACCURACY, AND PRIVACY ON WILLINGNESS TO ADOPT 2 (2020), https://arxiv.org/pdf/2005.04343.pdf [https://perma.cc/LVJ4-7PNZ].

89. Timberg et al., *supra* note 57; *see also* Wash. Post & Univ. of Md. Cntr. for Democracy & Civic Engagements, *Washington Post-University of Maryland National Poll*, *April 21-26*, *2020*, WASH. POST (May 21, 2020, 11:26 AM), https://www.washingtonpost.com/context/washington-post-university-of-maryland-national-poll-april-21-26-2020/3583b4e9-66be-4ed6-a457-f6630a550ddf [https://perma.cc/T4UY-A9K2]. *But see* Divya Ramjee, Pollyanna Sanderson & Imran Malek, *COVID-19 and Digital Contact Tracing: Regulating the Future of Public Health Surveillance*, 2021 CARDOZO L. REV. DE NOVO 101, 126 ("[O]ver 60% of the U.S. population would likely install a contact tracing app on their smartphones" (citing Luke Milsom, Johannes Abeler, Sam Altmann, Severine Toussaert, Hannah Zillessen & Raffaele Blasone, *Survey of Acceptability of App-Based Contact Tracing in the UK, US, France,*

conform to the norms of cooperative surveillance, they did so in a way that failed to take account of widespread public distrust. Put differently, although it is necessary for digital contact tracing to adhere to the norms of cooperative surveillance, it is not sufficient.

A. *Distrust of Public Health Authorities*

To start, people may be wary of digital contact tracing because public health authorities have failed to cultivate trust during the current pandemic. In certain communities, this lack of trust has deep historical roots.[90] But public health authorities did themselves no favors in the early months of the crisis by providing unnuanced and often contradictory information and advice, sometimes with the goal of strategically influencing behavior.[91] Both the desire to have a unified message and the lack of faith in Americans to understand the threat and to act accordingly led public health authorities to put forth inaccurate and sometimes misleading information—including an early recommendation against wearing masks, condemning states for reopening too early while defending Black Lives Matter protests, and endorsing seemingly inconsistent positions on the relative safety of indoor and outdoor congregating.[92] Whether deliberate or an unintended result of the challenge of communicating rapidly evolving scientific understanding, the resulting loss of confidence was the same.

Some scholars have dubbed the COVID-19 outbreak the first "post-truth pandemic."[93] One author notes:

> [The] unfortunate pattern from the first months of the pandemic, in which public health messaging has had a considerably less stellar and considerably less reliable record than you might hope for—not just for

Germany and Italy, OSF, https://osf.io/7vgq9 [https://perma.cc/HL3C-BLN2] (June 28, 2020, 3:41 PM)).

90. *See supra* note 42 and accompanying text; Charles M. Blow, Opinion, *A Holistic View of Vaccine Hesitancy*, N.Y. TIMES (Feb. 7, 2021), https://www.nytimes.com/2021/02/07/opinion/black-americans-covid-vaccine.html [https://perma.cc/9953-ED5C] (pointing to young African Americans' pervasive distrust of government, particularly in the context of COVID-19 vaccination).

91. *See* Kerrington Powell & Vinay Prasad, *The Noble Lies of COVID-19*, SLATE (July 28, 2021, 5:50 AM), https://slate.com/technology/2021/07/noble-lies-covid-fauci-cdc-masks.html [https://perma.cc/85NF-8XGY].

92. *See* Charlie Warzel, Opinion, *How to Actually Talk to Anti-Maskers*, N.Y. TIMES (July 22, 2020), https://www.nytimes.com/2020/07/22/opinion/coronavirus-health-experts.html [https://perma.cc/HY4P-G2XK]; Wallace-Wells, *supra* note 64.

93. Wendy E. Parmet & Jeremy Paul, *COVID-19: The First Post-Truth Pandemic*, 110 AM. J. PUB. HEALTH 945, 945 (2020), https://doi.org/10.2105/AJPH.2020.305721 [https://perma.cc/7WJX-VQMS].

