**Articles**

# A Proportionality-Based Framework for Government Regulation of Digital Tracing Apps in Times of Emergency

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ABSTRACT

Times of emergency present an inherent conflict between the public interest and the preservation of individual rights. Such times require granting emergency powers to the government on behalf of the public interest and relaxing safeguards against government actions that infringe rights. The lack of theoretical framework to assess governmental decisions in times of emergency leads to a polarized and politicized discourse about potential policies, and often, to public distrust and lack of compliance.

Such a discourse was evident regarding Digital Tracing Apps ("DTAs"), which are apps installed on cellular phones to alert users that they were exposed to people who tested positive for COVID-19. DTAs collect the most sensitive types of information, such as health-related and location or proximity information, which violates the right to privacy and the right to be free of surveillance. This sensitive information is normally legally protected. But in emergencies there are no legal restrictions limiting the collection of such data. The common privacy-law approach supports

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DTA implementation under the condition that the technology preserves the privacy of users. But this Article suggests that the privacy approach focuses on micro considerations and under-addresses the implications of DTA-based policy.

Instead, this Article suggests rethinking DTA implementation during COVID-19 through the doctrine of proportionality. Often used by European Union courts in areas where decisions entail meaningful implications to individual rights, the doctrine offers a clear and workable normative evaluation of tradeoffs in a more nuanced, explicable, and transparent way. Highlighting macro considerations, the doctrine of proportionality suggests that 1) DTA-based policy is less proportionate compared to traditional contact-tracing methods; 2) policies created while relying on smartphones are inequitable and biased; and 3) the sharing of sensitive personal information with private companies will have irreversible social surveillance implications. Additionally, the proportionality method not only provides a flexible methodological tool to evaluate government decisions in times of emergency but also offers an opportunity to examine how governments achieve and justify the acceptance and assimilation of new technological policy measures, which may take societies in new directions.

Part I establishes the framework of governance during COVID-19, the use of emergency powers, and the conflict between the public interest and individual rights. Part II explores the value of using the doctrine of proportionality as a method for policymaking during emergencies. Part III applies the doctrine of proportionality to the case study of DTA-based policy, exploring the parameters of its suitability, necessity, and proportionality *stricto sensu*. Proportionality *stricto sensu* assesses the desirability and relative proportionality of three policies that have been used to promote the public interest in different ways: a general shelter-at-home policy, a traditional-contact-tracing policy, and a DTA-based policy. Part IV discusses the policy implications of using a DTA-based policy.

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## I. BACKGROUND

### *A. COVID-19 Public Health Emergency*

December of 2019 brought with it reports of people getting sick in the city of Wuhàn, People's Republic of China. The virus (Sars-Cov-2) was familiar as part of the Coronavirus family that had previously introduced us to the SARS virus, yet different from what we have previously known. It was extremely contagious; symptoms varied drastically between patients (from asymptomatic to severe), and in the beginning, it was (wrongly) perceived to be more deadly than previously known SARS viruses.[1] Within a few weeks, the virus traveled to Europe, and within a few more weeks, the number of infected people grew exponentially.[2] The world faced a pandemic

1. *But see* Jill Seladi-Schulman, *COVID-19 vs. SARS: How Do They Differ?* HEALTHLINE, https://bit.ly/3mc8UM3 [https://perma.cc/EA8C-FB5Z] (Sept. 15, 2021) (clarifying that SARS has a higher mortality rate than COVID-19 at "about 10 percent, with some patient populations having a mortality rate as high as 45 percent").

2. Gianfranco Spiteri et al., *First Cases of Coronavirus Disease 2019 (COVID-19) in the WHO European Region, 24 January to 21 February 2020*, 25 EUROSURVEILLANCE 1, 3 (2020).

that has caused, to this day, more than 820,355 deaths in the United States alone.[3]

Experts were ignorant of the virus's behavior, the methods by which it transferred (e.g., through contact with skin, surfaces, air, etc.), and its resilience (whether it can survive environmental changes, such as changes in temperature). As a result, it was hard to estimate how many people might be infected, to identify populations at risk, or to assess the impact on health systems. The Director-General of the World Health Organization (WHO) reconvened the Emergency Committee ("EC") in January of 2020.[4] The EC "reached consensus and advised the Director-General that the outbreak constituted a Public Health Emergency of International Concern."[5]

Once governments announce a national public health emergency, their emergency powers, which are brought into play in exceptional circumstances, go into effect.[6] Coercive public health powers include measures of surveillance, investigation, and intervention that may infringe individual civil liberties such as rights to due process, freedom of speech, assembly, travel, and privacy.[7] The COVID-19 pandemic led to sweeping governmental actions that drastically affected the lives of citizens in ways that would not have been imaginable a year prior. States were placing new restrictions on their citizens: closing national borders, restricting air traffic, enforcing self-isolation, closing education institutions and teaching remotely via the internet, and prohibiting gathering or physical activity done outdoors. These new restrictions gained normative legitimacy because the pandemic required that the government en-

3. *United States COVID-19 Cases, Deaths, and Laboratory Testing (NAATs) by State, Territory, and Jurisdiction*, CDC, https://bit.ly/3EGZuQ7 [https://perma.cc/ULK4-28AC] (last visited Dec. 31, 2021).

4. *Statement on the Second Meeting of the International Health Regulations (2005) Emergency Committee Regarding the Outbreak of Novel Coronavirus (2019-nCoV)*, WHO (Jan. 30, 2020), https://bit.ly/3icwsy3 [https://perma.cc/E7CB-MKAF].

5. *Archived: WHO Timeline—COVID-19*, WHO (Apr. 27, 2020), https://bit.ly/3EK16ID [https://perma.cc/7RK6-SFC4]; *see also Statement on the Second Meeting of the International Committee Regarding the Outbreak of Novel Coronavirus (2019-nCov)*, WHO (Jan. 30, 2020), https://bit.ly/3zy2DxY [https://perma.cc/E7CB-MKAF] (agreeing that the outbreak now meets the criteria for a Public Health Emergency of International Concern).

6. Ronald Bayer, *The Continuing Tensions Between Individual Rights and Public Health*, 8 EMBO REPS. 1099, 1100–01 (2007).

7. *Id.*

sure public safety, protect health, and secure the rights and freedoms of others.[8] But the toll on individual rights was heavy.

### *B. Digital Tracing Apps to Join Public Health Efforts*

To confront the emergency, permit economies to open, and make the process of public health surveillance more efficient, governments around the world have been considering the use of Digital Tracing Apps ("DTAs") to trace exposure to COVID-19 and confirm cases.[9] The smartphone apps identify and alert users who have been exposed to individuals diagnosed as carrying the virus. Since COVID-19 can be transmitted by someone before they are symptomatic, these apps can detect people who are exposed to others who are carrying the virus prior to any official diagnosis. DTAs can recommend self-isolation to break the chain of transmission and may also display useful instructions or videos about tests, treatments, preventing infections, and current policies on self-isolation requirements.

The two main technologies used by DTAs to trace user contacts are location-history matching and proximity tracing. Location-history matching is based on geolocation, which is determined by a Global Positioning System (GPS), a common feature that exists on most smartphones through apps such as Google Maps. In addition to providing information to the individual, location-history matching provides information on the population density over time, measured against a baseline dataset from pre-pandemic times. Such analysis is useful for several purposes: (1) creating mobility reports that assess the public's response to interventions in terms of the rate of movement; (2) assessing the impact of social distancing on the spread of the virus; (3) determining containment measures and anticipating peaks of contamination; (4) assisting in risk modeling that could help public health authorities; and (5) planning urban

8. Olga Halub-Kowalczyk, *Redefining the Right to Privacy in the Age of the COVID-19 Pandemic*, I-CONNECT: INT'L J. CONST. L. (Apr. 2, 2020), https://bit.ly/3nL0z3i [https://perma.cc/6DMY-TFQ3].

9. Mia Sato, *Contact Tracing Apps Now Cover Nearly Half of America. It's Not Too Late to Use One*, MIT TECH. REV.: PANDEMIC TECH. PROJECT (Dec. 14, 2020), https://bit.ly/3Exleh4 [https://perma.cc/6YU7-HBC3].

and transit infrastructure.[10] But, GPS violates user privacy because it tracks all places visited by users all day, every day.[11]

In contrast, proximity-tracing apps record to *whom* users are near, instead of recording *where* users are.[12] These apps can be designed in different ways, but they all function similarly: they broadcast a unique identifying log number, measure signal strength, and keep track of the log numbers received. Each app has a time and distance threshold to notify users. When 2 users of an app come near each other, the apps estimate the distance between 2 phones (e.g., 6 feet) and the duration of exposure (e.g., 15 minutes) to determine whether 2 smartphones were close enough together for their users to be at risk.[13] When a user reports her confirmed diagnosis of COVID-19, the app detects which tracked Bluetooth logs from the previous two weeks meet the distance and time threshold. For example, if the app estimates that log numbers are less than six feet apart for a sufficient amount of time, it alerts individuals that they are at risk.

At their core, DTAs try to imitate the contact tracing and public health surveillance traditionally conducted by public health authorities. The goals of traditional methods—the surveillance and detection of cases—are key responses to a pandemic.[14] The public health community uses analytic tools to (1) detect, characterize, monitor, and respond to events of public health concern; (2) iden-

10. Natasha Lomas, *Google Is Now Publishing Coronavirus Mobility Reports, Feeding Off Users' Location History*, TECHCRUNCH (Apr. 3, 2020, 9:19 AM) https://tcrn.ch/3vNWm0D [https://perma.cc/2TQG-JLE6]; Caroline O. Buckee et al., *Aggregated Mobility Data Could Help Fight COVID-19*, 368 SCIENCE 145, 145 (2020) (advocating for the use of mobility data collected by private companies); *see* Ellen Sheng, *Facebook, Google Discuss Sharing Smartphone Data with Government to Fight Coronavirus, but There Are Risks*, CNBC: TECH DRIVERS, https://cnb.cx/2XzT7gT [https://perma.cc/8SCP-AA7P] (Mar. 19, 2020, 3:01 PM) ("Direct Relief, a California-based disaster-relief organization, has been working with mapping tools such as those at Facebook to track population movements during natural disasters, like hurricanes or wildfires, to determine evacuation patterns and if people are leaving the fire perimeter zone.").

11. *See Manage Your Location History*, GOOGLE ACCOUNT HELP, https://bit.ly/3i0LQ0x [https://perma.cc/2EVD-FB3E] (last visited Oct. 25, 2021).

12. *See* WHO Team, *Infection Prevention and Control: Contact Tracing*, WHO (May 9, 2017), https://bit.ly/3CqFxek [https://perma.cc/ZZW6-K7T2].

13. Andrew Crocker, Kurt Opsahl & Bennett Cyphersa, *The Challenge of Proximity Apps for COVID-19 Contact Tracing*, ELEC. FRONTIER FOUND. (Apr. 10, 2020), https://bit.ly/3kpDFw9 [https://perma.cc/UNB7-D8U4].

14. *See* U.S. DEPT. OF HEALTH AND HUM. SERVS., HHS PANDEMIC INFLUENZA PLAN 23 (2005), https://bit.ly/3lGlFx3 [https://perma.cc/R6T8-WXTQ] (explaining the rationale for virologic and disease surveillance, such as identifying "trends in influenza disease activity and identify populations that are severely affected").

tify concentrated areas requiring more resources; and (3) signal anomalies, health risks, and interventions to keep people safer and healthier. Surveillance of the travel history, movement, and body temperature of a person diagnosed with COVID-19 informs decision makers of the spread of the pandemic, of concentrated areas that require more resources, and of locations requiring lockdowns. Public health authorities traditionally collect this information through public health surveillance and contact-tracing interviews.[15]

An obvious concern regarding DTAs is the requirement to collect sensitive information that is essential for DTAs to function and the requirement to share such sensitive information as part of pandemic protocols, rather than keep it confidential. DTAs collect and process health and location or proximity information, regardless of whether users are healthy or infected. Location, health, and proximity information are considered to be the most sensitive types of data, and collecting them violates an individual's right to privacy and right to be free of surveillance.[16] When locations reveal what people are doing, or when proximity features reveal with whom people connect, people might begin to refrain from participating in activities and associations that may be considered controversial in fear of being monitored.[17] Free association is required for citizens to shape their social and political lives, and it is a central necessity for democratic participation.[18] New civilian surveillance technologies challenged these rights by conducting generalized, invisible, real-time surveillance of people protesting race and policing follow-

15. *Public Health Surveillance and Data: Strategies for Improvement*, CDC, https://bit.ly/3nTAQ8O [https://perma.cc/TU4N-HJFM] (Jan. 26, 2021); WHO, WHO GLOBAL INFLUENZA PREPAREDNESS PLAN 26–27 (2005), https://bit.ly/2XLoOUy [https://perma.cc/U48C-CFLK] (noting the reasons for surveillance, including identifying initial cases, contacts, and the spread of infection; detecting, characterizing, and assessing clusters of influenza-like illness or respiratory deaths, with provision for surge capacity and inter-sectoral and inter-institutional collaboration; and gaining more information on viruses to update the description of the epidemiological, virological, and clinical features of the infection and its possible source).

16. *See* Kinfe Micheal Yilma, *Bill of Rights for the 21st Century: Some Lessons from the Internet Bill of Rights Movement*, INT'L J. HUM. RTS., Aug. 2, 2021, at 1, 5.

17. Kiel Brennan-Marquez, *The Constitutional Limits of Private Surveillance*, 66 KAN. L. REV. 485, 492–98 (2018) (reviewing studies that demonstrate the impact of governmental online surveillance on users' behavior); Karen Gullo, *Surveillance Chills Speech—as New Studies Show—and Free Association Suffers*, ELEC. FRONTIER FOUND. (May 19, 2016), https://bit.ly/2XsReSC [https://perma.cc/A3YM-3VR6].

18. *See* Julie Cohen, *What Privacy is For*, 126 HARV. L. REV. 1904, 1912 (2013) (noting that diminished privacy can threaten liberal democracy).

ing the death of George Floyd.[19] Such surveillance is being conducted when the usual legal protections on individual rights and restrictions on government actions do not apply. For example, the Health Insurance Portability and Accountability Act[20] (HIPAA), which addresses the protection and portability of personal health information belonging to people who seek care under national standards, does not protect information collected during an emergency.[21] Surveillance leads to a chilling effect on policed activities; diminishes individual and collective autonomy, rights, and interests; and undermines the flourishing of society. Maintaining these rights can outweigh public health interests, which may be why individual rights that contest coercive public health powers have remained unrestricted, even during the COVID-19 emergency.[22]

### *C. Emergency Governmental Powers: An Inherent Conflict Between the Public Interest and Individual Rights*

Under normal circumstances, constitutional limits restrain governments from taking disproportionate, oppressive, and arbitrary actions that can interfere with the fulfillment of citizens' rights.[23] However, in emergency situations—such as the COVID-19 pandemic—the best practices of ordinary times cannot always be maintained. Times of emergency have a dualistic nature: public interest requires governments to adopt policies to address the emergency even at the price of infringing on some individual rights, but governments must nevertheless strive for minimum infringement of those rights. Often, the toolbox of emergency powers used to respond to public health emergencies includes some infringement of rights, which are protected only to the extent reasonable and tolerable under the circumstances.[24] Thus, during emergencies, laws limit-

19. Umberto Bacchi & Avi Asher-Schapiro, *Debate on Surveillance and Privacy Heats Up as U.S. Protests Rage*, REUTERS (June 1, 2020, 8:53 PM), https://reut.rs/3tT0Nqa [https://perma.cc/Z8NR-C6X2].

20. Health Insurance Portability and Accountability Act of 1996, Pub. L. No. 104-191, 110 Stat. 1936.

21. *See infra* Section III.A.3.

22. *See* Lawrence O. Gostin, *The Model State Emergency Health Powers Act: Public Health and Civil Liberties in a Time of Terrorism*, 13 HEALTH MATRIX: J. L.-MED. 3, 12–13 (2013); *see also* Michael Nwogugu, Chapter-7: Complex Systems Challenges: Epidemics, the Welfare-State and the Constitution 27 (Apr. 10, 2020) (unpublished manuscript) (on file with author) (discussing the right of association versus the public interest during COVID-19).

23. Vicki C. Jackson, *Constitutional Law in an Age of Proportionality*, 124 YALE L.J. 3094, 3108 (2015).

24. Justin Bernstein et al., Grappling with the Ethics of Social Distancing: A Framework for Evaluating Social Distancing Policies and Reopening Plans 11 (Apr. 17, 2020) (unpublished manuscript) (on file with John Hopkins Berman Inst.

ing a government's power to infringe on the rights of its citizens are relaxed, enabling the government to adapt and implement responses that would otherwise be unacceptable. As a result, some tradeoffs between certain rights and public health interests are unavoidable. In these circumstances, governments may partially suspend basic rights, including the privacy of health information in favour of the public interest.[25]

Highly restrictive actions that infringe on rights are essential to preserve public health during a pandemic. For example, the Model State Emergency Health Powers Act[26] grants state and local public health authorities the power to ensure that planning, prevention, and response mechanisms are strong, effective, and timely during public health emergencies.[27] It also immunizes officials from liability if their acts abuse individual rights and cause injury.[28] It gives public health agents broad authority to track, prevent, and control disease while also limiting the time, duration, and scope of their authority to abate serious public health threats.[29] Additionally, courts have previously recognized the government's authority to

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of Bioethics); *see also* H. McD Clokie, *Emergency Powers and Civil Liberties*, 13 CAN. J. ECON. & POL. SCI., 384, 389 (1947) (reviewing the nature and extent of emergency powers and their constitutional basis).

25. *Compare* Convention for the Protection of Human Rights and Fundamental Freedoms, Nov. 4, 1950, 213 U.N.T.S. 221 (noting that in Europe, according to Article 15 of the ECHR, "in time of war or other public emergency . . . any State may take measures derogating from its obligations under the Convention to the extent strictly required by the exigencies of the situation, provided that such measures are not inconsistent with its other obligations under international law"), *with* Directive 2002/58, of the European Parliament and of the Council of 12 July 2002 Concerning the Processing of Personal Data and the Protection of Privacy in the Electronic Communications Sector ¶36, 2002 O.J. (L 201) 37, 41 (EC) ("Member States may restrict the users' and subscribers' rights to privacy with regard to calling line identification and location data where this is necessary to allow emergency services to carry out their tasks as effectively as possible.").

26. MODEL STATE EMERGENCY HEALTH POWERS ACT (CTR. FOR L. & THE PUB.'s HEALTH, Proposed Draft 2001). For examples of states that passed regulations based on this act, see Joneigh S. Khaldun, *In Context: The Turning Point Model State Public Health Act*, 12 AMA J. ETHICS 731, 732 (2010).

27. MODEL STATE EMERGENCY HEALTH POWERS ACT (CTR. FOR L. & THE PUB.'s HEALTH, Proposed Draft 2001). *Compare* Lawrence O. Gostin, *When Terrorism Threatens Health: How Far Are Limitations on Human Rights Justified?*, 31 J.L. MED. & ETHICS 524, 527 (2003) (discussing the justifications for limiting human rights during public health emergencies), *with* GEORGE J. ANNAS, WORST CASE BIOETHICS: DEATH, DISASTER, AND PUBLIC HEALTH 229 (2010) (discussing the bioethics behind controversial public health decisions during worst case scenarios).

28. MODEL STATE EMERGENCY HEALTH POWERS ACT § 804.

29. Lawrence O. Gostin et al., *The Model State Emergency Health Powers Act: Planning for and Response to Bioterrorism and Naturally Occurring Infectious Diseases*, 288 JAMA 622, 625 (2002).

quarantine, prevent travel, require vaccinations, and make people submit to medical exams.[30]

The public health exception subverts traditional constitutional limitations and other legal rules or procedures levied against governments. Whether unconstitutional or extra-constitutional,[31] emergency powers are not covered by the regular provisions of constitutional systems. Under HIPAA, authorities have emergency powers that allow them to act outside of their usual legal obligations.[32] To manage the spread of infections, covered entities may use or disclose Protected Health Information (PHI), including identity contacts, to notify those "who may have been exposed to a communicable disease or may otherwise be at risk of contracting or spreading a disease."[33] These entities may also use or disclose PHI if such notification is authorized by law and necessary to conduct a "public health intervention or investigation."[34] HIPAA permits, but does not require, covered entities to share PHI with a public health authority without an individual's authorization "for the purpose of preventing or controlling disease, injury, or disability, including, but not limited to, the reporting of disease" and "public health surveillance, public health investigations."[35] If required, HIPAA's exceptions permit the disclosure and use of PHI to non-public-health

30. *See* Jacobson v. Massachusetts, 197 U.S. 11, 29 (1905) (finding that a "well-ordered society . . . [may] enforc[e] . . . reasonable regulations, as the safety of the general public may demand"); Polly J. Price, *Quarantine and Liability in the Context of Ebola*, 131 PUB. HEALTH REP. 500, 501 (2015); John Kruzel, *Response to Coronavirus Could Test Limits of Government Powers*, HILL (March 11, 2020, 6:00 AM), https://bit.ly/3ArcEhD [https://perma.cc/8H8R-ERWZ] ("Major legal decisions about quarantines, which have mostly been decided by state supreme courts, are quite dated.").

31. CARL SCHMITT, POLITICAL THEOLOGY: FOUR CHAPTERS ON THE CONCEPT OF SOVEREIGNTY 5–15 (George Schwab trans., Univ. of Chi. Press 2005); Clokie *supra* note 24, at 385.

32. *See infra* Section III.A.2.

33. 45 C.F.R. § 164.512(b)(1)(iv) (2020).

34. *Id.*

35. *Id.* § 164.512(b)(1)(i). In normal times, a covered entity may not use or disclose PHI except (1) as is permitted or required by HIPAA's Privacy Rule or (2) when the subject of the information authorizes the disclosure in writing. *Id.* § 164.512. While not a typical case of informed consent, the process of obtaining an authorization should inform individuals in advance about how their information will be used or disclosed. For the general rule on using and disclosing PHI, see 45 C.F.R. § 164.502(a). For uses that require authorization, see 45 C.F.R. § 164.508(a)(1). For the requirements of a valid authorization, see 45 C.F.R. § 164.508(c)(1) (including these core elements: a description of the information to be used or disclosed; identification of persons authorized to make the requested use or disclosure; identification of the those to whom the covered entity may make the disclosure; a description of each purpose of the disclosure; and an expiration date with respect to each purpose).

entities during COVID-19.[36] Efforts to monitor and control the COVID-19 pandemic have complied with disclosure requirements under HIPAA's Privacy Rule.[37]

Previous cases show that emergency and surveillance powers are normalized and rarely go away after an emergency ends.[38] Personal data initially collected for national security purposes in times of emergency continues to be collected past the emergency to facilitate different ends, such as monitoring dissent movements and ensuring societal conformity.[39] For example, after more than 20 years since 9/11, the NSA is still conducting internet surveillance.[40] Laws originally enacted to address 9/11 have been amended to allow the U.S. government to continue gathering, storing, and processing data.[41] There is also international evidence of similar surveillance

36. *See* 45 C.F.R. § 164.512 (listing a covered entity's permissible uses and disclosures of PHI, including for health oversight activities authorized by law; for research purposes; and "to prevent or lessen a serious and imminent threat to the health or safety of a person or the public").

37. *See* 45 C.F.R pt. 164, subpart E (acknowledging that HIPAA's Privacy Rule accepts some erosion of privacy when trying to balance the need to obtain the information required for public health surveillance with the need to preserve privacy); *see also* HOMELAND SEC. COUNCIL, NATIONAL STRATEGY FOR PANDEMIC INFLUENZA: IMPLEMENTATION PLAN 110 (2006), https://bit.ly/39kGzvV [https://perma.cc/3BX9-UAPC] (containing a single reference to privacy in the context of the Influenza pandemic, which implies that protecting privacy is not a priority).

38. Ayse Ceyhan, *Surveillance as* Biopower, *in* ROUTLEDGE HANDBOOK OF SURVEILLANCE STUDIES 38, 38 (Kirstie Ball et al. eds., 2012); Brandon J. Johnson, *Executives in Crisis: An Examination of Formal and Informal Emergency Powers*, 42 U. PA. J. INT'L L. 341, 405 (2020); Adam Klein & Edward Felten, *The 9/11 Playbook for Protecting Privacy*, POLITICO (Apr. 4, 2020, 11:11 AM), https://politi.co/3Cz5rwF [https://perma.cc/M5D6-DTET]; Arjun Kharpal, *Use of Surveillance to Fight Coronavirus Raises Concerns About Government Power After Pandemic Ends*, CNBC: TECH, https://cnb.cx/3nQI0uK [https://perma.cc/T4BL-B592] (Mar. 30, 2020, 12:17 PM); Alan Z. Rozenshtein, *Government Surveillance in an Age of Pandemics*, LAWFARE (Mar. 23, 2020, 4:20 PM), https://bit.ly/3nR1Y8E [https://perma.cc/UG9G-F23F]; Isobel Asher Hamilton, *Edward Snowden Says COVID-19 Could Give Governments Invasive New Data-Collection Powers That Could Last Long After the Pandemic*, INSIDER (Mar. 27, 2020, 8:37 AM), https://bit.ly/3Cs9o6a [https://perma.cc/4WSQ-YJW6].

39. Jan-Werner Mueller, *Beware Viral Enabling Acts*, PROJECT SYNDICATE (Mar. 31, 2020), https://bit.ly/3u2Q7Fp [https://perma.cc/XFZ2-L8QZ] (describing the "super-majoritarian escalator," which allows periodic renewals of laws and decrees only if larger majorities agree and noting that this mechanism questions whether a return to ordinary times is possible and highlights the protection of basic rights).

40. Adam Schwartz, *How EFF Evaluates Government Demands for New Surveillance Powers*, ELEC. FRONTIER FOUND. (Apr. 3, 2020), https://bit.ly/3CqPJUf [https://perma.cc/D6AN-8PL2].

41. Sean McDonald, *No, We Don't Need an App for This*, NEW HUMANITARIAN (Mar. 30, 2020), https://bit.ly/3lHpcLB [https://perma.cc/9U7G-ZKK9] ("[I]n the United States, the post-9/11 PATRIOT Act (a raft of counter-terrorism measures) is set for bi–partisan renewal, 19 years later."); *see, e.g.*, Hina Shamsi & Alex

and data collection in pandemics. During the MERS outbreak of 2015, the South Korean government said it would stop information-collection efforts and delete all personal data when the outbreak ended.[42] However, despite being criticized for withholding the data of patients after the outbreak, South Korea amended its laws to improve its ability to track people.[43] Additionally, in the summer of 2020, Singapore assured its citizens that data collected from the digital TraceTogether application would be used exclusively for contact tracing. In early January 2021, however, Singapore reneged on that promise by announcing that "[t]he Singapore Police Force is empowered . . . to obtain any data, including TraceTogether data, for criminal investigations."[44] Currently, there is no specific condition that compels the authorities to return to their pre-pandemic standards of governance and waive their excessive emergency powers.

Given the nature of excessive government emergency powers, poor legal responses can have serious costs.[45] The conflict between politics and law—present since time immemorial[46]—reaches its peak during emergencies.[47] Regardless of how their political systems are socially or economically designed, democratic societies ought to strive for individual liberty. As such, basis protections are needed to ensure that the government's discretionary powers are accompanied by reasonable procedures that protect individuals against discrimination and arbitrary, illogical, partisan, or personal persecution.[48] A policy that compromises personal liberties should therefore be thoroughly justified and chosen only if it yields significant gains proportionate to the significant losses of liberties. Several suggestions have been made in the context of public health.[49] How-

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Abdo, *Privacy and Surveillance Post-9/11*, A.B.A. (Jan. 1, 2011), https://bit.ly/3ClBLTA [https://perma.cc/N7F2-DGEG] (discussing amendments to the Foreign Intelligence Surveillance Act).

42. Anthony Kuhn, *South Korea Admits Keeping Personal Data of 2015 MERS Outbreak Patients*, NPR (June 23, 2020, 3:55 PM) https://n.pr/3kselG5 [https://perma.cc/VG6J-U8GL].

43. Jedidiah Bracy, *On Balancing Personal Privacy with Public Interest*, IAPP (Mar. 6. 2020), https://bit.ly/3CsJE9D [https://perma.cc/YEA5-VGSL].

44. Laurel Wamsley, *Singapore Says COVID-19 Contact-Tracing Data Can Be Requested by Police*, NPR (Jan. 5, 2021, 3:42 PM), https://n.pr/3zsdXvc [https://perma.cc/PFN6-ZC58].

45. Leslie E. Gerwin, *Planning for Pandemic: A New Model for Governing Public Health Emergencies*, 37 AM. J.L. MED. & ETHICS 128, 154 (2011).

46. *See, e.g.*, PLATO, EUTHYPHRO (n.d.).

47. Luigi Farrajoli, *The Past and the Future of the Rule of Law*, *in* THE RULE OF LAW, HISTORY, THEORY AND CRITICISM 323, 336–37 (Pietro Costa & Danilo Zolo eds., 2007).

48. Clokie *supra* note 24, at 393.

49. Gerwin, *supra* note 45, at 144 (proposing an emergency republic paradigm "supported by new mechanisms for justification and accountability of executive

ever, the law has not yet developed a clear and systematic way to address the validity and the scope of limitations on a government's ability to impose emergency policies.[50] Instead, a vigorous debate has emerged as to whether DTAs-based policy is a desirable or necessary tool.[51]

To address the tension between the public interest and individual rights and to evaluate the legitimacy of DTA-based policy, public, private and governmental institutions have focused primarily on privacy-preserving aspects of DTAs. Both European and U.S. bodies have concluded that as long as DTAs are designed to preserve the privacy of user information, they are a desirable policy measure.[52] There is quite a strong consensus that people should not have to choose between their health and their privacy.[53] Many leading public, private, and governmental institutions, such as the Centers for Disease Control and Prevention (CDC), the WHO, the European parliament, and companies such as Microsoft, Google, and Apple, incorporated somewhat overlapping privacy-preserving principles into the designs of DTAs. Additionally, Congress has introduced the Exposure Notification Privacy Act to prevent poten-

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action," including a positive-mandate mechanism "that requires the independent and expert members of the technocracy to advise the executive on the declaration and termination of a state of emergency, and the other a normative constraint of executive power to derogate individual rights"). Gerwin also suggests "that in determining what role they should assume in protecting the public's health, legislators should be guided by the advice that Hippocrates gave to physicians: 'First, do no harm.'" *Id.* at 158. The proportionality paradigm proposed here can be incorporated into the decision to declare and terminate an emergency.

50. Lawrence O. Gostin & James G. Hodge, *U.S. Emergency Legal Responses to Novel Coronavirus: Balancing Public Health and Civil Liberties*, 323 JAMA 1131, 1132 (2020) (noting that "compulsory public health powers should be evaluated and justified under a common legal and ethical standard" but that there is no organized legal framework to balance public interests and individual rights).

51. *See, e.g.*, *Re-Opening the Nation: Privacy, Surveillance, and Digital Tools for Contact Tracing*, HASTINGS CTR. (May 18, 2020), https://bit.ly/2Zb8tbT [https://perma.cc/4D5T-W22X]; Casey Ross, *After 9/11, We Gave Up Privacy for Security. Will We Make the Same Trade-off After Covid-19?*, STAT: HEALTH TECH (Apr. 8, 2020), https://bit.ly/3AtKtym [https://perma.cc/FP3H-JNSU]; Cansu Canca, *Why 'Mandatory Privacy-Preserving Digital Contact Tracing' Is the Ethical Measure Against COVID-19*, MEDIUM (Apr. 10, 2020), https://bit.ly/3kqMZ2X [https://perma.cc/KY2J-TZ28].

52. *See infra* Appendix A; *see also Enlisting Big Data in the Fight Against Coronavirus Before the S. Comm. on Commerce, Sci., and Transp.*, 116th Cong. 10 (2020) (statement of Stacey Gray, Senior Counsel, Future of Privacy Forum) (stressing the need for "baseline federal consumer privacy legislation").

53. *E.g.*, Michael Birnhack, *A Process-Based Approach to Informational Privacy and the Case of Big Medical Data*, 20 THEORETICAL INQUIRIES L. 257 (2019); A Thing By, *Yuval Noah Harari on The World Before, During and After Coronavirus*, YOUTUBE (Apr. 17, 2020), https://bit.ly/3Av5w3I [https://perma.cc/AG39-RSSR].

tial abuse of DTAs.[54] It has been recommended that privacy-preserving designs[55] should include security safeguards, data integrity, data minimization, limited use, time of storage (a sunset clause), and restricted access.[56] Despite these recommendations, this Article suggests that while data privacy should concern decision makers, focusing exclusively on privacy creates an incomplete analysis.

This Article looks at the issue from the point of view of emergency policymaking. It pursues one promising framework for policy evaluation: the doctrine of proportionality. This doctrine is traditionally applied by public health authorities. It offers a procedural method for evaluating DTA-based policy, which assesses the trade-offs between the public interest and individual rights. Such a method is broader than the privacy-law approach, which focuses on implementing privacy-preserving features in DTA use. Beyond this COVID-19 case study, the proportionality analysis is helpful in evaluating how governments achieve and justify the acceptance and assimilation of new technological policy measures that may move society in new directions.

## II. THE DOCTRINE OF PROPORTIONALITY FRAMEWORK

The primary goal of the doctrine of proportionality is to impose some limits on otherwise *authorized* government action, to prevent government abuse of power, and to ensure that any impact on civil rights is mitigated.[57] The doctrine of proportionality evaluates how governmental bodies balance their powers to act with how their actions would infringe on the rights of those who are subjected to them. It offers a systematic, transparent doctrinal structure to balance these competing interests. The methodology is multi-layered; the first two steps focus on the means to accomplish the objective.[58] The third step is normative, comparing competing interests and alternatives. Step I, *suitability*, asks whether the measure taken can achieve its goal technically and practically. Step II, *necessity*, asks whether the measure taken is necessary to achieve a legitimately pursued goal. Step III, *proportionality stricto sensu*, requires

54. Exposure Notification Privacy Act, S. 3861, 116th Cong. (2020) (regulating contact-tracing apps by making the use of such systems voluntary and limiting the types of information that can be collected).

55. A privacy-preserving design chooses features that will better protect the privacy of DTA users.

56. *See infra* Appendix A.