> those worrying about the coronavirus threat but anyone concerned about the status of scientific expertise and technocratic policy more generally.[94]

Thus, people may have lost any trust that they had in the government as a protector of public health during the initial months of the outbreak.

Moreover, some public health officials departed from their own trust-inspiring norms and values in the course of the COVID-19 pandemic. For example, some public health authorities shared the names and addresses of people infected with COVID-19 with law enforcement.[95] There may be legitimate reasons for these practices. Providing first responders information about positive cases, for example, allows them to take the appropriate precautions to avoid contracting or spreading the virus. However well-meaning these practices may have been, the fact of the information sharing seems inconsistent with public promises of confidentiality.

The contact-tracing technologies themselves also proved to be less than trustworthy. While Apple appears to have adhered to its promises regarding the API, Google struggled to keep its users' data secure. For example, some Android users' location information was initially accessible to Google through the API.[96] Later, AppCensus, a privacy analysis firm, announced that it had uncovered a vulnerability in the Android version of the API that could allow certain pre-installed apps to have access to contact-tracing data as part of the information that they receive via user analytics and crash reports.[97] Google allegedly dismissed the bug as inconsequential until reporters contacted the company for comment.[98]

The terms of service of Rhode Island's app state that—although it will not sell users' data—it may share that information with

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94. Wallace-Wells, *supra* note 64; *see also* Benjamin Mueller, *Contact Tracing, Key to Reining in the Virus, Falls Flat in the West*, N.Y. TIMES, https://www.nytimes.com/2020/10/03/world/europe/covid-contract-tracing.html [https://perma.cc/D4XM-263P] (Oct. 4, 2020).

95. *E.g.*, Associated Press, *Covid-19 Test Data Shared with Law Enforcement*, COURTHOUSE NEWS SERV. (May 19, 2020), https://www.courthousenews.com/covid-19-data-shared-with-law-enforcement [https://perma.cc/4F3F-TM64].

96. *See* Natasha Singer, *Google Promises Privacy with Virus App but Can Still Collect Location Data*, N.Y. TIMES (July 20, 2020), https://www.nytimes.com/2020/07/20/technology/google-covid-tracker-app.html [https://perma.cc/K49P-YE6C].

97. Alfred Ng, *Google Promised Its Contact Tracing App Was Completely Private—But It Wasn't*, MARKUP (Apr. 27, 2021, 8:00 ET), https://www.themarkup.org/privacy/2021/04/27/google-promised-its-contact-tracing-app-was-completely-private-but-it-wasnt [https://perma.cc/G7BR-XZUB].

98. *Id.*

third parties.[99] The American Civil Liberties Union ("ACLU") of Rhode Island issued a statement expressing its concern for user privacy, particularly with respect to sharing disease-tracking data with law enforcement.[100] Moreover, the North and South Dakota app, Care19, appears to have violated its own privacy policy by sharing data with private firms, including Foursquare.[101] According to a privacy review by an outside company, the location-based app sent Foursquare a user's location, an advertising identifier (which points to a specific device), and a "citizen code" generated by the app.[102] Care19's developer, ProudCrowd, responded by saying that it planned to update its privacy policy and share less user data in the future.[103]

And while not impacting the initial skepticism regarding digital contact tracing specifically, the mismanagement of the COVID-19 vaccines could impact trust in public health authorities in the future. The Trump Administration promised Americans that 20 million people would be vaccinated by the end of 2020, but, in reality, only 3 million individuals received their first dose before the new year.[104] And stories of vaccine mismanagement still littered the headlines months later, including stories of prepared doses expiring with no one to receive them, older Americans waiting in grueling lines, and pharmaceutical company staff being inoculated before frontline health care workers.[105] Future infectious disease responses may then need to deal with this added source of distrust.

Communities of color may have additional reasons to be wary. Civil rights activists have raised concerns about racial profiling and immigration enforcement in the course of the pandemic.[106] Given the disproportionate impact of COVID-19 on minority

99. *CRUSH COVID RI – Privacy Policy*, R.I. DEP'T OF HEALTH, https://covid.ri.gov/covid-19-prevention/crush-covid-ri-app/privacy-policy [https://perma.cc/5WY2-DNFT] (Nov. 19, 2021).