57. H.D. Gunnarsdóttir et al., *Applying the Proportionality Principle to COVID-19 Antibody Testing*, 7 J.L. & BIOSCIENCES 1, 4 (2020).

58. For a discussion about the objective of DTAs, see *infra* III.A.

governmental decisions affecting freedoms and rights to maintain a reasonable balance between the public interest and the intrusion on individual rights. It also requires a proper proportion between the means utilized and the government's objective.[59] Where there is a choice between several suitable options, the least burdensome and harmful policy must be pursued.[60]

### *A. Proportionality Use in U.S. Law*

The doctrine of proportionality is philosophically embedded in theories of punishment. The main principle is that "penalties [must] be proportionate in their severity to the gravity of the defendant's criminal conduct."[61] Traditionally, theories of punishment have been either consequentialist (i.e., concerned with the supposed effects of punishment) or deontological (i.e., concerned with the moral justification of a punishment, rather than the consequences). Consequentialist theories focus on the benefits associated with discouraging criminal behavior.[62] The most significant challenge to the consequentialist approach came from Immanuel Kant's principle that people should not be treated merely as means to an end (i.e., punished to induce others to desist from crime). Rather, Kant prefers a retributive method for punishment, which "requires each person to be treated as being of value in him or herself.[63] According to the Kantian approach, a "person's punishment depend[s] on his own deserts rather than on the penalty's societal benefits."[64] Under the retributive theory of justice, it is "unjust to punish a wrongdoer *more* than she deserves."[65] This method requires that the punishment be proportional to the wrongful act.[66] If the sanction is condemnatory rather than preventive, the "severity of the response ought to reflect the . . . gravity of the criminal conduct."[67] Moreover, basing punishment on the gravity of crime encourages self-restraint because citizens would consider the punishment to be more

59. Aharon Barak, *Proportional Effect: The Israeli Experience*, 57 U. TORONTO L.J. 369, 372–74 (2007).

60. Gunnarsdóttir et al., *supra* note 57, at 4.

61. Andrew von Hirsch, *Proportionality in the Philosophy of Punishment*, 16 CRIME & JUST. 55, 55 (1992).

62. JEREMY BENTHAM, AN INTRODUCTION TO THE PRINCIPLES OF MORALS AND LEGISLATION 158–64 (J.H. Burns & H.L.A. Hart eds., Clarendon Press 1996) (1780).

63. Von Hirsch, *supra* note 61, at 59.

64. *Id.*

65. Alec Walen, *Retributive Justice*, STAN. ENCYCLOPEDIA OF PHIL., https://stanford.io/3hO7LI2 [https://perma.cc/EG2Y-PCBW] (July 31, 2020).

66. Von Hirsch, *supra* note 61, at 74.

67. *Id.* at 70.

just.[68] In this sense, the principle of proportionality is a requirement of fairness, whether explained in terms of a just allocation of the "benefits" and "burdens" of law-abidingness, or as a way of expressing blame or censure of criminal wrongdoing.[69]

The doctrine of proportionality was developed after World War II to limit legislative power.[70] Because the doctrine is a well-established principle of EU law, the European Union will take only necessary action and nothing more.[71] The doctrine is also used in the German, Canadian, and Israeli legal systems.[72] The doctrine of proportionality is usually applied by courts ex post facto in areas where decisions have meaningful effects on individual rights, such as constitutional law, human rights law, criminal law, antitrust law, and war law.[73]

Several elements of proportionality are currently being used by U.S. courts. For example, courts use proportionality in Eighth Amendment analysis by requiring a sufficiently important or "compelling" government purpose, a rational connection between the means chosen and the end, and a "minimal impairment" inquiry into whether there are less restrictive means towards the same goal.[74] Additionally, "legislation under Section 5 of the [14th] Amendment must have 'congruence and proportionality' to conduct that Section 1 prohibits."[75] Meaning, when the Supreme Court

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68. *Id.* at 68.

69. *Id.* at 68.

70. Jackson, *supra* note 23, at 3110.

71. Consolidated Version of the Treaty on European Union art. 5, ¶ 4, Oct. 26, 2012, 2012 O.J. (C 326) 13 ("[T]he content and form of Union action shall not exceed what is necessary to achieve the objectives of the Treaties.").

72. Jackson, *supra* note 23, at 3110; *see also* Gráinne de Búrca, *Reappraising Subsidiarity's Significance After Amsterdam* (Harv., Working Paper No. 7/99, 2000) (explaining that proportionality principles were initially accepted in European Council Conclusions at Edinburgh in 1992, then adopted into the Interinstitutional Agreement in 1993, and eventually codified in the EC Treaty by the Amsterdam Treaty).

73. *See* Gunnarsdóttir et al., *supra* note 57, at 3. For example:

> In Europe, the proportionality principle is applied by the European Court of Human Rights and the Court of Justice of the European Union. National courts may also apply their own variation of the proportionality principle. The German Federal Constitutional Court, for example, may apply the 'principle of practical concordance,' in the case of conflicting constitutional rights.

*Id.*

74. Jackson, *supra* note 23, at 3119, 3104 n.43–44; Jud Mathews & Alec Stone Sweet, *All Things in Proportion? American Rights Review and the Problem of Balancing*, 60 EMORY L.J. 797, 864 (2011) (showing that all three levels of review—rational basis, intermediate review, and strict scrutiny—have, at various points in their evolution, contained core elements of proportionality).

75. Jackson, *supra* note 23, at 3105.

reviews enforcement legislation, it demands that "the unconstitutional behavior of the States and the means by which Congress has chosen to eradicate it" be congruent and proportionate.[76] Moreover, different areas of law use tests that weigh some aspects of proportionality to determine reasonableness of government action or lack thereof.[77] Under the Takings Clause, zoning-permit conditions must have "rough proportionality" to the effects of the proposed use of the property.[78] Under the Due Process Clause, courts must ensure that the measure of punitive damages in civil cases "is both reasonable and proportionate to the amount of harm to the plaintiff and to the general damages recovered."[79] Additionally, the "undue burden" standard in the abortion cases requires reasonable regulations affecting women's choices to abort their pregnancies.[80]

Nevertheless, as a comprehensive framework, the doctrine of proportionality in its entirety is not regularly used by the U.S. courts.[81] The current use of the doctrine is inconsistent and often cost-benefit focused, which misses a bigger value-based consideration that can equally advance the law's purpose while intruding less on rights.[82] For example, in *Domingo v. Kowalski*,[83] where a teacher strapped students with disabilities to toilets and chairs for

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76. Jeremy W. Brinster, Comment, *Taking Congruence and Proportionality Seriously*, 95 N.Y.U. L. REV. 580, 583 (2020).

77. *See, e.g.*, RESTATEMENT (SECOND) OF TORTS § 520 (Am. Law Inst. 1977). It states:

> In determining whether an activity is abnormally dangerous, the following factors are to be considered: (a) existence of a high degree of risk of some harm to the person, land, or chattels of others; (b) likelihood that the harm that results from it will be great; (c) inability to eliminate the risk by the exercise of reasonable care; (d) extent to which the activity is not a matter of common usage; (e) inappropriateness of the activity to the place where it is carried on; and (f) extent to which its value to the community is outweighed by its dangerous attributes.

*Id.*

78. *See, e.g.*, Koontz v. St. Johns River Water Mgmt. Dist., 570 U.S. 595, 606 (2013); *see also* Dolan v. City of Tigard, 512 U.S. 374, 391, 398 (1994).

79. State Farm Mut. Auto. Ins. Co. v. Campbell, 538 U.S. 408, 426 (2003). *See generally* BMW of N. Am. v. Gore, 517 U.S. 559 (1996) (limiting punitive damages under the Due Process Clause).

80. *See* Planned Parenthood v. Casey, 505 U.S. 833, 878 (1992).

81. *See* KAI MOLLER, THE GLOBAL MODEL OF CONSTITUTIONAL RIGHTS 181 (2012) ("But before engaging in the balancing exercise it is important to establish that there exists a genuine conflict (suitability) between relevant interests (legitimate goal) which cannot be resolved in a less restrictive way (necessity).").

82. Mathews & Sweet, *supra* note 74, at 864; T. Jeremy Gunn, *Deconstructing Proportionality in Limitations Analysis*, 19 EMORY INT'L L. REV. 465, 467 (2005) ("Although aspects of a proportionality analysis resembles a 'cost-benefit' analysis, it is also likely to include a range of other issues, including human rights, federalism, institutional competencies, and the appropriateness of judicial deference to other institutions."); *see also* Gunnarsdóttir et al., *supra* note 57, at 4 (proposing an

extended periods of time, the court examined the methods of discipline in isolation from the purpose of discipline.[84] The court noted that purposeless discipline could be proportionate if the disciplinary method itself was not severe and did not violate the 14th Amendment.[85] Put in simpler terms, as long as the measure falls within a range of reasonable alternatives, it is legitimate. However, in using the minimal impairment test, the court did *not* ask whether the use of any discipline or force without a purpose was legitimate.[86] If courts apply a minimal impairment analysis to resolve specific questions on individual rights, they may fail to see bigger policy implications.[87] Constitutional law scholar Vicki Jackson notes, "By going beyond rationality and minimal impairment, [the doctrine of proportionality can be] more rigorous than U.S. strict scrutiny."[88] The doctrine addresses interests, values, and principles that other methods of analysis do not address, and it decides what is most importantly at stake by asking whether the amount of force is necessary to meet the need, rather than comparing it to alternatives.[89] If a less restrictive approach can be imagined, the law should be invalid.[90]

A possible explanation for why the doctrine of proportionality has not been used as a theoretical framework in the United States is that, unlike modern constitutions, the U.S. Constitution does not have a limitation clause inviting courts to review the justifications for government actions through a proportionality analysis.[91] According to Jackson, U.S. law generally does not discuss rights as being subject to external limits. Rather, "in the United States, courts often blend the two ideas—which personal interests a right protects, and how the government may legitimately act to limit freedom—and articulate a 'right' only after internally accounting for limitations deemed warranted by the government interests."[92] U.S. courts often combine the question about personal interests and protected rights with an assessment of whether the government le-

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additional preliminary procedural balance requiring transparency, objectiveness, impartiality, and administrative order).

83. Domingo v. Kowalski, 810 F.3d 403, 412 (6th Cir. 2016).

84. *Id.*

85. *Id.* at 414 (citing Lillard v. Shelby Cnty. Bd. of Educ., 76 F.3d 716, 726 (6th Cir. 1996)).

86. Emily Suski, *The School Civil Rights Vacuum*, 66 UCLA L. REV. 720, 735 (2019).

87. *See id.* at 734.

88. Jackson, *supra* note 23, at 3116.

89. *Id.* at 3148.

90. *Id.* at 3114.

91. *Id.* at 3122–23.

92. *Id.* at 3125.

gitimately limits freedom and articulates the scope of the "right" accordingly.[93] Therefore, when U.S. jurists, lawyers, or scholars say a "right" has been "infringed," it is typically the end of the analysis.

Moreover, in the United States, the doctrine of proportionality is criticized for its flexibility, which detracts from its quality as law and creates an unacceptable level of indeterminacy.[94] A "functional" view relies on the assumption that the roles of the judiciary and the legislature radically differ. It further assumes that the judiciary would invade legislative functions if it addressed questions that the legislature has already answered. When using the doctrine, courts review the process, method, or manner in which a governmental body has reached the decision, but not the decision itself.[95] Criticism of the doctrine focuses on the role of judges and on the position of the law as distinct from politics. Some scholars have severely criticized Step III, proportionality *stricto sensu*, as consisting of the personal preferences of judges and allowing for unconstrained moral reasoning, which is perceived as an undemocratic character of judicial lawmaking.[96] For example, Jurgen Habermas claims that balancing competing values is irrational because it places incommensurable values on the same scale.[97] In such cases, critics argue that the legal ties of proportionality are too weak to prevent judges from engaging in policymaking.[98] Given this criti-

93. *Id*.

94. *See, e.g.*, GRÉGOIRE C.N. WEBBER, THE NEGOTIABLE CONSTITUTION: ON THE LIMITATION OF RIGHTS 89–115 (2009); *see also* Stavros Tsakyrakis, *Proportionality: An Assault on Human Rights?*, 7 INT'L. J. CONST. L. 468, 470–72 (2009).

95. *See, e.g.*, Coimbatore Dist. Cent. Coop. Bank v. Emps. Assn., 4 SCC 669 (2007) (India).

96. *See* Francisco J. Urbina, *A Critique of Proportionality*, 57 AM. J. JURIS. 49, 66 (2012) (discussing proportionality as unconstrained moral reasoning); *see also* Frederick Schauer, *Balancing, Subsumption, and the Constraining Role of Legal Text*, *in* INSTITUTIONALIZED REASON: THE JURISPRUDENCE OF ROBERT ALEXY 307, 310 (Matthias Klatt ed., 2012) ("When critics like Habermas accuse the balancing process of being irrational, however, it appears that what they mean is *unconstrained*."); PIETER VAN DIJK & G.J.H. VAN HOOF, THEORY AND PRACTICE OF THE EUROPEAN CONVENTION ON HUMAN RIGHTS 81 (3d ed. 1998) (arguing that the application of the proportionality test, rather than its theory, is flawed because it "has not been applied in a uniform manner . . . [and] the Court uses different variants for different contexts").

97. *See* JÜRGEN HABERMAS, BETWEEN FACTS AND NORMS: CONTRIBUTIONS TO A DISCOURSE THEORY OF LAW AND DEMOCRACY 253–61 (1996); *see also* Bendix Autolite Corp. v. Midwesco Enter., Inc., 486 U.S. 888, 897 (1988) (Scalia, J., concurring) (noting that balancing rights is like trying to decide "whether a particular line is longer than a particular rock is heavy"); T. Alexander Aleinikoff, *Constitutional Law in the Age of Balancing*, 96 YALE L.J. 943, 972–76 (1987) (discussing the problem of comparison and the development of a common scale).

98. *See* Aleinikoff, *supra* note 97, at 973; Tsakyrakis, *supra* note 94, at 472–75; H. Jefferson Powell, *Reasoning About the Irrational: The Roberts Court and the*

cism, the U.S. Supreme Court should be reluctant to challenge the justifications of a policy and should maintain that in reviewing legislation, it is not the Court's function to substitute its views on what is desirable for that of the legislature.[99]

Despite these criticisms, some suggest that the doctrine should be applied to other areas of U.S. constitutional law.[100] Supporters argue that regardless of whether one thinks of judicial review as a "functional system" or a system of "checks and balances," proportionality *should* be part of the review process.[101] Functionally, it is impossible to judge a policy without considering its purpose, reasonableness, specific context, and alternatives. When courts ignore these considerations, they focus on whether a measurement is "reasonable," rather than whether the legislative purpose is legitimate or justified, thus failing to perform their unique role of reviewing legislation.[102] Therefore, for courts to interpret legislative purpose, they must be "involved in all the difficulties, theoretical and practical, which surround that task."[103] Alternatively, under the "checks and balances" theory, courts reconsider questions that the legislature has already addressed, which requires that they evaluate proportionality, since the legislature should consider the option that infringes on rights the least. The proportionality analysis not only guards the integrity of the legislative process but also respects the judicial process that reviews it.[104] Additionally, because the doctrine of proportionality is used in other liberal, democratic, and constitutional systems, it can also be applied in the United States, especially in times of emergency.[105] The question of whether the doctrine of proportionality should be used by courts is beyond the

*Future of Constitutional Law,* 86 WASH. L. REV. 217, 227–28 (2011) (criticizing the Court equating "rational basis" as a standard of review with the substance of the constitutional guarantee).

99. *But see* Jackson, *supra* note 23, at 3155 ("Recent experience with categorical rules in the United States suggests that neither determinacy nor respect for legislative outcomes is necessarily protected through such rules.").

100. *See, e.g.*, *id.* at 3096–98; JAMAL GREENE, HOW RIGHTS WENT WRONG: WHY OUR OBSESSION WITH RIGHTS IS TEARING AMERICA APART (2021); Mathews & Sweet, *supra* note 74.

101. *See, e.g.*, Joseph Tussman & Jacobus tenBroek, *The Equal Protection of the Laws*, 37 CALIF. L. REV. 341, 365–66 (1948).

102. Gunn, *supra* note 82, at 487 ("In a typical judicial analysis of a limitations question, the court is called upon to make determinations pertaining to the purpose, intent, and effect of legislation. In short, why did the legislature adopt the statute, did the statute accomplish its intended effects, and were the effects beneficial?").

103. Tussman & tenBroek, *supra* note 101, at 366.

104. *Id.* at 351.

105. GREENE, *supra* note 100, at 110.

scope of this Article. Instead, this Article suggests that the doctrine should be applied to create a structured emergency policymaking process within the legislative branch.[106]

### *B. Proportionality as Part of Policymaking in Times of Emergency*

Some have suggested expanding the use of proportionality beyond judicial review to legislation and policymaking.[107] With this expansion, we would no longer need to rely on judges, and it would be beneficial particularly in times of emergency. Applying the doctrine to policymaking bypasses the criticism associated with its application to the judicial process as constituting unconstrained moral reasoning. The usual legislative mechanisms that evaluate the limitations on, or legitimacy of, government actions are partly suspended or relaxed in times of emergency. The scope of governmental powers necessary to respond to emergencies cannot be anticipated and must be adjusted according to specific requirements and challenges posed by the emergencies.[108] Therefore, the government has excessive power to further restrict or infringe fundamental rights and freedoms through its non-legislative agencies. Absent a clearly defined and alternative legal mechanism to restrict emergency power, the doctrine of proportionality offers policymakers a clear and workable standard to assess potential policy approaches while adopting more flexible and sensitive reactions to changing circumstances rather than adopting strict laws. Moreover, the doctrine of proportionality can improve emergency governance and create better policymaking by: (1) encouraging public compliance, which is needed to overcome national emergencies; (2) providing accountability; (3) expressing commitment to justice; (4) committing to democratic values; and (5) detecting possible mistakes in policymaking.

First, proportionality review encourages public compliance by providing a structured methodology for persuasive reasoning and evidence. Proportionality review would also show that "government decisions are driven by . . . respect for individuals' rights and dignity as well as for constitutional [and democratic] values."[109] For example, with COVID-19, social distancing, mask wearing, the use of contact-tracing or symptom-tracing apps, voluntary testing, and

106. Jackson, *supra* note 23, at 3153–54.

107. *See* Jackson, *supra* note 23, at 3097, 3144–47; Mathews & Sweet, *supra* note 74, at 804.

108. Gerwin, *supra* note 45, at 139.

109. *Id.* at 134–35.

self-reporting all rely on individual compliance in support of a larger public interest. A current lack of public compliance with such recommendations implies that too many restrictions on liberties result in noncompliance.[110] In certain contexts, society does not object to a restriction of rights. For example, citizen concerns encouraged increasing government surveillance following 9/11, with some citizens even opining that government policies were not going far enough to protect the nation against terrorism.[111] Citizens willingly sacrificed civil liberties and data privacy for the sake of "national security" and felt confident that their rights were protected by the Fourth Amendment's prohibition on unreasonable surveillance.[112] The government can foster similar public trust and compliance in the COVID-19 context by clarifying why limitations on freedom are necessary to address public health concerns.[113] People are more likely to adhere to policies that limit their liberties and freedoms if they believe that the government's actions are necessary and fair.[114] In circumstances where government actions collide with individual rights, the doctrine of proportionality can foster policy that encompasses ethical, political, and economic considerations. Under such a policy, impacted rights can still be exercised to

110. *See, e.g.*, Daisy Fancourt, *People Started Breaking Covid Rules When They Saw Those with Privilege Ignore Them*, GUARDIAN (Jan. 2, 2021, 3:00 AM), https://bit.ly/3zq7fpJ [https://perma.cc/8ALB-RQPP].

111. *See* John Gramlich, *Defending Against Terrorism Has Remained a Top Policy Priority for Americans Since 9/11*, PEW RSCH. CTR. (Sept. 11, 2018), https://pewrsr.ch/3tTCetb [https://perma.cc/BP3H-ZHJ2]; *see also* Gerwin, *supra* note 45, at 144, 145. Gerwin notes:

> Although the attacks on 9/11 initiated new debates over the legitimacy of executive emergency powers derogating individual rights, they did not fundamentally change the frame of the constitutional discussion . . . . In most discussions, however, the issue of what constitutes a "legitimate" emergency remained subsumed within arguments over the constitutionality of certain government emergency responses.

*Id.*

112. *See* Daniel Woislaw, *How the Fourth Amendment Can Protect Us from Becoming a Surveillance State*, PAC. L. FOUND. (Dec. 23, 2019), https://bit.ly/39oFvXP [https://perma.cc/AJ4L-RYHN] (noting that the Fourth Amendment provides protection to citizens as it "prohibits unreasonable searches and seizures of . . . personal possessions such as cell phones, computers, vehicles, and every other article of moveable property).

113. Jackson, *supra* note 23, at 3142; Rosie Gray & Caroline Haskins, *The Coronavirus Pandemic Has Set Off a Massive Expansion of Government Surveillance. Civil Libertarians Aren't Sure What to Do*, BUZZFEED NEWS (Mar. 30, 2020, 3:55 PM), https://bit.ly/3lNty42 [https://perma.cc/23VX-W7F7]; Vincent Manancourt et al., *In Fight Against Coronavirus, Governments Embrace Surveillance*, POLITICO (Mar. 24, 2020, 1:55 PM), https://politi.co/2Xtldd8 [https://perma.cc/7FJC-K8W5]; Ross, *supra* note 51.

114. Gerwin, *supra* note 45, at 142.

the greatest possible extent, despite inevitable infringement of rights.[115]

Second, proportionality clarifies the justifications for a decision, thereby enhancing a government's transparency.[116] A constitutional democracy's legitimacy is based on its government being accountable to the people.[117] The burden of justifying an action lies with the government. In times of emergency, the government may provide opaque justifications, relying on only a presumption of legality. Proportionality encourages legislative and executive actors to give justifications for their decisions and explain their preference for one decision over another. Such action is particularly beneficial when the available options during emergencies involve closely contested values, colliding rights, and inherent infringements.

Third, a commitment to "Justice" has been associated with proportionality since at least the time of Aristotle.[118] Legal systems that are inconsistent with widely held conceptions of justice undermine people's respect for law and the legitimacy of public policy and judicial decisions.[119] "Justice is not synonymous with law,"[120] meaning a legal action is not necessarily applied justly. However, there is normative value in a legal system's aspirations for justice as it is understood by its society.[121] Actions by public authorities that burden individuals must be understandable, reasonable, and in alignment with collective judgments on justice and legitimate policy.[122] The proportionality doctrine brings law closer to the community's sense of constitutional justice, highlighting the derogation of rights, and ensures that options are compared to the best alternatives that are available to policymakers.[123] Therefore, when new threats call for extreme measures, a government can enhance its

115. Gunnarsdóttir et al., *supra* note 57, at 4.

116. Jackson, *supra* note 23, at 3142.

117. *Id.* at 3109.

118. ARISTOTLE, NICOMACHEAN ETHICS 162–63 (Sarah Broadie ed., 2002).

119. Jackson, *supra* note 23, at 3147.

120. *Id.* at 3147.

121. *See* JOHN RAWLS, POLITICAL LIBERALISM 465 (2005) (discussing the concept of public reason).

122. Jackson, *supra* note 23, at 3146–47.

123. *Id.* at 3155. For a discussion on justice as a goal of the U.S. Constitution, see *id.* at 3106. Jackson notes:

> The Constitution's Preamble states that one of its goals is to "establish Justice," . . . . Similarly, there are allusions to proportionality in the Federalist Papers, where the constitutional design is described more generally as aimed to produce "a wise and well-balanced government for a free people" in a way that will help control "abuses" and avoid the exercise of "arbitrary and vexatious of powers."

*Id.*

crisis management capability by reaffirming its commitment to fairness and upholding constitutional values.[124]

Fourth, applying the doctrine to policymaking mirrors a constitutional democracy's dual commitment to the protection of rights and to self-governance, a democratic right in itself.[125] In times of emergency, the justification for a government decision must be more than a matter of administrative interpretation.[126] Proportionality may make legislators and other officers more aware of constitutional values. The doctrine of proportionality opens the door for meaningful participation by all branches of government, encourages more deliberation over constitutional rights, and leaves room for democratic debate on the scope of rights and on legitimate infringements under the circumstances.[127] By encouraging policies that consider strategies from different perspectives and by advancing democratic principles within policymaking, proportionality can add a level of reasonableness to the ongoing process of achieving effective and protective governance.[128]

Finally, a proportionality-based approach allows for proper evaluation of the law and for the identification of and response to deficiencies in governance.[129] Disproportionalities, which occur when a law is more intrusive than necessary, may reveal underlying problems associated with lawmakers: their disregard for the effects of their actions on the relatively powerless, their unconscious or unarticulated prejudices, or their inability to anticipate the effects of legislation.[130] Each of these issues might be understood as the government's failure to fulfill its duty of impartiality to the public. Proportionality allows for more consideration of serious deficiencies in processes that reflect entrenched biases against particular groups of people. The fact that proportionality is a largely technical, fact-dependent, neutral, structured, and manageable test is an advantage.[131] Its legal-balancing methodology can reveal process fail-

124. Gerwin, *supra* note 45, at 170.

125. Jackson, *supra* note 23, at 3145.

126. Tussman & tenBroek, *supra* note 101, at 352 ("We would expect to find, therefore, very few cases of legislative classification which can successfully plead emergency justification, and it may well be held that the initial presumption, in the case of legislation, should run against the emergency plea."); *see also* Johnson, *supra* note 38, at 353.

127. Jackson, *supra* note 23, at 3144.

128. *Id.* at 3196.

129. *Id.* at 3142.

130. *Id.* at 3151.

131. Urbina, *supra* note 96, at 49; Gertrude Liibbe-Wolff, *The Principle of Proportionality in the Case-law of the German Federal Constitutional Court*, 34 HUM. RTS. L.J. 12, 16 (2014) (discussing the importance of "distinguish[ing] the

ures, including departures from impartial governance, enable cautious decision making, and help identify criteria legislatures should abide by in justifying policy.[132] Proportionality offers a structured, systematic methodology rather than an "all-things-considered" balancing test, and it prevents governmental indifference or blindness to acute harms caused to those who are less able to protect themselves.[133]

## III. PROPORTIONALITY ANALYSIS OF DTA-BASED POLICIES—A CASE STUDY

The inherent conflict between the public interest and individual rights in the context of DTAs presents a good opportunity to apply the doctrine of proportionality. Applying proportionality, rather than privacy law, provides a more nuanced view of the trade-offs associated with DTA-based policy. This Article evaluates the desirability of DTA-based policy by following the three steps in a proportionality inquiry. The first and second steps assess the suitability and necessity of the means used (the DTAs) to achieve the desired end. The third step assesses the burden on the individual in relation to the objective sought to be achieved—in this case: DTAs impact on users' rights and freedoms in relation to public health considerations.

### *A. Step I—Suitability of DTA-Based Policy*

To be considered viable policy, DTAs must be effective. Something is not suitable or necessary if it cannot effectively achieve its defined purpose. In other words, if DTAs are ineffective, they are neither suitable nor necessary. At the moment, there is deep moral and political disagreement about what the goals of DTAs should be. Proportionality requires policymakers to clearly define such goals, whether the policy is meant to prevent death,[134] infection, an overwhelmed health system,[135] or to allow society to flourish even

three levels of the [means] test and applying them in due order"); Tracy A Thomas, *Proportionality and the Supreme Court's Jurisprudence of Remedies*. 59 HASTINGS L.J. 73, 121 (2007) ("The use of formulas, ratios, and three-factored tests provides the appearance of objectivity necessary to avoid the caprice of the decisionmaker.").

132. Gunnarsdóttir et al., *supra* note 57, at 3.

133. Jackson, *supra* note 23, at 3142.

134. *See, e.g.*, Rebecca Klar, *Cuomo: It's Not the Economy or Public Health, It's Both*, HILL (Mar. 24, 2020, 12:14 PM), https://bit.ly/3tXtGBi [https://perma.cc/G2Y6-D8RY] (noting that New York Governor Andrew Cuomo stated "The first order of business is to save lives, period. Whatever it costs.").

135. Bernstein et al., *supra* note 24, at 1.

under a pandemic.[136] The goal of "saving lives" may be evaluated differently than the more concrete goal of contact tracing. Any goal, however, should be carefully defined and evaluated, and the tradeoffs it requires should also be considered.[137]

DTAs further both a narrow and a broad goal.[138] The narrow goal is to alert users about exposure to people diagnosed with COVID-19 without letting anyone else access the personal information of users. This goal is accomplished by tracing and alerting contacts, and it attempts to imitate traditional contact tracing conducted by public health authorities. The broad goal is for DTAs to provide accurate, timely, and complete information for public health authorities to rely on while handling a crisis. Policies that further either a narrow or a broad goal may utilize DTAs to minimize long-term general lockdowns, to prevent the social and economic costs posed by lockdown policy, and to minimize the heavy disruption on daily life posed by COVID-19. Step I reviews the preliminary technical and practical conditions required for DTAs to be suitable: accurate technology and sufficient availability of COVID-19 testing. Suitability evaluates different designs that address technical and practical considerations, and it reveals graded levels of effectiveness and suitability based on the design. In other words, it asks: Can DTAs manage to do what they aim to do?

### *1. Preliminary Technical Conditions*

Given the inaccuracy of GPS and Bluetooth-based technologies, it is unclear whether they offer a suitable solution to the problem they aim to solve.[139] GPS-based technologies are accurate only up to a 16-foot radius; they cannot reliably measure distances at smaller radiuses, including the 6-foot proximity gap that is necessary, according to the CDC, to prevent the spread of COVID-19.[140]

136. Maggie Haberman & David E. Sanger, *Trump Says Coronavirus Cure Cannot 'Be Worse than the Problem Itself'*, N.Y. TIMES (Mar. 23, 2020), https://nyti.ms/3vWCeJU [https://perma.cc/FKV4-VGBK] (discussing President Trump's tweet that "We cannot let the cure be worse than the problem itself").

137. Gunn, *supra* note 82, at 491.

138. It should also be noted that there are policies that address intermediate or combined forms of these goals.

139. *E.g.*, Lokke Moerel, *Contact Tracing Apps: Why Tech Solutionism and Privacy by Design Are Not Enough*, IAPP (May 7, 2020), https://bit.ly/2XKm8X9 [https://perma.cc/ETB4-R4FB] (noting that Singapore and Israel had to return to lockdowns despite using DTAs); David Stavrou, *Israel's Back in Lockdown While Swedish COVID Deaths Are Plummeting. Here's Why*, HAARETZ (Sept. 22, 2020), https://bit.ly/3hN9sWc [https://perma.cc/CAD2-P2U4].

140. *GPS Accuracy*, GPS.GOV, https://bit.ly/3hR5H1Q [https://perma.cc/YJ26-F2A7] (last visited Oct. 5, 2021); Adam Schwartz & Andrew Crocker, *Governments Haven't Shown Location Surveillance Would Help Contain COVID-19*,

Bluetooth contact-tracing apps, on the other hand, are much more nuanced and more accurate in measuring proximity than GPS-based technologies.[141] Because they can detect proximity through walls, vehicles, airplanes, and underground transit, the measurements can be misleading.[142] For example, the Israeli security agency Shin Bet ordered a woman into confinement when a contact-tracing app indicated that she had allegedly been in contact with her COVID-19-postive partner.[143] Though her smartphone accurately showed her proximity to her partner, in reality, she had been waving at him from outside the building. If such examples render DTAs unreliable in the public's opinion, people may refuse to self-isolate when there are actual risks of infection. Alternatively, the app's faulty mandates will result in over-quarantining, which is ineffective.[144] Additionally, neither GPS nor Bluetooth systems consider the precautions taken by individuals in their interactions with others, such as personal protective equipment (e.g., surgical masks) that alter an individual's contagiousness, or the non-human forms of infection such as infected surfaces, assuming the virus spreads that way.[145]

A second preliminary condition for the function of effective DTAs is the existence of an adequate diagnostic scheme that identifies confirmed COVID cases and traces their contacts. Efficient and accurate laboratory testing capabilities (testing, testers, and lab workers) should be available to quickly confirm expanding infec-

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ELEC. FRONTIER FOUND. (Mar. 23, 2020), https://bit.ly/2VY1eD5 [https://perma.cc/9A6E-DKRR].

141. SYDNEY VON ARX ET AL., COVID WATCH, WHITEPAPER: SLOWING THE SPREAD OF INFECTIOUS DISEASES USING CROWDSOURCED DATA 8 (2020), https://bit.ly/3nShzEI [https://perma.cc/6SXC-H9XD].

142. Patrick Howell O'Neill, *Bluetooth Contact Tracing Needs Bigger, Better Data*, MIT TECH. REV. (Apr. 22, 2020), https://bit.ly/2XAxiNO [https://perma.cc/C3L2-9UAQ]; JR Raphael, *6 Make-Or-Break Questions About Google and Apple's COVID-Tracking Tech*, COMPUT. WORLD (Apr. 16, 2020, 9:15 AM), https://bit.ly/3kq5MeM [https://perma.cc/WS46-68G2].

143. Danielle Groen, *How to Lift a Lockdown*, WALRUS, https://bit.ly/3nSjCIQ [https://perma.cc/YXT7-52R9] (Dec. 1, 2020, 12:41 PM).

144. *See infra* notes 191–92 and accompanying text.