100. Press Release, ACLU of Rhode Island, ACLU of RI Statement on the "Crush Covid RI" Contact Tracing App (May 19, 2020), https://www.aclu.org/press-releases/aclu-ri-statement-crush-covid-ri-contact-tracing-app [https://perma.cc/4XNP-VDPT].

101. Geoffrey A. Fowler, *One of the First Contact-Tracing Apps Violates Its Own Privacy Policy,* WASH. POST (May 21, 2020), https://www.washingtonpost.com/technology/2020/05/21/care19-dakota-privacy-coronavirus/ [https://perma.cc/S63V-9L3W].

102. *Id*.

103. *Id*.

104. Alex Woodward, *What Went Wrong with America's Botched Vaccine Rollout?*, INDEPENDENT (Dec. 31, 2020, 19:52), https://www.independent.co.uk/news/world/americas/us-vaccine-rollout-how-many-b1781036.html [https://perma.cc/K3UJ-QVVN].

105. *Id.*

106. Associated Press, *supra* note 95.

communities, the discriminatory history of public health, and the often tense relationship between these communities and law enforcement, digital contact-tracing data sharing could have undesirable effects in those communities.[107] The Tennessee Black Caucus issued a statement pointing out that "[t]he information could actually have a 'chilling effect' that keeps those already distrustful of the government from taking the COVID-19 test and possibly accelerate the spread of the disease."[108] The ACLU of Rhode Island expressed similar concerns in a letter, writing that "[s]haring this information with law enforcement agencies can have an especially harmful effect in marginalized communities and, in particular, Black and Latino neighborhoods."[109] In other words, individuals already rightfully wary of law enforcement may choose not to participate in digital contact tracing at all to avoid being targeted by the police or by immigration officials.

B. *Distrust of New Technologies*

Just the move from an analog process to a digital one could lead to heightened skepticism. Traditional contact tracing, while slower, is a far more calculated and personalized process. Individuals previously benefitted from the public deliberation preceding state-level reporting requirements through public health agencies, the consent process associated with visiting a health care provider for a diagnostic test, and the rapport building involved in manual contact tracing. By contrast, individuals may test for COVID-19 not through a trusted physician but rather in a public testing site, drive-thru clinic, or the comfort of their own home. Additionally, the automated process of digital contacting and exposure notification lacks the personal connection of the more traditional methods.

The whole concept of digital contact tracing arose ad hoc as a response to COVID-19, an understandable effort to bring all available tools to bear on the worst public health crisis in a century. Public health authorities and tech companies thus sprang into action somewhat spontaneously, entering previously uncharted territory without seeking public input or subjecting the process to

107. *See Data from RI's New Coronavirus App Can Be Shared with Third Parties, Raises Concerns*, GOLOCALPROV (May 20, 2020), https://www.golocalprov.com/news/Data-From-RIs-New-Coronavirus-App-Can-Be-Shared-With-Third-Parties-Raises [https://perma.cc/N8VU-97F9].

108. *See* Associated Press, *supra* note 95.

109. GOLOCALPROV, *supra* note 107.

public scrutiny. For all of these reasons, digital contact tracing could seem haphazard and untrustworthy, especially when compared to traditional analog methods.

C. *Distrust of Big Tech*

Another reason for the distrust of digital contact tracing could be Big Tech's involvement. The public trust in Big Tech is decreasing.[110] A survey in *The Washington Post* reported that while fifty-seven percent of smartphone users trust public health authorities, only forty-three percent trust tech companies.[111]

Big Tech wields significant power in the face of the pandemic and does so with very little legal oversight. Private tech companies operate free from the ethical and legal standards that govern medical and public health professionals. For example, the Health Insurance Portability and Accountability Act ("HIPAA") applies only to data collected by health care providers, health plans, health care clearing houses, and their business associates.[112] Once a person takes their protected information and shares it with a third party, such as a contact-tracing app, that shared data falls outside HIPAA's reach.[113] Moreover, insofar as HIPAA would apply, the Department of Health and Human Services announced that it would relax its enforcement in light of the pandemic.[114] Tech companies that promise to anonymize or de-identify data often impose those obligations on themselves, not because of any legal standard.[115] Ryan Calo wisely notes that absent regulation, "technology

110. Carroll Doherty & Jocelyn Kiley, *Americans Have Become Much Less Positive About Tech Companies' Impact on the U.S.*, PEW RSCH. CTR. (July 29, 2019), https://www.pewresearch.org/fact-tank/2019/07/29/americans-have-become-much-less-positive-about-tech-companies-impact-on-the-u-s [https://perma.cc/QBX9-4849].