145. Ashkan Soltani et al., *Contact-Tracing Apps Are Not a Solution to the COVID-19 Crisis*, BROOKINGS: TECH STREAM (Apr. 27, 2020), https://brook.gs/3nVHk79 [https://perma.cc/W75P-AQXD]; *How COVID-19 Spreads*, CDC, https://bit.ly/3tYesMD [https://perma.cc/DYE4-4MHN] (July 14, 2021). *See generally* Amanda M. Wilson et al., *Quantifying SARS-CoV-2 Infection Risk Within the Apple/Google Exposure Notification Framework to Inform Quarantine Recommendations*, 2020 RISK ANALYSIS 1 (arguing that "Bluetooth attenuation is not a reliable measure of distance, and infection risk is not a binary function of distance, nor duration, nor timing," and instead basing the probability of infectiousness on the number of symptom-free days since exposure and any negative test results).

tion, whether the goal of the app is to trace people diagnosed with COVID-19 and their contacts or to find concentrations of infection.[146] Because five days of self-isolation is currently required when individuals test positive for COVID-19 or when they are exposed to someone who tests positive, testing should be processed quicker to cut the chain of transmission and prevent further exposure.[147] Experts have suggested that the United States needs to administer between 500,000[148] and 5 million tests per day,[149] increasing over time to 20 million tests.[150] For the time being, most of the population is not tested and testing kits are not equally distributed.[151] Without equal access to sufficient testing and treatments, some app users may be exposed to infected people who

146. *See* Ross Anderson, *Contact Tracing in the Real World*, LIGHT BLUE TOUCHPAPER (Apr. 12, 2020), https://bit.ly/3B6d3pW [https://perma.cc/SJ8F-YKJV]; *Re-Opening the Nation: Privacy, Surveillance, and Digital Tools for Contact Tracing*, *supra* note 51; *see also Coronavirus (COVID-19) Update: FDA Authorizes First Diagnostic Test for Screening of People Without Known or Suspected COVID-19 Infection*, FDA (July 24, 2020), https://bit.ly/3tTkGgM [https://perma.cc/L98E-YLMN] ("Last month, the FDA posted updated templates with recommendations for test developers to demonstrate validation for a test to be authorized for screening of asymptomatic people, as well as for sample pooling . . . . [and] authorized the first COVID-19 test that could be used with pooled samples.").

147. *See CDC Updates and Shortens Recommended Isolation and Quarantine Period for General* Population, CDC (Dec. 27, 2021), https://bit.ly/3eCkCep [https:perma.cc/GGG6-ZTGC] (stating that the five-day isolation requirement is based on what the CDC currently knows about the Omicron variant and COVID-19, including that the majority of transmission generally occurs one to two days before the onset of symptoms and two to three days after).

148. Keith Collins, *Coronavirus Testing Needs to Triple Before the US Can Reopen, Experts Say*, N.Y. TIMES (Apr. 17, 2020), https://nyti.ms/3ks01gC [https://perma.cc/3MFV-65E4].

149. Dialynn Dwyer, *Harvard Researchers Have a Plan to Reopen the Economy Amid COVID-19. But it Would Require a Huge National Effort*, BOSTON.COM (Apr. 27, 2020), https://bit.ly/3CBak8x [https://perma.cc/N6SW-RTD5].

150. Cathy Cosgrove, *Privacy Questions for COVID-19 Testing and Health Monitoring*, IAPP (May 13, 2020), https://bit.ly/3EzpOLZ [https://perma.cc/2P4D-57BN].

151. *Coronavirus (COVID-19) Testing*, OUR WORLD IN DATA, https://bit.ly/3CA5NTN [https://perma.cc/Y3ZV-EUDK] (Oct. 28, 2020). For information on testing, treatment, and vaccine administration for uninsured people, see *FAQs for Covid-19 Claims Reimbursement to Health Care Providers for Testing, Treatment, and Vaccine Administration*, HEALTH RES. & SERVS. ADMIN., https://bit.ly/3kra1XC [https://perma.cc/F6VK-QK7Q] (last visited Oct. 5, 2021) (explaining that the Uninsured Program provides reimbursements "on a rolling basis directly to eligible providers for claims that are attributed to the testing, treatment, or vaccine administration of COVID-19 for uninsured individuals"); *see, e.g.*, Families First Coronavirus Response Act, Pub. L. No. 116-127, 134 Stat. 178 (2020) (allowing states to provide for uninsured individuals' Medicaid coverage of certain COVID-19 diagnostic tests and limiting coverage to the test and related services).

haven't been tested. Hence, the ability of DTAs to trace and identify concentrations of COVID-19 is limited.

Notwithstanding disagreements regarding the accuracy and effectiveness of public health requirements and technologies, for the purpose of this Article, I will assume the fulfillment of the two preliminary requirements of suitability: that DTAs can be accurate if they are further developed and that they can be supported by the required amount of testing.

### *2. Design Dependent Suitability*

Even if DTA technology is accurate and supported by the required amount of testing, DTA suitability still depends on the design used. Apps can be designed to either collect or avoid collecting the information of users, including their locations, their COVID-19 statuses, their health information, and any other information contained in user cellphones. Their suitability for achieving either the goal of cutting the chains of transmission or the goal of improving public health surveillance is relative.[152] Next, this Article analyzes the tradeoffs for different data-management designs and how those designs reflect concepts of autonomy and privacy. It posits that the more the design preserves privacy and autonomy, the more difficult it is to maintain DTAs' effectiveness. Suitability is therefore scaled according to how DTA designs address voluntary use and data management.

#### a. Voluntary Versus Mandatory Use

Many apps and phones keep detailed logs of a user's physical movements and interactions through automatic GPS tracking (e.g., Waze). While such apps offer users the option to opt-in or out of GPS tracking, most people in Western society (over 70 percent of

152. *See generally* Patrick Howell O'Neill et al., *A Flood of Coronavirus Apps Are Tracking Us. Now It's Time to Keep Track of Them*, MIT TECH. REV. (May 7, 2020), https://bit.ly/3zrb3qL [https://perma.cc/PAG3-E73P] (comparing 25 significant automated COVID-19 contact-tracing efforts across the world by comparing what information is gathered; whether the data collection is minimized; whether there are limitations on the way data is used; whether the data be destroyed or not after a period of time; and whether there is an effort for transparency, publicly availability, and open-source code base). *See also* Stacey Gray, *A Closer Look at Location Data: Privacy and Pandemics*, FUTURE OF PRIVACY FORUM (Mar. 25, 2020), https://bit.ly/2Xsrypb [https://perma.cc/S8FJ-BNLB] (discussing ethical and privacy considerations for collecting location data, including limiting the purpose for collection).

the entire U.S. population[153]) choose to opt-in, regardless of the current emergency atmosphere due to the pandemic.[154] An app that relies on users' GPS-location histories can avoid seeking autonomous consent to collect user data and requires little cooperation from individuals. Mandatory information sharing may increase the calculus of DTA suitability yet render DTAs less voluntary and user autonomy questionable. A user's consent to GPS usage for one app does not necessarily reflect an autonomous decision to share information for other purposes, such as COVID-19 public health surveillance.[155] A design that requires the active download of a DTA whose explicit purpose is to address COVID-19 could better facilitate specific, informed, and voluntary user consent in accordance with liberal values.

Voluntary DTA use allows for different rates of adoption that produce relative levels of effectiveness. During the early stages of the pandemic, developers argued that in countries where the use of smartphones is not widespread, 60 percent of smartphone owners (meaning 56 percent of the population) would have to use the DTA before it could be deemed effective.[156] Later studies measured the relative effectiveness of using the same DTA based on different rates of adoption. For example, if 75 percent of the population used the same app, "it could help reduce deaths by up to 78 percent and infections by 81 percent."[157] However, "even a 15 [percent] adop-

153. S. O'Dea, *Smartphone Penetration Rate as Share of the Population in the United States from 2010 to 2021*, STATISTA (Apr. 8, 2020), https://bit.ly/39l78Bl [https://perma.cc/BTX6-UQK6].

154. *See generally* Crocker, Opsahl & Cyphers, *supra* note 13. *See also* Paige M. Boshell, *The Power of Place: Geolocation Tracking and Privacy*, BUS. L. TODAY: INTERNET L. & CYBER-SEC. (Mar. 25, 2019), https://bit.ly/3lLQTTq [https://perma.cc/A8D9-M87G].

155. *See, e.g.*, Olivia Krauth, *Your Smartphone Can Be Tracked Even If GPS, Location Services Are Turned Off*, TECHREPUBLIC (Feb. 8, 2018, 7:27 AM), https://tek.io/3lHnVUS [https://perma.cc/LB3S-G77Z] (noting that in some instances, GPS locations can be tracked even if all location services and GPS have been turned off).

156. *Digital Contact Tracing Can Slow or Even Stop Coronavirus Transmission and Ease Us Out of Lockdown*, UNIV. OF OXFORD (Apr. 16, 2020), https://bit.ly/3Csk70v [https://perma.cc/73SS-JSRK] (explaining that the Oxford model assumes that no traditional contact tracing was underway and that people over the age of 70 would remain under lockdown); Kelly Servick, *COVID-19 Contact Tracing Apps Are Coming to a Phone Near You. How Will We Know Whether They Work?*, SCI. MAG. (May 21, 2020), https://bit.ly/3CqiujM [https://perma.cc/R8WF-BDP9]; Tom Abate, *Stanford Researchers Help Develop Privacy-Focused Coronavirus Alert App*, STANFORD NEWS (Apr. 9, 2020), https://stanford.io/3AxmDSw [https://perma.cc/87LR-GLDH].

157. Alejandro de la Garza, *People Are Finally Downloading COVID-19 Exposure Notification Apps. Will They Make a Difference?*, TIME (Dec. 14, 2020, 3:52 PM), https://bit.ly/3CysAiS [https://perma.cc/3L6F-H6BT]; Patrick Howell O'Neill,

tion rate can mean 11.8 [percent] fewer deaths and 15 [percent] fewer infections" (which, over the course of the 300-day model, could translate into many lives saved).[158] Individuals who use DTAs gain more accurate information on exposure (90 percent app tracing accuracy) compared to individuals who receive information through non-app tracing methods (50 percent tracing accuracy).[159] The higher degree of accuracy should incentivize individuals to use the DTAs voluntarily. An individual's informed and autonomous choice to use the app could also be a reason to assume that the user will want to comply with reporting and isolation requirements. Partial adoption would still benefit the entire population by decreasing the spread of infection, provided that DTA users follow self-isolation requirements when alerted to a potential exposure.[160]

Most public health authorities, universities, and NGOs around the world support a voluntary design.[161] However, for a DTA to be truly voluntary, there cannot be any informal pressure to use the app. For example, a design that requires people to use the app as a condition to work or as a condition to receive government services, such as unemployment benefits, could not be considered voluntary.[162] Evidently, not all smartphone owners are willing to voluntarily adopt such technology.[163] So far, in countries where DTA installation is voluntary, adoption rates have been low.[164] In U.S.

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*Coronavirus Tracing Apps Can Save Lives Even with Low Adoption Rates*, MIT TECH. REV. (Sept. 2, 2020), https://bit.ly/3lGZnLM [https://perma.cc/E4UY-QMAP] ("Even at low uptake, it can make significant contributions.").

158. O'Neill, *Coronavirus Tracing Apps Can Save Lives Even with Low Adoption Rates*, *supra* note 157.

159. VON ARX ET AL., *supra* note 141, at 5.

160. Canca, *supra* note 51; *Infectious Disease Experts Provide Evidence for a Coronavirus Mobile App for Instant Contact Tracing*, UNIV. OF OXFORD (Mar. 17, 2020), https://bit.ly/3nVMgsH [https://perma.cc/Z84Z-DMKH].

161. *See infra* Appendix A.

162. Ignacio N. Cofone, *Immunity Passports and Contact Tracing Surveillance*, 24 STAN. TECH. L. REV. 24 (forthcoming 2021). *But see id.* at 26 ("Even if information can be conveyed to users in a way sufficient for consent to be achieved, and even if the apps are made optional by the government, it is difficult to ensure that users have a meaningful choice—and the app is not de facto mandatory."); *id.* ("Australia, for example, is considering a draft bill that would outlaw mandating employees or customers to use the country's contact tracing app, called COVIDsafe.").

163. For a discussion of smartphone-owning populations, see *infra* Part III.

164. *See* Craig Timberg et al., *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://wapo.st/3hRODsO [https://perma.cc/Y2P9-L8WL] ("Singapore's TraceTogether app, which launched [in March], has been downloaded by approximately a fifth of the population. In Australia, more than 2 million people have downloaded the government's COVIDSafe app since [release in April]—about 8 percent of the country's 25 million people.");

regions where DTAs have been launched, relatively few people have downloaded these apps. For example, in Virginia, the first state to launch an exposure notification app, an estimated 10 to 20 percent of the population downloaded the app.[165] Since the beginning of October, approximately five percent of New York residents[166] and only one to three percent of residents in Wyoming, North Dakota, Michigan, Nevada and Alabama, adopted DTAs.[167] Even where adoption was considered "rocketing," only 13 to 28 percent of adoptions contained users' signatures.[168] Moreover, an opt-in system should include routine check-ins with users to determine whether they want to continue broadcasting, or the system should include a turn-off option[169] that can be utilized at any moment to reflect a user's continuous consent. When the app's tracing is turned off, it cannot function, and its benefit is suspended.

Society's willingness to use the technology is not enough, however. As DTAs grow in variety, individual DTAs become less effective because each app tracks smaller portions of the population and operates with different time and proximity criteria. For example, Bluetooth signals from Android and Apple phones cannot easily connect to one another.[170] Interoperability between different apps

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*see also* Servick, *supra* note 156 ("Singapore, which pioneered app-based contact tracing with its launch of TraceTogether on [March 20, 2021], reports more than 1.4 million users—roughly one-quarter of the country.").

165. Rich Griset, *Virginia Leads Nation in COVID-19 App Use*, VA. BUS. (Dec. 11, 2020), https://bit.ly/3lMIEqn [https://perma.cc/P5T5-E5MD].

166. Gwynne Hogan, *Governor Cuomo Said the State's COVID App Could "Make a Big Difference"—Did It?*, GOTHAMIST (Dec. 3, 2020, 2:07 PM), https://bit.ly/2XBikaN [https://perma.cc/YN5K-RQP6]. For a discussion on how the COVID-19 pandemic has impacted people's mental health, see Nirmita Panchal et al., *The Implications of COVID-19 for Mental Health and Substance Use*, KFF (Feb. 10, 2021), https://bit.ly/3Fc9kcg [https://perma.cc/F5RB-5P74].

167. Nicole Wetsman, *Contact Tracing Apps Promised Big and Didn't Deliver*, VERGE (Dec. 11, 2020, 10:52 AM), https://bit.ly/2Zg2XVA [https://perma.cc/5YJF-RTFS]; Bryan Anderson & Matt O'Brien, *Despite Promise, Few in US Adopting COVID-19 Exposure Apps*, AP NEWS (Dec. 6, 2020), https://bit.ly/3Bp2a21.

168. *See* de la Garza, *supra* note 157 (indicating that 28% of adoptions in Colorado, 20% in Connecticut, 17% in Washington, and 13% in California contained user signatures).

169. *See, e.g.*, Davey Winder, *How to Disable Apple and Google's COVID-19 Notifications on Your Phone*, FORBES (June 28, 2020, 8:59 AM), https://bit.ly/3iiQmYg [https://perma.cc/LS3X-FAZP].

170. Jules Polonetsky, *Will I Install an Exposure Notification App? Thoughts on the Apple-Google API*, LINKEDIN (May 20, 2020), https://bit.ly/2Z7fytY [https://perma.cc/XZ6V-K59H]. *But see*, *e.g.*, Kylie Foy, *Bluetooth Signals from Your Smartphone Could Automate COVID-19 Contact Tracing While Preserving Privacy*, MIT NEWS (Apr. 8, 2020), https://bit.ly/3CAG5yt [https://perma.cc/WAS5-DQX7] (reporting that engineers have achieved interoperability at the prototype phase).

is needed to trace alarming exposures. However, commercial interests may drive companies to achieve wide, exclusive adoption rates and earn the largest market share. To increase the effectiveness of DTA-based policy, governments can intervene and pass regulations that require interoperability.

Therefore, the more we respect a person's autonomous choice to download a DTA, the more we compromise the effectiveness of the app. Several scholars argued that maintaining a free flow of information is an ethical requirement during public health crises, and therefore, the ethically desirable option is to mandate DTA use.[171] They argue that if data security is guaranteed and users can trust that DTAs will not disclose their private information, then there is a moral duty for authorities to mandate DTA use for the sake of public interest.[172] Mandated use signals a need for public compliance.[173] For these and other reasons, some countries have decided not to promote voluntary use.[174] The importance of data privacy is therefore undeniable.[175] If mandatory, DTAs should secure the privacy of user information to minimize the violation of civil rights. If DTAs are consent-based, privacy of sensitive personal information is essential to improve user trust and usage.[176] Without assurances

171. *See* Ross, *supra* note 51. According to Michelle Mello, a health law professor at Stanford University, "There are times that not using the information that we have is morally hard to defend, and I think this is one of them." *Id.*; *see also* Canca, *supra* note 51 (arguing that population-wide mandatory use of DTAs that contain privacy preserving designs can be more efficient and more respective of privacy than traditional contact tracing or lockdowns and is therefore the only ethical option for fighting COVID-19.).

172. *See* Ross, *supra* note 51; Canca, *supra* note 51.

173. *See* Fancourt, *supra* note 110.

174. Dave Gershgorn, *We Mapped How the Coronavirus Is Driving New Surveillance Programs Around the World*, ONEZERO (Apr. 9, 2020), https://bit.ly/3nSCszS [https://perma.cc/Z5RX-6AHP] ("[I]n Argentina . . . those who are caught breaking quarantine are being forced to download an app that tracks their location. In Hong Kong, those arriving in the airport are given electronic tracking bracelets that must be synced to their home location through their smartphone's GPS signal."); Isobel Asher Hamilton, *Poland Made an App That Forces Coronavirus Patients to Take Regular Selfies to Prove They're Indoors or Face a Police Visit*, INSIDER (Mar. 23, 2020, 8:06 AM), https://bit.ly/3nP01cz [https://perma.cc/69JE-GX3F] ("In Poland, citizens under quarantine had to download a government app that mandated they respond to periodic requests for selfies."); Tal Schneider, *Israeli Cabinet Unanimously Approves Phone-Tracking App Bill*, GLOBES (June 24, 2020, 5:56 PM), https://bit.ly/3tYamEn [https://perma.cc/UG4Y-YK69].

175. It could be argued that when citizens voluntarily choose to use an app independent from any governmental pressure, they are free to use a proportionate or disproportionate app. However, this choice will neither prevent potential privacy harms to those citizens nor avoid the consequential implications to society.

176. *See* Ashley Kirzinger et al., *KFF Health Tracking Poll—Late April 2020: Coronavirus, Social Distancing, and Contact Tracing*, KFF (Apr. 24, 2020), https://

of privacy, people will be unlikely to trust DTAs enough to adopt their technologies.

Regardless of whether users accept mandatory DTAs, they do not have control over how and in what way their information is shared. Developers determine how information is transferred, which varies with each DTA design. The next part of this Article reviews possible data-management designs and their implications on the suitability of DTAs in light of privacy-preserving recommendations.[177] In particular, it addresses the types of information collected by DTAs and whether it is appropriate for DTAs to restrict access to such information by public health authorities and other stakeholders.

b. Managing Sensitive Information

Several key questions regarding recommended DTA designs that preserve privacy may be relevant to suitability. How should the design prevent excessive use of information? Which types of information should be collected—identifying or non-identifying? How should this data be processed and stored? What will the information be used for? Should different types of data or databases be cross-referenced? And who should get access to the data?

Contact tracing requires information on who was close enough to people diagnosed with COVID-19. This information can be discovered by collecting geolocation data through GPS or Bluetooth technology. GPS-based apps connect to specific phones and users, reveal their whereabouts at any given moment, and impose great privacy violations.[178] DTAs can preserve more privacy if they anonymize this proximity information.[179] Yet, anonymization alone is not enough to secure privacy. Moreover, *individual anonymized*

bit.ly/3zorrYV [https://perma.cc/VA3G-R5AK] (reporting that privacy was a major consideration for polled app users and that fewer than three in ten were willing to use an app if there was a "chance that data from the app could be hacked"); Yves-Alexandre de Montjoye et al., *Evaluating COVID-19 Contact Tracing Apps? Here Are Eight Privacy Questions We Think You Should Ask.*, COMPUTATIONAL PRIV. GRP. (Apr. 2, 2020), https://bit.ly/2ZcZyGV [https://perma.cc/LD42-LFRX] (offering questions for those with privacy concerns to ask when evaluating prospective contact-tracing apps). Without implementing specific measures to mitigate the public's fear of being identified by the authorities and others, many will refuse to use DTAs voluntarily.

177. *See infra* Appendix A.

178. *See* Brooke Crothers, *Coronavirus Tracing Apps Could Be Used by Hackers to Access Your Personal Data, Report Says*, FOX NEWS (June 12, 2020), https://fxn.ws/3kpWakg [https://perma.cc/YH83-P93Q].

179. *See also Guide to the Ethics of Surveillance and Quarantine for Novel Coronavirus*, NUFFIELD COUNCIL ON BIOETHICS, https://bit.ly/3CvVRKT [https://perma.cc/PBD9-B6G3] (last visited Oct. 1, 2021) ("To assess and predict trends in

information does not really preserve privacy because many inferences can be drawn from the locations that users visit. It takes very little to fully identify who users are and what they do.[180] For example, location history can identify a user's home and work addresses or places and people visited, including health centers, immigration or criminal lawyers, immigration clinics, meetings to plan protests, and meetings with psychiatrists, and doctors. This tracking may be the reason why most GPS-based information is used in an *aggregated, anonymized* form rather than in an individualized form.[181]

DTAs using *aggregated* data combine the location trails of many anonymous users to reveal statistical patterns, thus imposing fewer privacy risks.[182] While use of aggregated data can be suitable for policy design purposes, this goal is different from the goal of contact tracing. For example, Google developed the COVID-19 Community Mobility Reports, open to the public and policymakers, which contains aggregated, anonymized sets of data from users who turned on their Location History setting.[183] The reports show users' mobility patterns and provide insight into how society changed in response to policies aimed at combating COVID-19. In Israel, for example, COVID-19 Community Mobility Reports helped the Min-

infectious disease[,] it is acceptable for anonymi[z]ed data to be collected and used without consent, as long as any invasion of privacy is reduced as far as possible.").

180. *See* Stuart A. Thompson & Charlie Warzel, *Twelve Million Phones, One Dataset, Zero Privacy*, N.Y. TIMES (Dec. 19, 2019), https://nyti.ms/3tZXjlu [https://perma.cc/VS5A-D6V6].

181. *See* Martin Untersinger, *Europe Requests Data from Telephone Operators to Assess the Effect of Containment Measures*, ARCHYDE (Mar. 25, 2020), https://bit.ly/3hV4arT [https://perma.cc/G4BK-YVJN] (reporting that the European Commission asked mobile phone providers to access aggregated user data "to better understand and anticipate" the evolution of the pandemic); Natasha Lomas, *What Are the Rules Wrapping Privacy During COVID-19?*, TECHCRUNCH (Mar. 20, 2020, 1:37 PM), https://tcrn.ch/3hSgF7E [https://perma.cc/D6DW-2JAP] (reporting that in Germany, the United Kingdom, and other European jurisdictions, "anonymized mobile phone data has been handed over to organizations" for analysis).

182. *But see* Melissa Gymrek et al., *Identifying Personal Genomes by Surname Inference*, 339 SCI. 321, 321 (2013) (showing how "a combination of a surname with other types of metadata, such as age and state," can identify anonymized genetic data, relying "on free, publicly accessible Internet resources").

183. *COVID-19 Community Mobility Reports*, GOOGLE, https://bit.ly/39mHz2P [https://perma.cc/RTK4-QEM5] (last visited Oct. 30, 2021). This platform provides reports of "movement trends over time by geography, [and] across different categories of places[,] such as retail and recreation, groceries and pharmacies, parks, transit stations, workplaces, and residential" areas. *Id.* The reports consist of data per country, with 131 countries covered initially, or per state, further broken down into regions and counties—with Google offering an analysis of how community mobility has changed, compared to a baseline average before COVID-19. *Id.*; *see* Lomas, *Google Is Now Publishing Coronavirus Mobility Reports, supra* note 10.

istry of Finance assess the rate of unemployment due to the pandemic by comparing data on the presence of phones in workplaces before and during the Coronavirus, but the assessment has limited validity due to the rise in remote work.[184] Thus, aggregated data could assist policymakers in designing response policies and restrictions targeting specific populations. However, once aggregated, information is unsuitable for the purpose of contact tracing. Since the data is not individualized, an app could not detect if someone was exposed to a person diagnosed with COVID-19.

Bluetooth-based apps can preserve user privacy better than GPS-based apps because with Bluetooth, a DTA's historical data logs *may* collect location information but does not need to. DTAs can avoid accessing a user's location data and/or their phone's contact list, thus preventing Bluetooth communications from being tied to a user's identity.[185] A Bluetooth-based DTA would need to be programmed to detect only whether users are close enough to one another to create a risk of infection. The app's server can gain access to anonymous user identifiers and send messages to every user that matches a specific event log number, all without infringing on user privacy.[186] The app can be fully functional with minimal collection, storage, or transmission of private information.[187] Less intrusive but still beneficial, most recommendations prefer DTAs that use Bluetooth over GPS. However, the benefits of an encrypted event log are limited unless they cross-reference user information with their health information, such as their COVID-19 status.[188] The collection of COVID-19 statuses can be

184. Amit Chagay, *What Did Your Smartphone Do in Azrieli Mall on Sunday Morning?*, MARKER (June 24, 2020), https://bit.ly/3tX2dQp [https://perma.cc/Y8QW-FWGD] (Isr.).

185. *See* Crocker, Opsahl & Cyphers, *supra* note 13.

186. *See* VON ARX ET AL., *supra* note 141, at 5. *But see* Soltani et al., *supra* note 145 (arguing that because these contact tracing systems "reveal health status in connection with a unique . . . identifier" (if rotating, meaning, changing identifiers for a single user, to minimize potential identification), "it is possible to correlate infected people with their pictures using a stationary camera connected to a Bluetooth device in a public place").

187. *But see* Cofone, *supra* note 162, at 202 n.132 (highlighting one experiment that placed several Bluetooth devices at different locations of a city by tracking proximity, not location, to show that a linkage attack on them enables reidentification and profiling).

188. *See, e.g.*, Costica Dumbrava, *Tracking Mobile Devices to Fight Coronavirus*, at 7, EUR. PARL. RSCH. SERV. (Apr. 2020), https://bit.ly/3nT9EqJ [https://perma.cc/MWQ2-ZAJG] (citing a study of the 2014 west African Ebola crisis that "questioned the effectiveness of location tracking in tackling epidemics, arguing that location data [is] most useful when cross-referenced with other data (e.g.[,] testing and diagnostics data)").

designed in either a centralized form or a decentralized form.[189] A centralized design requires one or more authorities, usually governmental, to confirm that an individual is indeed infected and to alert relevant contacts. A decentralized design requires deciding if and to what extent public health authorities would insert information into the system and/or alert other users. Public health authorities may interfere in two scenarios: when reporting a diagnosed user to alert the DTA system and when alerting other users that they have been exposed to a person diagnosed with COVID-19.

When reporting confirmed cases in a centralized DTA design, health authorities can confirm a user's COVID-19 status and update their diagnosis in the system.[190] However, in decentralized apps that require self-reporting, people who are diagnosed with COVID-19 must autonomously update their status to an encrypted database. A decentralized reporting design can impede a DTA's suitability. Self-reporting may result in significant numbers of mistaken or malicious reports by healthy users that they are diagnosed with COVID-19.[191] False reporting increases panic and burden among users who undergo unnecessary self-isolation and decreases a user's trust in and compliance with DTAs.[192] Yet, a decentralized DTA may still be suitable, even with false-positive reporting in the sense that even if it over alerts, people who have been exposed will be notified and could self-isolate. Although suitable, it is ineffective because it encourages isolation for those who do not need to isolate. With time, many people could disregard alerts altogether.

Some suggest a middle approach where public health authorities confirm a diagnosis and make sure that reporting is based on actual test results updated in the public health system.[193] After confirming that a diagnosis is not a false report, public health authori-

189. Jessica Morley et al., *Ethical Guidelines for COVID-19 Tracing Apps*, 582 NATURE 29, 31 (2020); *see* Cofone, *supra* note 162, at 183 ("Some refer to decentralized apps as 'exposure notification apps' and reserve the term 'contact tracing apps' for centralized apps."). Australia and Singapore are examples of countries that use centralized forms to collect COVID-19 statuses, and Germany and Italy are examples of countries that use decentralized forms.

190. *See* Morley et al., *supra* note 189, at 31; Canca, *supra* note 51; Crocker, Opsahl & Cyphers, *supra* note 13.

191. Soltani et al., *supra* note 145; Crocker, Opsahl, & Cyphers, *supra* note 13.

192. Soltani et al., *supra* note 145 ("Individuals living in densely populated neighborhoods and apartment buildings—characteristics that are also correlated to non-white and lower income communities—are likelier to experience incidences of false positives due their close proximity to one another.").

193. *See* Casey Newton, *Apple and Google Answer Our Questions*, INTERFACE WITH CASEY NEWTON (Apr. 13, 2020), https://bit.ly/2VZFeYv [https://perma.cc/23EQ-BDMX]; Nicole Wetsman, *Apple and Google's COVID-19 Tracking System Will Make Its Full U.S. Debut in New Virginia App*, VERGE (Aug. 5,

ties give the diagnosed user a one-time anonymous code to maintain the user's privacy, which the user then inserts into the app to begin alerting others. If the only goal of DTA-based policy is to alert users about exposure, authorities can encrypt the data so that the only interaction users have with it is when reporting a positive test result.

Public health authorities may also have access to a DTA user's personal information when alerting contacts who are exposed to a diagnosed user. In a decentralized design, lists of log numbers are stored on the users' own devices, rather than on servers run by the DTA developer or by public health authorities so that only the user is notified that they were exposed (peer-to-peer).[194] For example, when user A sits within 6 feet of user B for longer than 15 minutes, A's DTA logs the contact with B, and B's DTA logs the contact with A. If user A reports a positive COVID-19 diagnosis, user B will receive a direct alert. The practice of public health authorities alerting contacts may be more suitable, but increased third-party exposure to user information may make DTAs more prone to data breaches and leaks.

The type of information contained in an alert is also important. Whether alerts are sent in a centralized or decentralized way, the scope of the diagnosed user's data released to exposed contacts is unclear.[195] As a default, in traditional contact tracing, the decision of how much data to share is left to local health departments, which tend to respect confidentiality as much as possible. They usually do not inform contacts of the diagnosed patient's name[196] and almost never provide general information about a person's employment, the links between infected individuals, or the onset of symptoms.[197] While arguably useful, the release of exact information could result in harmful consequences to diagnosed users, such as others stigmatizing them as being reckless or careless in taking precautions. This stigma is especially problematic if DTAs are not 100 percent accu-

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2020, 12:04 PM), https://bit.ly/3lOG2bx [https://perma.cc/CE2S-XX5Y] (reporting on the debut of Virginia's COVIDWISE app).

194. *See* Crocker, Opsahl & Cyphers, *supra* note 13.

195. *See* Cosgrove, *supra* note 150 ("First responders are being given the addresses of people who have tested positive for COVID-19.").

196. Cohen et al., *infra* note 223, at 2371. However, even if public health authorities do not reveal the identity of the diagnosed patient, those informed can somtimes infer the identity. *Id.*

197. Christian Sheckler, *Details on Coronavirus Cases Are Often Scant as Health Officials Point to Privacy Laws*, S. BEND TRIB. (Apr. 4, 2020, 5:00 PM), https://bit.ly/3ku3z28 [https://perma.cc/W732-Y8BW].

rate.[198] For example, in the Philippines, the Mayor of the Municipality of Lambunao requested the consent of diagnosed individuals to publish their names and ease contact-tracing efforts.[199] As a result, the diagnosed individuals were identified and their residences were attacked by unknown individuals.[200] If such incidents became common, people would be reluctant to report their COVID-19 status, which would compromise DTA suitability. On the other hand, we may wish to hide a user's identifying details but disclose those details about alleged encounters, thereby allowing users to appeal alerts based on inaccurate DTA assessments requiring their self-isolation. Allowing such appeals is necessary given the evidence of inaccurate exposure alerts and the severe deprivation of the freedom of movement due to the required self-isolation following such alerts.[201]

A decentralized design provides limited benefits to the broad goal of public health administration since public health authorities cannot benefit from real-time information and assess adjust their policies accordingly.[202] Privacy-preserving designs minimize the information that can be extracted from DTAs.[203] However, a regulation that pairs decentralized collection with mandatory reporting by collectors could create a centralized system of information needed for policymaking.[204] For example, the Department of Health and

198. *Compare* Max S. Kim, *Seoul's Radical Experiment in Digital Contact Tracing*, NEW YORKER (Apr. 17, 2020), https://bit.ly/3CvGJ02 [https://perma.cc/4A2H-KVHK] (addressing the fear of social stigmatization and other reflections on conflicting interests), *with* Sabrina Tavernise & Richard A. Oppel Jr., *Spit on, Yelled at, Attacked: Chinese-Americans Fear for Their Safety*, N.Y. TIMES, https://nyti.ms/3hOo87B [https://perma.cc/BQ8W-PCVY] (May 5, 2021) (reporting on the stigmatization of Asians in the United States because of COVID).

199. Tara Yap, *Stoning of Residence of Family Being Ravaged by COVID-19 Condemned*, MANILA BULL. (Apr. 5, 2020, 12:00 AM), https://bit.ly/2WyObYU.

200. *Id.*

201. *See* Omar Kabir, *To Be Released from Isolation: Sixty Percent of the Appeals Against GPS Location Were Found to Be Justified*, CALCALIST (July 14, 2020, 12:04 PM), https://bit.ly/39pzsT0 [https://perma.cc/H9F6-G2YB] (Isr.).

202. *See infra* Part III.C.3. While a decentralized design reveals the notification only to the relevant users in a manner that preserves their privacy, it is unclear why designs should avoid giving public health authorities access to confirmed COVID-19 information. To decide the amount of respect given to users' privacy, the criterion of comparison should not be digital privacy-preserving designs in normal times, but rather proportionate legal privacy exceptions during a pandemic, when traditional contact tracing is taking place.

203. *See* Tauvod, *Can We Stop the Spread of the Pandemic and Maintain Privacy?*, YOUTUBE, at 1:38:00 (July 28, 2020), https://bit.ly/2W76xA8 [https://perma.cc/JS4V-BP22] (Isr.) (mentioning that countries that adopt Google and Apple's privacy-preserving design lose options to control the pandemic).