111. Timberg et al., *supra* note 57.

112. *See* 45 C.F.R. § 160.103 (2021) (defining "covered entity").

113. Bradford et al., *supra* note 82, at 9; Carmel Shachar, *Protecting Privacy in Digital Contact Tracing for COVID-19: Avoiding a Regulatory Patchwork*, HEALTH AFFS. (May 19, 2020), https://www.healthaffairs.org/do/10.1377/hblog20200515.190582/full/ [https://perma.cc/4JBP-XJTL]; The Health Breach Notification may apply in these circumstances, but significant questions remain about the scope and enforcement of this rule. *See generally* 13 CFR § 318 (2021).

114. *See* U.S. DEP'T OF HEALTH & HUM. SERVS., NOTIFICATION OF ENFORCEMENT DISCRETION UNDER HIPAA TO ALLOW USES AND DISCLOSURES OF PROTECTED HEALTH INFORMATION BY BUSINESS ASSOCIATES FOR PUBLIC HEALTH AND HEALTH OVERSIGHT ACTIVITIES IN RESPONSE TO COVID-19 (2020), https://www.hhs.gov/sites/default/files/notification-enforcement-discretion-hipaa.pdf [https://perma.cc/V5BS-PN54].

115. *See Paper Hearing*, *supra* note 71 (statement of Professor Ryan Calo).

companies are held to the promises they make and not much more."[116]

Even aggressive state-level consumer privacy statutes, like the California Consumer Privacy Act ("CCPA"), may not offer robust protection.[117] In particular, digital contact-tracing data may not meet that statute's definition of "consumer information."[118] This absence of meaningful protection could contribute to the lack of trust in digital contact-tracing efforts.[119] Two undeniable facts further complicate this matter. First, the tech companies have been complicit in developing and operating the tools of adversarial surveillance.[120] Second, there have been several high-profile incidents in which technology companies have failed to live up to promises they made to customers regarding data privacy.[121] Digital contact tracing thus could engender suspicion because the public views tech companies as untrustworthy data stewards regardless of context.

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To sum up, any successful digital contact-tracing programs must conspicuously adopt public health norms and practices.[122] But that

116. *See id.*

117. *See* Bradford et al., *supra* note 82, at 10.

118. The CCPA covers "businesses" that collect consumer data. *See* CAL. CIV. CODE § 1798.140 (Deering 2021). Public health agencies do not exist to generate revenue or to broker data, so the statute may not apply to them. Additionally, Apple and Google deidentify the data, and the CCPA specifically states that, "'personal information' does not include consumer information that is deidentified or aggregate consumer information." *Id*.

119. Bradford et al., *supra* note 82, at 10.

120. *See, e.g.*, Anne Flaherty, *What the Government Pays to Snoop on You*, USA TODAY (July 10, 2013), https://www.usatoday.com/story/money/business/2013/07/10/what-government-pays-to-snoop-on-you/2504819/ [https://perma.cc/Y4PX-V2DF]; Kleinman & Krishnaswami, *supra* note 81; Kalev Leetaru, *Much of Our Government Digital Surveillance is Outsourced to Private Companies*, FORBES (June 18, 2019, 8:46 PM), https://www.forbes.com/sites/kalevleetaru/2019/06/18/much-of-our-government-digital-surveillance-is-outsourced-to-private-companies/?sh=1940df6d1799 [https://perma.cc/T6CE-NR32]; Alan Z. Rozenshtein, *Surveillance Intermediaries*, 70 STAN. L. REV. 99, 99 (2018) (noting the role of the large technology companies as "surveillance intermediaries" that collect much of the data used for government surveillance); Elizabeth E. Joh, *The Undue Influence of Surveillance Technology Companies on Policing*, 92 N.Y.U. L. REV. ONLINE 19, 20 (2017) (noting the role the private sector plays in facilitating surveillance for law enforcement purposes).