204. *See* Anderson, *supra* note 146. Given the novelty of the disease, some jurisdictions have passed emergency laws mandating the reporting of confirmed

Human Services (HHS) specifically allows broad data sharing to promote "key public goals such as research, public health, and law enforcement."[205] Sharing information with public health authorities may be a justified exception to privacy safeguards.

c. Who Else Gets Access?

Privacy-preserving designs aim to minimize access by groups other than public health authorities, such as law enforcement, employers, or foreign governments. Nevertheless, the pandemic may require counterintuitive decisions regarding data sharing that may expose details to such groups. Sharing personal information with these other entities is uncommon in regular times. However, during a pandemic, many of those entities may need to access personal information to protect the public interest. Restricting access to such information would make DTAs less effective in cutting chains of transmission or even endanger others.

Normally, when public health authorities have access to personal health information, that information must not be used for other purposes, including the enforcement of criminal or immigration laws.[206] But, for purposes of enforcing isolation during a pandemic, HHS's Standards for Privacy of Individually Identifiable Health Information ("Privacy Rule") allows law enforcement authorities to access information on people diagnosed with COVID-19.[207] Additionally, some information can be shared with governmental agencies and health researchers.[208] Once the information is

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COVID-19 cases. *See Surveillance Case Definitions for Current and Historical Conditions*, CDC: NAT'L NOTIFIABLE DISEASES SURVEILLANCE SYS., https://bit.ly/3lKQIrB [https://perma.cc/EBS4-43BJ] (Apr. 16, 2021) (providing that in the US, under emergency public health policy, COVID-19 is a notifiable disease, so health care providers who diagnose confirmed cases must inform public health authorities); Jennifer Baker, *Pandemic Incites Concerns About Data-Sharing Overreach*, IAPP (Mar. 24, 2020), https://bit.ly/3hTNoJE [https://perma.cc/RKG3-H823] (reporting that Italy passed emergency legislation requiring "people in certain transmission risk categories to notify health authorities"); Lomas, *What Are the Rules Wrapping Privacy During COVID-19?*, *supra* note 181 (reporting on a coronavirus notification regulation in Germany); *Coronavirus (COVID-19) Listed as a Notifiable Disease*, GOV.UK (Mar. 5, 2020), https://bit.ly/3tZWl95 [https://perma.cc/29MF-V6PY] (reporting that the United Kingdom added COVID-19 to its list of notifiable diseases).

205. Standards for Privacy of Individually Identifiable Health Information, 64 Fed. Reg. 59,918, 59,923 (proposed Nov. 3, 1999) (to be codified at 45 C.F.R. pts. 160, 164).

206. Schwartz, *supra* note 40.

207. 45 C.F.R. § 164.512(f) (2021).

208. McDonald, *supra* note 41; Kharpal, *supra* note 38; *see* Liz Landers, *Alabama and Massachusetts Are Handing the Addresses of People with Coronavirus Over to Police*, VICE NEWS (Mar. 31, 2020, 3:20 PM), https://bit.ly/3tWE4JR

entered into a law enforcement database, often without a restriction on the purpose of use, it can be used for any other future purpose.[209] Traditionally, "disproportionate profiling, policing, and criminalization" have burdened vulnerable subpopulations more than others.[210] Governmental authorities should be fully transparent about what COVID-related data they acquire, the source of the data, how that data is being used, and who gets future access. At the time of this writing, most countries around the world have not adhered to these principles.

Additionally, sharing COVID-19 statuses or social-association histories can facilitate employment discrimination.[211] Employers may have financial interests to discriminate against people, such as switching employee insurance policies to save money or refusing to hire certain people whose health histories signal potential future costs.[212] Sharing genetic information has traditionally raised similar concerns about employment and insurance discrimination and is

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[https://perma.cc/344N-ZSVX]. "Two U.S. states—Alabama and Massachusetts—have begun providing the addresses"—but not the names—"of those known to have been diagnosed with COVID-19 to police" and other emergency responders "in a bid to contain the spread and protect first responders who might answer a call where a coronavirus sufferer is involved." *Id.* In Alabama, "[t]he information is being distributed to 85 emergency communications districts in the state, and is then relayed to police officers and other first responders when they go out on calls." *Id.*; *see also* Baker, *supra* note 204. ("In New Zealand, Privacy Commissioner John Edwards said, 'It will not be a breach of the Privacy Act for any accommodation provider or tourism operator to notify a medical officer or police officer of someone noncompliant with self-isolation obligations.'").

209. Natalie Ram & David Gray, *Mass Surveillance in the Age of COVID-19*, 7 J.L. & BIOSCIENCES 1, 15–16 (2020); *see also* Graham Greenleaf & Katharine Kemp, *Police Access to COVID Check-in Data Is an Affront to Our Privacy. We Need Stronger and More Consistent Rules in Place*, CONVERSATION (Sept. 7, 2021, 2:00 AM), https://bit.ly/3lP2BNn [https://perma.cc/GG2Z-SBE4] (reporting that Australian police have used COVID check-in data "on at least six occasions for unrelated criminal investigations").

210. Tereza Hendl et al., *Pandemic Surveillance and Racialized Subpopulations: Mitigating Vulnerabilities in COVID-19 Apps*, 17 J. BIOETHICAL INQUIRY 829, 829–30 (2020).

211. *See* United States v. Westinghouse Elec. Corp., 638 F.2d 570, 577 (3d Cir. 1980) (explaining that "an employee's medical records, which may contain intimate facts of a personal nature, are well within the ambit of materials entitled to privacy protection").

212. *See* Ann Reilly Dowd, *Protect Your Privacy: A Money Investigation Reveals the Five Biggest Threats to Your Privacy and How You Can Safeguard Yourself Against the Most Serious Types of Snooping.*, CNN MONEY (Aug. 1, 1997), https://cnn.it/3ieNdcb [https://perma.cc/8XZY-3YXL] (reporting that in studying "the privacy practices of 300 Fortune-500 companies," University of Illinois Professor David Linowes found that "35 percent of employers said they use personal medical information as a basis for hiring, promotion, and firing decisions").

thus protected by statutory law and corresponding regulations.[213] The Genetic Information Nondiscrimination Act (GINA) of 2008 restricts the access of employers and health-insurers to statutorily-covered genetic information that could result in harmful consequences, and bans the disclosure and discriminatory misuse of such information.[214] To prevent COVID-19 discrimination, a policy could apply anti-discrimination laws similar to GINA and others to minimize the misuse of COVID-19-related information.[215] However, a public health emergency may pose practical difficulties on restricting employers' access to such information.[216] During a pandemic, some information about an employee's health status *should* be shared with an employer to allow the employer to take preventive measures necessary for safety in the workplace.[217] According to

213. Such information could be an incidental collection, commercially purchased, or publicly available. Employers can use data to identify markers that may affect a person's employment, such as a disease that will require sick days or other genetic dispositions. *See* Jessica L. Roberts, *Preempting Discrimination: Lessons from the Genetic Information Nondiscrimination Act*, 63 VAND. L. REV. 437, 466–67 (2010) (discussing legislative history that demonstrates Congress's intent to address genetic-information discrimination even while acknowledging it was not widespread); *Health Insurance in the Age of Genetics*, NAT'L HUM. GENOME RSCH. INST., https://bit.ly/3nWQJvo [https://perma.cc/6GPU-DV4E] (Apr. 12, 2011).

214. *See* 42 U.S.C. § 2000ff–1(b)(5)(B)(i). Misuse could happen once employers or health insurers legally obtain genetic information. Since these institutions have a lot to gain from accessing genetic information, in an attempt to balance power relations, health insurers and employers are prohibited from purchasing genetic information from third parties. Insurers cannot request, require, or purchase genetic information of a potential or current employee, or their family members, in order to consider genetic dispositions. They also cannot obtain this information to determine a preexisting condition as a condition for one's eligibility for health insurance or to make decisions about premiums, coverage, or other payments. Similarly, employers with 15 or more employees cannot use family health history or genetic test results in making decisions about employment (hiring, firing, promotion, pay, or terms), or regarding the way they treat employees in the workplace (they cannot limit, segregate, classify, or otherwise mistreat employees). *See id.* (providing statutory requirements and prohibitions at various sections).

215. For a set of ethical values that should be considered when implementing disease surveillance technology in response to a pandemic, see Hendl et al., *supra* note 210.

216. 42 U.S.C. § 2000ff-1(b)(5)(B)(ii) (providing that if federal or state law requires the genetic monitoring, the employer does not need authorization).

217. *See* Baker, *supra* note 204; W. Nicholson Price II & I. Glenn Cohen, *Privacy in the Age of Medical Big Data*, 25 NATURE MED. 37, 41 (2019) (providing the definition of disclosure under the Privacy Rule and that it is enough that a third party has access to PHI available for review, regardless of whether the third party actually reviews any particular record); *see also* Angela Chen, *Why It's Time to Rethink the Laws That Keep Our Health Data Private*, VERGE (Jan. 29, 2019, 8:30 AM), https://bit.ly/3kuI4xT [https://perma.cc/8XEU-KV6R]. Health insurance would also inevitably be exposed to individuals' wider health information when they seek care for COVID-19. Insurance companies may refuse to sell insurance to those who suffered from COVID-19 complications, and long-term insurers could

HHS's Privacy Rule, covered entities may disclose protected health information to an employer regarding an employee, upon the former's request, to meet the employer's obligation to protect the safety of other workers.[218] Additionally, employers must maintain safe working environments under Occupational Safety and Health Administration regulations,[219] Mine Safety and Health Administration regulations,[220] and similar state laws; that responsibility might require employers to know which employees risk exposing others to COVID-19. Therefore, DTAs that are designed not to share such information with employers would be less suitable for the purpose of protecting public health.

Finally, one goal of the WHO is to create a global surveillance network that monitors trends of human infection and provides early warning of new strains in humans and animals.[221] DTAs can either provide information for such a network under the broad goal of supplying data to public health authorities or avoid doing so under a narrow goal of alerting only infected individuals. The narrow goal is not necessarily preferable. In the United States, the HHS invests resources into international surveillance and response to assist other countries in the early detection of an influenza outbreak and to minimize and contain the impact of a pandemic, should one occur.[222] DTAs that are designed to provide information would be more beneficial to the global network than apps that are designed to keep information confidential, since Sars-Cov-2 could require global surveillance activities given its ability to emerge anywhere in the world. DTAs that share information for such a purpose would be more suitable to promote broader public health purposes.

To conclude, different DTA designs vary in their levels of autonomy, privacy, effectiveness, and thus their suitability. The U.S. "federal government has yet to announce a nationwide [DTA] policy."[223] The collection of complete and accurate information may

use the information to increase insurance premiums. *Id.* However, insurance companies are covered entities according to HIPAA and are subjected to the Privacy Rule. *Id.*

218. 45 C.F.R. § 164.512(b) (2021).

219. Occupational Safety and Health Act of 1970, 29 U.S.C. §§ 651–678.

220. Federal Mine Safety and Health Act of 1977, 30 U.S.C. §§ 801–804, 811–826, 841–846, 861–878, 901–945, 951–966.

221. *WHO Global Surveillance and Monitoring System*, WHO, https://bit.ly/2Y127vv [https://perma.cc/GV9W-NDYX] (last visited Oct. 30, 2021).

222. *Office of Global Affairs, Office of Pandemics and Emerging Threats (PET)*, U.S. DEP'T OF HEALTH & HUM. SERVS., https://bit.ly/2ZaWJ9i [https://perma.cc/FFP8-42G8] (last visited Oct. 4, 2021).

223. I. Glenn Cohen et al., *Digital Smartphone Tracking for COVID-19: Public Health and Civil Liberties in Tension*, 323 JAMA 2371, 2372 (2020).

depend on whether the app aims to address a broad or narrow goal. In accordance with privacy-preserving objectives, some DTAs are designed with a degree of security and privacy in mind. But, many DTAs around the world do not adopt privacy-preserving principles,[224] which is unsurprising considering the implications of privacy-preserving designs on DTA effectiveness and suitability. There are some non-voluntary uses of DTAs as well as GPS-based DTAs.[225] The scope and use of collected information could theoretically be minimal, but in reality, many apps are designed to collect excessive amounts of information.[226] Some apps cross-reference smartphone location data with other types of data, including credit card records, airline databases, surveillance-camera footage, or health information.[227] Cross-referencing data is extremely worrisome because it often exposes private aspects of people's lives beyond what is required for public health purposes.[228] Additionally,

224. For the inconsistency between DTAs, see, e.g., O'Neill et al., *supra* note 152 ("[T]here was no central repository of information; just incomplete, constantly changing data spread across a wide range of sources. Nor was there a single, standard approach being taken by developers and policymakers: citizens of different countries were seeing radically different levels of surveillance and transparency"); Gershgorn, *supra* note 174 (stating that the website OneZero has been compiling press reports from 34 countries, with potential privacy issues, that are ramping up surveillance to combat the coronavirus); Samuel Woodhams, *COVID-19 Digital Rights Tracker*, TOP10VPN (Mar. 20, 2021), https://bit.ly/3Cy7913 [https://perma.cc/VP5U-LJJY].

225. Gershgorn, *supra* note 174 ("[I]n Argentina, . . . those who are caught breaking quarantine are being forced to download an app that tracks their location. In Hong Kong, those arriving in the airport are given electronic tracking bracelets that must be synced to their home location through their smartphone's GPS signal."); Hamilton, *supra* note 174 ("In Poland, citizens under quarantine have to download a government app that mandates they respond to periodic requests for selfies.").

226. *See* Crocker, Opsahl & Cyphers, *supra* note 13; Kharpal, *supra* note 38 ("[A]ccording to the Electronic Frontier Foundation (EFF), a nonprofit digital privacy advocacy group, . . . collection of certain data like phone location, hasn't been proven to be effective in tracking the spread of the virus.").

227. *See, e.g.*, Kharpal, *supra* note 38 ("In the south Indian state of Kerala, authorities have been using a mixture of telephone call records, surveillance camera footage and phone location data to track down people who may have been in contact with coronavirus patients."); Bracy, *supra* note 43 (interviewing Goh Jae-young, an official at the Korea Centers for Disease Control Prevention). The official told the BBC:

> At first we interview the patients and try to gather information, emphasizing that this affects the health and safety of the entire people . . . . Then, to fill in the areas they perhaps haven't told us, and also to verify, we use GPS data, surveillance camera footage, and credit card transactions to recreate their route a day before their symptoms showed.

*Id.*

228. For an example of such cross-referencing in South Korea, see Natasha Singer & Choe Sang-Hun, *As Coronavirus Surveillance Escalates, Personal Privacy*

not all DTA algorithms are transparent and/or open to peer review. Because of the gap between privacy-preserving-design recommendations and the way DTAs are actually designed, it is important to evaluate whether contact tracing through DTAs is a necessary measure to achieve their desired end.

### *B. Step II—The Necessity of DTA-Based Policy*

Step II of the proportionality doctrine, *necessity*, requires an assessment of whether a defined policy purpose (broad or narrow) is sufficiently important to restrict rights.[229] Traditional public health methods advance the broad and the narrow purpose. Health providers report confirmed infections to health departments, whereas public health workers interview diagnosed patients and trace their chain of contacts.[230] Once they discern the diagnosed patient's movements and the patient's close contacts, public health workers may publicly publish the locations that the patient visited and may further interview family members and others for addi-

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*Plummets*, N.Y. TIMES, nyti.ms/2Y5CA4o [https://perma.cc/9S2K-GC9D] (Apr. 17, 2020) (reporting that after the South Korean authorities began posting information, including location history, when people left for work, where they changed trains, about people who tested positive for coronavirus, internet mobs exploited such data "to identify people by name and hound them"); Mark Zastrow, *South Korea Is Reporting Intimate Details of COVID-19 Cases: Has It Helped?*, NATURE (Mar. 18, 2020), https://go.nature.com/2Y7wzUH [https://perma.cc/7SUJ-TJMY] ("In [South Korea], public information includes which rooms of a building the person was in, when they visited a toilet and whether or not they wore a mask. Even overnight stays at 'love motels' have been noted.").

229. *See* Barak, *supra* note 59, at 371 ("Canadian law has determined that an object is proper if it is necessary for the realization of collective goals of fundamental importance. Therefore, the object must be 'pressing and substantial.'"). Andrea Jelinek states general principles of law should be considered when processing personal data:

> Emergency is a legal condition which may legitimi[z]e restrictions of freedoms provided these restrictions are proportionate and limited to the emergency period. . . . The GDPR allows competent public health authorities and employers to process personal data . . . . when processing is necessary for reasons of substantial public interest in the area of public health. Under those circumstances, there is no need to rely on consent of individuals. . . . The GDPR also foresees derogations to the prohibition of processing of certain special categories of personal data, such as health data, where for reasons of substantial public interest in the area of public health (Art 9.2.i), is possible on the basis of Union or national law, or where there is the need to protect the vital interests of the data subject (Art 9.2.c), as recital 46 explicitly refers to the control of an epidemic.

Andrea Jelinek, *Statement on the Processing of Personal Data in the Context of the COVID-19 Outbreak*, EUR. DATA PROT. BD. 1, 1–2 (Mar. 19, 2020), https://bit.ly/3nUkw7O [https://perma.cc/93US-KHWE].

230. *See generally Key Information to Collect During a Case Interview*, CDC, https://bit.ly/3zqqqzz [https://perma.cc/A4T6-8X7L] (Oct. 21, 2020).

tional details about the patient.[231] They advise exposed contacts to stay at home and offer treatment as needed. Additionally, information derived from public health surveillance can assist authorities in their broader goal of assessing risk and can improve their ability to respond quickly to changing circumstances during a pandemic.