121. *See, e.g.*, Leah R. Fowler, Jim Hawkins & Jessica L. Roberts, *Uncertain Terms*, 97 NOTRE DAME L. REV. 1 (2021) (describing an FTC action against health app Flo).

122. JOHNS HOPKINS PROJECT ON ETHICS & GOVERNANCE OF DIGIT. CONTACT-TRACING TECHS., DIGITAL CONTACT TRACING FOR PANDEMIC RESPONSE: ETHICS AND GOVERNANCE GUIDANCE 2 (Jeffrey P. Kahn ed., 2020) (ebook), https://muse.jhu.edu/book/75831 [https://perma.cc/K9DK-7K6E].

alone will not overcome many Americans' concerns about using that technology. Unlike analog contact tracing, a successful digital contact-tracing program must also overcome distrust in public health authorities, skepticism regarding new technology, and suspicion of Big Tech. In the following Part, we contemplate how public health authorities can do their part to cultivate trust in digital contact tracing.

IV. CULTIVATING TRUST IN DIGITAL CONTACT TRACING

Public trust is essential to any successful contact-tracing effort. But instilling trust in digital contact tracing, in particular, will not be easy. In fact, some experts support further eroding data privacy protections to allow even more government oversight.[123] As with proposals for mandatory digital contact tracing, we strongly caution against this temptation. In addition to exposing the American people to widespread invasions of their privacy and civil liberties, it would undermine efforts to track and slow the spread of disease. Nor is the answer to abandon digital contact tracing altogether. As noted above, analog contact-tracing efforts alone will struggle to meet the public health need, thus permitting the coronavirus—and any future viruses like it—to continue its spread unnecessarily. Given the costs that such viruses can impose, we should be employing all available tools to bring these viruses under control.

This Part considers the central challenge for successful digital contact tracing: how to cultivate the necessary trust. We argue any future attempts to track disease spread using technology must not only incorporate the norms of cooperative surveillance described in Part II but also proactively cultivate trust. Public health professionals have grown to recognize the need to win the public's confidence, and the field of public health has developed several strategies to foster this confidence. In our other work on data collection and trust, we assess the potential roles of industry self-regulation, data protection statutes, and agency regulation.[124] Here, we consider a range of traditional public health strategies—focused on transparency, communication, and public engagement—to instill public confidence in the measures being taken.[125]

123. Bradford et al., *supra* note 82, at 1 n.3.

124. Berman et al., *supra* note 52.

125. Julie Henderson, Paul R. Ward, Emma Tonkin, Samantha B. Meyer, Heath Pillen, Dean McCullum, Barbara Toson, Trevor Webb, John Coveney & Annabelle Wilson, *Developing and Maintaining Public Trust During and Post-COVID-19: Can We Apply a Model*

A. *Transparency*

Transparency is a recurring theme in approaches to augment trust in public health initiatives. This includes transparency about when and how a public health authority seeks information from those affected and honest disclosures about relevant information and findings.[126] Policymakers, public health authorities, and app developers can foster this transparency by clearly outlining their assumptions, justifications, and reasoning for policy decisions.[127] Transparency also involves a commitment to candid disclosure when things go wrong, such as data breaches, malfunctions, and modifications to previously communicated information.

For digital contact tracing specifically, transparency about data practices is critical.[128] Apps of all varieties, including those for contact-tracing purposes, often hide material terms about data processing and sharing in difficult-to-read terms of service and privacy policies. Further mystery can shroud what happens to data once an app transfers data to a third party, be it a public health authority or another technology company. Future digital contact-tracing efforts would benefit from transparency about these practices and should not rely on the public to seek out and read the fine print in terms of service or other highly technical documents for themselves. Moreover, information about app design, data sharing, and digital contact tracing generally can be highly complex for the lay public, requiring a concerted effort to simplify highly technical information and industry-specific jargon so that the public can understand. Additionally, the apps may treat consent as an ongoing process and require users to regularly affirm their desire to participate in digital contact tracing and confirm that they understand material terms that may impact the security and privacy of their data.

Developed for Responding to Food Scares?, FRONTIERS PUB. HEALTH, July 2020, at 1, https://doi.org/10.3389/fpubh.2020.00369 [https://perma.cc/2JPS-LA7U].

126. James F. Childress, Ruth R. Faden, Ruth D. Gaare, Lawrence O. Gostin, Jeffrey Kahn, Richard J. Bonnie, Nancy E. Kass, Anna C. Mastroianni, Jonathan D. Moreno & Phillip Nieburg, *Public Health Ethics: Mapping the Terrain*, 30 J.L. MED & ETHICS 170, 174 (2002), https://doi.org/10.1111/j.1748-720X.2002.tb00384.x [https://perma.cc/CW5B-6J86].

127. Nancy M. Baum, Sarah E. Gollust, Susan D. Goold & Peter D. Jacobson, *Looking Ahead: Addressing Ethical Challenges in Public Health Practice*, 35 J.L. MED. & ETHICS 657, 662 (2007), https://doi.org/10.1111/j.1748-720X.2007.00188.x [https://perma.cc/SRQ2-DU7R]; *see also* Sam Berger & Jonathan D. Moreno, *Public Trust*, *Public Health*, *and Public Safety: A Progressive Response to Bioterrorism*, 4 HARV. L & POL'Y REV. 295, 302 (2010).

128. Ramjee et al., *supra* note 89, at 145.

B. *Communication*

Communication is another critical component of public health engagement and trust-building, including information about the threat and mitigation efforts.[129] Communication is distinct from transparency. While transparency may dictate the contents of what someone communicates, communication speaks to how someone transmits that message to the public, including the mechanism and the wording. Some authors have argued that providing the public with useful information should indeed be the primary focus of any public health response and that effective communication should reduce the need for more coercive measures that undermine trust.[130]

Trustworthy communication requires considering both the messenger and the message. Tailored and tested messaging, including public service announcements, personal appeals from high-profile public figures, and social media messaging can encourage cooperation.[131] The message should also be broadly appealing regardless of political affiliation and benefit from local faith-based and other community organizations' input. The Centers for Disease Control and Prevention takes the discussion further, citing lessons from risk communication literature highlighting empathy and caring, honesty and openness, dedication and commitment, and competence and expertise as necessary elements of a trusted and credible messenger.[132] This encompasses a need to craft rich messages that go beyond matter-of-fact science to include an appeal to various moral concerns and not just the liberal values common in public health communication.[133] Information campaigns can facilitate cooperative models of public health intervention, which can be more effective than their more coercive counterparts.[134]

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129. Louise Cummings, *The 'Trust' Heuristic: Arguments from Authority in Public Health*, 29 HEALTH COMMC'N 1043, 1043 (2014), https://doi.org/10.1080/10410236.2013.831685 [https://perma.cc/58ED-QXVC].

130. Berger & Moreno, *supra* note 127, at 302–04.

131. Alice Miranda Ollstein & Darius Tahir, *Contact Tracing Foiled by Conspiracy Theories, Lack of Federal Messaging*, POLITICO (Sept. 3, 2020), https://www.politico.com/news/2020/09/03/contact-tracing-conspiracy-theories-trump-messaging-408611 [https://perma.cc/SV5E-CJDK].

132. Abbigail J. Tumpey, David Daigle & Glen Nowak, *Communicating During an Outbreak of Public Health Investigation*, CTRS. FOR DISEASE CONTROL & PREVENTION, https://www.cdc.gov/eis/field-epi-manual/chapters/Communicating-Investigation.html [https://perma.cc/VX5W-GE7M] (Dec. 13, 2018).

133. Matthews et al., *supra* note 51, at 420–21.

134. Berger & Moreno, *supra* note 127, at 305.

Communication about digital contact tracing failed, in part, due to the highly disjointed and politicized nature of the pandemic. Future efforts would benefit from a more robust centralized and cohesive response. For example, the consistent acknowledgment that contact tracing is good, important, and safe can, at a high level, help a hesitant public accept a novel intervention.

While consistent messages are essential on a population level, one broad message is unlikely to help address more particularized objections. In those cases, tailored messaging is required, sharing the same or similar content using different framing and for different audiences. Successful efforts would advertise digital contact-tracing apps across various media, including print, radio, and television, using culturally appropriate language and content to reach a broader audience. Approaches could mirror efforts to normalize vaccination that took place shortly after Pfizer and Moderna began distributing their vaccines. For example, Dr. Kizzmekia Corbett, a Black scientist who co-led the development of the Moderna vaccine, attended the vaccination of civil rights leader Reverend Jesse Jackson in a publicized effort to establish trustworthiness with Black communities.[135] In her remarks at the event, Dr. Corbett noted that "[a] lot of times, people just need to see their mirror image."[136] This need for representation is also true in politics. Bipartisan support with consistent messaging could counter misinformation and politicized resistance.

C. *Public Engagement*

However, no matter how inclusive, advertising and messaging must be part of a multi-level strategy, not a standalone approach.[137] Public engagement can result in more effectively targeted programs and, as a result, lead to more efficient use of limited resources. It can also foster public health initiatives that get

135. Maudlyne Ihejirika, *Black Scientist Who Helped Develop COVID-19 Vaccine Attends Inoculation of Rev. Jesse Jackson*, CHI. SUN-TIMES (Jan. 8, 2021, 8:59 PM), https://chicago.suntimes.com/coronavirus/2021/1/8/22221102/coronavirus-covid-vaccine-moderna-kizzmekia-corbett-jesse-jackson-distrust-black-community [https://perma.cc/GJ8J-JYJU].

136. *Id.*; *see also* Thomas A. LaVeist & Georges C. Benjamin, Opinion, *60 Black Health Experts Urge Black Americans to Get Vaccinated*, N.Y TIMES (Feb. 7, 2021), https://www.nytimes.com/2021/02/07/opinion/covid-black-americans.html [https://perma.cc/9RRC-WRQN].

137. Michael P. Kelly & Mary Barker, *Why is Changing Health-Related Behaviour So Difficult?*, 136 PUB. HEALTH 109, 111 (2016), https://doi.org/10.1016/j.puhe.2016.03.030 [https://perma.cc/5X64-XBWJ].

potentially controversial interventions right the first time, obviating the need to reestablish trust after it is lost.

A comprehensive approach to developing and nurturing trust should be iterative and interactive and can be time- and resource-intensive. Public hearings and deliberative engagement can result in procedurally just solutions that balance competing values and account for minority views.[138] And understanding how and why groups fail to trust entities takes on increasing importance when data collection becomes more intrusive.[139]

For example, early research showed that the public was more likely to support apps if public health agencies or insurance providers were the entities distributing them[140] or familiar technology companies about which the public already holds a favorable opinion developed them.[141] Garnering insight such as this from the end users of proposed technology can inform how contact-tracing apps are most effectively developed, introduced, and marketed. Further, engaging the public can allow program developers to take full advantage of tested theories and models—like the Health Belief Model[142]—which can help public health interventions overcome barriers to behavioral change to achieve desired outcomes. These approaches are common in public health program planning and help guide and develop strategies based on an evidence-based understanding of health behaviors instead of guesswork and gut instinct.[143]

138. Nancy E. Kass, *An Ethics Framework for Public Health*, 91 AM. J. PUB. HEALTH 1776, 1781 (2001), https://dx.doi.org/10.2105%2Fajph.91.11.1776 [https://perma.cc/AY3T-DVHL].

139. Sandra Soo-Jin Lee, *Obligations of the "Gift": Reciprocity and Responsibility in Precision Medicine*, 21 AM. J. BIOETHICS 57, 62 (2021), https://doi.org/10.1080/15265161.2020.1851813 [https://perma.cc/YZ7X-A38J].

140. Eszter Hargittai & Elissa Redmiles, Opinion, *Will Americans Be Willing to Install COVID-19 Tracking Apps?*, SCI. AM. (Apr. 28, 2020), https://blogs.scientificamerican.com/observations/will-americans-be-willing-to-install-covid-19-tracking-apps/ [https://perma.cc/C2Q7-PSTN].

141. Lucy Simko, Ryan Calo, Franziska Roesner & Tadayoshi Konho, *COVID-19 Contact Tracing and Privacy: Studying Opinion and Preferences*, ARX IV (May 8, 2020), https://arxiv.org/pdf/2005.06056.pdf [https://perma.cc/7YMN-75A9].

142. *See generally* Irwin M. Rosenstock, *Historical Origins of the Health Belief Model*, 2 HEALTH EDUC. MONOGRAPHS 328 (1974) (demonstrating the model that was originally developed at the United States Public Health Service to explain and predict preventive health behavior).

143. HEALTH BEHAVIOR: THEORY, RESEARCH, AND PRACTICE xi (Karen Glanz et al. eds., 5th ed. 2015) (ebook).

Under ideal circumstances, proactive engagement efforts can stay ahead of public health crises.[144] Building trust and establishing trustworthiness before a public health emergency can improve cooperation, build on local knowledge, and improve outcomes.[145] Even when proactive measures are no longer possible, similar efforts should be integrated, constant, and ongoing as programs are developed in real time and refined in response to an evolving crisis.[146]

Importantly, these approaches are not siloed. Public engagement can help inform policy decisions, which can lead to increased transparency.[147] Understanding public opinion can help tailor communication strategies to reach populations reluctant to participate in public health initiatives. Using public health tools to build trust is a complex but essential process that must accompany the technological development if we are to avoid the problems that thwarted digital contact tracing for the COVID-19 pandemic in the future.

* * *

Successful digital contact tracing requires cooperation. Yet while abiding by the norms of cooperative surveillance is necessary—based on the distrust of the Apple and Google API—it will not be sufficient. Public health authorities should also employ other strategies to cultivate the trust necessary for these programs to succeed. Transparency, clear communication, and public engagement will help encourage people to participate in digital contact-tracing efforts, both to combat the ongoing COVID-19 pandemic and in future public health emergencies.

CONCLUSION

The United States is in the throes of one of the deadliest public health crises in our history, but this crisis will not be our last. What lessons can we learn from our COVID-19-related missteps that

144. *See* Sheila Mulrooney Eldred, *Trusted Messengers May Help Disenfranchised Communities Overcome Vaccine Hesitancy*, KHN (Dec. 17, 2020), https://khn.org/news/article/trusted-messengers-may-help-disenfranchised-communities-overcome-vaccine-hesitancy [https://perma.cc/6JEG-XZ83].

145. Berger & Moreno, *supra* note 127, at 306.

146. Kass, *supra* note 138, at 1782.

147. Soo-Jin Lee, *supra* note 139, at 63.

might aid us in later stages of the pandemic and in subsequent infectious disease crises?

Several countries—some with great success—turned to technology to track and slow or stop the spread of the coronavirus.[148] However, these measures failed to take hold in the United States. Despite attempts to conform with the norms of cooperative surveillance, public health authorities were unable to win the confidence necessary for effective digital contact tracing. A lack of faith in the government, trepidation regarding new technologies, and wariness of Big Tech's role all contributed to this widespread distrust. Simply relying on the ideals that make traditional contact tracing palatable will not be sufficient for the future.

While some have encouraged further dialing back privacy protections or mandating participation, we reject the idea of adopting intrusive or coercive policies. Contact tracing is just one step in controlling the spread of disease. Individuals must also take tests, report their results, and, most importantly, self-quarantine after a confirmed exposure. Safeguarding public health in this manner is an inherently cooperative endeavor. Digital contact tracing must therefore actively win the trust of the American people to succeed.

148. *See, e.g.*, Devin Skoll, Jennifer C. Miller & Leslie A. Saxon, *COVID-19 Testing and Infection Surveillance: Is a Combined Digital Contact-Tracing and Mass-Testing Solution Feasible in the United States?*, 1 CARDIOVASCULAR DIGIT. HEALTH J. 149, 151–52 (2020), https://doi.org/10.1016/j.cvdhj.2020.09.004 [https://perma.cc/MMR2-4S5Z] (listing countries that have used digital contact tracing with varying levels of success).