Although essential needs are met by low-tech, traditional contact tracing methods, a DTA-based policy may be more efficient because it addresses the two main flaws in the traditional approach: reliance on a person's memory to remember past encounters and on the ability to alert only identifiable contacts. Most people do not recollect every encounter they had in the two weeks before their diagnosis. Even the most detailed interviews may result in significant gaps or mistakes when based solely on an individual's memory.[232] Even when interviewees remember, traditional contact tracing is useful only for notifying contacts that the patient can remember and identify. DTAs do not rely on users' memory and can notify unidentified bystanders who have been in direct contact with an infected user, such as someone who sat beside an infected user at the coffee shop for an hour.

Moreover, traditional contact-tracing methods are too slow to keep up with high infection rates, such as those of the coronavirus.[233] Almost half of coronavirus transmissions occur in the very early phase of infection, before symptoms appear.[234] It is extremely important to alert people who have been exposed at this stage to break the chain of transmission and limit exposure. Former CDC Director Tom Frieden estimated that the United States would need around 300,000 contact tracers to mount the same level of contact tracing that helped contain the virus in Wuhan, China.[235] A

231. *See, e.g.*, Derek Thompson, *The Technology That Could Free America from Quarantine*, ATL. (Apr. 7, 2020), https://bit.ly/2W14765 [https://perma.cc/J3X4-FPVA] (reporting that, to stop the spread of Ebola, the CDC asked sick people to list recent interactions with family, friends, and businesses, who would be monitored for illness for several weeks).

232. Crocker, Opsahl & Cyphers, *supra* note 13.

233. *See, e.g.*, *Infectious Disease Experts Provide Evidence for a Coronavirus Mobile App for Instant Contact Tracing*, *supra* note 160.

234. *Id.*

235. Tom Frieden, *A New Normal with COVID-19: The Next Steps We Must Take*, THINKGLOBALHEALTH (Apr. 6, 2020), https://bit.ly/3EPZ3TI [https://perma.cc/M233-KKZT]; *see* Selena Simmons-Duffin, *States Nearly Doubled Plans for Contact Tracers Since NPR Surveyed Them 10 Days Ago*, NPR (May 7, 2020, 5:36 PM), https://n.pr/39rsoVY [https://perma.cc/3MP2-F5JA]; James Temple, *Why Contact Tracing May Be a Mess in America*, MIT TECH. REV. (May 16, 2020), https://bit.ly/3u3PawK [https://perma.cc/N97Q-JPWL] (reporting an estimation that 30 professionals for every 100,000 people, or more than 98,000 people nationwide, are needed for traditional methods). I have not found the estimation for

report from Johns Hopkins University estimated the cost of hiring 100,000 new community workers for contact tracing to be $3.6 billion, meaning that at least $10 billion would be required for 300,000 tracers.[236] Others have estimated that for the United States to reach a comprehensive infrastructure comparable to the one that produced an efficient response in Wuhan, it would need to invest $20 billion into the public health workforce.[237] While such an investment would still amount to just one percent of the more than three trillion dollars in total coronavirus-relief funding to date,[238] it would still be higher than the costs invested in developing DTAs.[239] A major incentive for abandoning the traditional method would be the ability to use resources more efficiently. New York invested $700,000 into a DTA, and the state will run a marketing campaign to spread awareness of the app by purchasing internet, TV, print, and radio advertisements.[240] Virginia invested $229,000 to develop and launch a DTA that costs about $29,000 a month to operate.[241] Palm Beach County, Florida spent $774,000 on a DTA and an additional $100,000 on marketing, though only 27,000 people, roughly 1.8 percent of the Palm Beach County population, have downloaded the app.[242] But whether a policy aims to substitute or

required manpower to support DTAs, but it may be less. *See also* Casey Newton, *Why Bluetooth Apps Are Bad at Discovering New Cases of COVID-19*, VERGE (Apr. 10, 2020, 6:00 AM), https://bit.ly/3ACzxyQ [https://perma.cc/MJK7-ED7T] (suggesting that people who are recently out of work could be hired for contact tracing). With more DTAs, their added value becomes even less significant.

236. CRYSTAL WATSON ET AL., JOHN HOPKINS CTR. FOR HEALTH SEC., A NATIONAL PLAN TO ENABLE COMPREHENSIVE COVID-19 CASE FINDING AND CONTRACT TRACING IN THE U.S. 3 (2020), https://bit.ly/2XAHwxJ [https://perma.cc/5UCY-U7UD]. That estimate as the minimum requirement was included in a memo the Association of State and Territorial Health Officials submitted to Congress. *See Contact Tracing Workforce*, ASSOC. OF STATE AND TERRITORIAL HEALTH OFFS. (Apr. 10, 2020), https://bit.ly/3CzwHLw [https://perma.cc/58Y9-DDC3].

237. Joshua A. Salomon & Arthur L. Reingold, *Federal Funding for State and Local Contact Tracing Efforts Is an Urgent Priority, and a Bargain*, HEALTH AFFAIRS (May 11, 2020), https://bit.ly/3u1Fq6b [https://perma.cc/9GR6-6Q5G].

238. *Id.*

239. *Compare* Tyler Arnold, *Virginia Uses CARES Act Funding to Launch COVID-19 Tracing App*, CTR. SQUARE (Aug. 5, 2020), https://bit.ly/3hUQs8c [https://perma.cc/9FZV-N65M], *with* Andrea Downey, *Total Cost of NHS Contact-Tracing App Set to Top £35 Million*, DIGITAL HEALTH (Sept. 22, 2020), https://bit.ly/3hVImfI [https://perma.cc/3MPN-D6XE] (describing costs of implementing DTAs in the United Kingdom).

240. Wetsman, *Contact Tracing Apps Promised Big and Didn't Deliver*, *supra* note 167.

241. Arnold, *supra* note 239.

242. Danielle Waugh, *Palm Beach County COVID App: Big Investment, Few Users*, CBS12 NEWS (Dec. 9, 2020), https://bit.ly/3lMNx2D [https://perma.cc/67YN-XJER].

supplement the existing tracing scheme, additional costs should be considered, such as enforcing self-isolation requirements for people diagnosed with COVID-19 and exposed contacts, as well as creating a fully staffed epidemiology entity to investigate and secure people without smartphones.[243] Using DTAs to supplement the work of contact tracers would make DTAs less necessary and beneficial, given the significant overlap in their functions.

Beyond the narrow goal of stopping COVID-19 chains of transmission, DTAs can provide systematic, continuous, and quality data in real time to assist public health authorities in detecting susceptible populations, developing protective policy tailored to the populations' needs, and evaluating the effectiveness of social-distancing policies.[244] Therefore, as an emergency measure, DTAs can offer a more comprehensive and precise model than the traditional method.

However, the contribution of DTAs is still limited. Both DTA-based methods and traditional methods face clear difficulties. In Louisiana, for example, after 7 months and a $30 million investment, the traditional method did not produce the results health experts initially wanted. Aly Neel, a Health Department spokeswoman, noted, "the largest barrier [was] a lack of accurate contact information."[245] The number of people reached was lower than 70 percent of total cases, and fewer than 30 percent of those reached shared close contacts, but these contact-tracing rates have improved slightly in recent months.[246] If the percentage of people alerted by traditional methods seems disappointing, DTAs' percentage is much lower. Some people base DTA success rates on modeling, arguing that a DTA would be effective if 60 percent of the population downloaded it, but actual adoption rates are insufficient.[247] In New York, for example, fewer than 3,000 of 180,000 people diagnosed with COVID-19 were DTA users, and only 800 alerts were sent to exposed contacts.[248] When considering necessity,

243. This is especially concerning given an existing shortage in contact tracers. *See* Jacqueline Howard, *New Data Highlights Shortage of Contact Tracers in Hotspot States*, CNN HEALTH (Jun. 29, 2020, 9:47 AM), https://cnn.it/3EHsSFK [https://perma.cc/DVR9-2JUN].

244. *See* Luca Ferretti et al., *Quantifying SARS-CoV-2 Transmission Suggests Epidemic Control with Digital Contact Tracing*, 368 SCIENCE 1, 1 (2020).

245. Sam Karlin, *Contact Tracing Racks Up $30 Million in Costs but Hasn't Worked Out Like Officials Hoped*, ADVOCATE (Dec. 5, 2020, 7:15 PM), https://bit.ly/3Cy3ctf [https://perma.cc/62KG-QK88].

246. *Id.*

247. *See supra* Part III.A.2.

248. Hogan, *supra* note 166.

lower costs of DTAs in comparison to traditional methods should be considered along with their lower success rate.[249]

Success is harder to measure when the information gathered by DTAs is more private, such as the number of alerts and whether users have self-isolated. When DTAs keep information private, it is nearly impossible to quantify how well they can actually cut transmission or to define what should be considered a success rate.[250] Without this information, it is impossible to compare the success ratio of DTAs to that of traditional contact tracing and to comprehensively assess the necessity of DTAs. It has been argued that using DTAs is an easy way to show that the government is reacting to the pandemic.[251] But, DTAs are not necessarily solutions that afford practical value that benefits scientific evaluation.[252]

The first two steps of proportionality analysis focused on rational reasons to use DTAs based on their suitability and necessity. If DTAs are not suitable or necessary, there is no point in considering their proportionality compared to other policy options. The analysis may end even before we reach Step III. If, on the other hand, we find that society has an interest in the objective of developing more efficient public health surveillance, we should compare DTA-based policy to other options, including the burdens posed by each option on relevant rights. Step III therefore goes beyond assessing how we should apply privacy law or privacy-preserving principles to DTAs and compares DTA-based policy to other policies aimed at confronting COVID-19.

### *C. Step III—Proportionality Stricto Sensu*

"Proportionality *stricto sensu*" is the very heart of the proportionality doctrine. The requirement, in the words of C. J. Dickson, is that there be

> a proportionality between the effects of the measure which are responsible for limiting the Charter right or freedom, and the objective which has been identified as of 'sufficient importance' . . . . Even if an objective is of sufficient importance, and the first two elements of the proportionality test are satisfied, it is still possible

249. *See* Wetsman, *Contact Tracing Apps Promised Big and Didn't Deliver*, *supra* note 167 (quoting Professor Calo).

250. Wetsman, *Contact Tracing Apps Promised Big and Didn't Deliver*, *supra* note 167.

251. *See* Don Macpherson, *COVID-19, Trudeau, Legault, and Do-Something-Ism*, MONTREAL GAZETTE (Mar. 3, 2020), https://bit.ly/3CTY5Eq [https://perma.cc/J5JS-9DYD].

252. McDonald, *supra* note 41.

> that, because of the severity of the deleterious effects of a measure on individuals or groups, the measure will not be justified by the purposes it is intended to serve.[253]

Unlike Steps I and II, Step III of the doctrine does not focus solely on the policy measure taken (the DTA). Rather, it includes an independent evaluation of the government's reasons for using that policy measure to achieve its public goal, and whether those reasons justify the specific restrictions on the freedoms and rights of citizens.[254] It requires assessing whether the strength of the advanced interests justifies the derogation of rights.[255] "Alongside the need for a proper object lies the need for the proper mean."[256] The severity of the intrusion must be proportionate, meaning that greater intrusions should be founded on stronger justifications. "The more basic the right that is being limited, and the more severe the limitation, the greater the weight is that will be required from the considerations justifying that limitation."[257] The burdens and benefits must be fairly distributed across all stakeholders; if they are not, the differences should be proportionate and mitigated.[258]

Past experience demonstrates that the "engagement of individuals and communities is essential for effectively managing the spread of diseases."[259] If the public's compliance is required, it is crucial for policymakers to consider the burdens each policy imposes on individuals and to estimate the sacrifices that people are expected to make. This Article follows this line of analysis by assessing the desirability and relative proportionality of three policies that have been promoting the public interest in different ways: a general shelter-at-home policy, a DTA-based policy, and a traditional contact tracing policy. Direct comparison may not be easy, as

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253. R. v. Oakes, [1986] 1 S.C.R. 103, 139 (Can.).

254. Jackson, *supra* note 23, at 3099.

255. *Id.* at 3117.

256. Barak, *supra* note 59, at 372.

257. *Id.* at 375 (addressing the Israeli Court case HCJ 7052/03 *Adalah v. Minister of the Interior*, (1) 92 (2006) (Isr.) (available at https://bit.ly/3o9Bn5d [https://perma.cc/V54T-XZ2D] ); *see also* R. v. Oakes, [1986] 1 S.C.R. 103, 139–40 (Can.) ("The more severe the deleterious effects of a measure, the more important the objective must be if the measure is to be reasonable and demonstrably justified in a free and democratic society.").

258. *See* PAUL CRAIG & GRAINNE DE BURCA, EU LAW: TEXT, CASES, & MATERIALS 526 (5th ed. 2011) ("In any proportionality inquiry . . . there will be some ascription of weight or value to those interests, since this is a necessary condition precedent to any balancing operation."). *See generally* Bernstein et al., *supra* note 24, at 9–10.

259. Alicia Ely Yamin & Roojin Habibi, *Human Rights and Coronavirus: What's at Stake for Truth, Trust, and Democracy?*, HEALTH & HUM. RTS. J. (Mar. 1, 2020), https://bit.ly/3zzX161 [https://perma.cc/H4C5-PZ2T].

every policy varies in its effects on individual rights by imposing different burdens on different groups of people. Thus, the doctrine of proportionality compares, in a way, oranges to apples.

### *1. Shelter-at-Home Policy*

A shelter-at-home policy restricts and interferes with an individual's freedom of movement to cut the chains of transmission or flatten the curve of infection by minimizing contacts between infected and uninfected people.[260] This severe policy was implemented in many countries prior to reopening. The policy broadly applies to the entire population, regardless of device ownership or the number of contact tracers, and is thus easy to impose and quite effective.[261] But, the policy imposes heavy burdens on the freedom of movement and other fundamental human rights protected by international and U.S. constitutional law.[262]

The burdens of a lockdown policy are unequally distributed. Vulnerable populations in society, such as the sick, the working class, the elderly, and the young, will be more burdened by lockdowns.[263] First, the sheltering-at-home policy affects the rights of domestic abuse victims to bodily safety and the rights of people who need medical care to access health-care centers.[264] Additionally, restricting the freedom of movement might carry emotional and mental costs, including anxiety, depression, and isolation. Many people will pay a high price, including death, due to these long-term and severe restrictions.[265]

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260. Nicholas G. Evans, *The Ethics of Social Distancing*, PHILOSOPHER'S MAG. (May 18, 2020), https://bit.ly/3Cu9oCC [https://perma.cc/T2MF-JBDE]; Maria Godoy, *Flattening a Pandemic's Curve: Why Staying Home Now Can Save Lives*, NPR (Mar. 13, 2020, 7:21 PM), https://n.pr/3CzujnX [https://perma.cc/HT7U-B6EQ].

261. *See* Nils Haug et al., *Ranking the Effectiveness of Worldwide COVID-19 Government Interventions*, 4 NATURE HUM. BEHAV. 1303, 1308 fig.4 (2020).

262. For a discussion on freedom of movement in international law, see G.A. Res. 217 (III) A, Universal Declaration of Human Rights (Dec. 10, 1948). When drafting the U.S. Constitution, the right was thought to be so fundamental that it was not explicitly mentioned. In *Corfield v. Coryell*, 6 F. Cas. 546, 552 (C.C.E.D. Pa. 1823) (No. 3,230), the court recognized "the right of a citizen to pass through . . . any other state" as a fundamental right under the Privileges and Immunities Clause of the U.S. Constitution. For the definition of freedom of movement, see Paul v. Virginia, 75 U.S. 168, 180 (1869) (defining it as the "right of free ingress into other States, and egress from them").

263. *See* Adrianne Haggins & Arline Geronimus, *Racial Disparities in the Time of COVID-19*, UNIV. OF MICH. INST. FOR HEALTHCARE POL'Y & INNOVATION (May 4, 2020), https://bit.ly/3hUKLY4 [https://perma.cc/5G38-F83B].

264. *See* Evans, *supra* note 260.

265. *See id.*

Second, in circumstances where people have unequal backgrounds, closing workplaces may place heavier economic burdens on people whose financial resources are strained due to the lockdown. While some people can keep their jobs and work remotely, others, such as blue-collar workers, who are usually from lower-income households, cannot perform their jobs from the comfort and safety of their homes. If they are unable to physically attend their workplaces, they may be deprived of their incomes. Many people who have no financial reserves and already struggle to make ends meet in regular economic settings cannot support their households for long without the ability to work. Alternatively, low-income workers may have jobs where they are expected to go to work as essential workers, despite the risks of getting infected.[266] Such workers will face increased exposure to COVID-19 and may further expose their families to the virus when they return to their homes.

Finally, a lockdown poses proximate and long-term harms to individuals due to the restrictions on their family and personal life, on their ability to self-develop, and on their right to pursue happiness as they see fit.[267] Lockdowns deprived children of many of the educational system's benefits. Students may be further deprived if they are unable to afford higher education due to the financial harm they or their families suffered during and after the pandemic.[268] Moreover, lockdowns hinder people's ability to form communities and to achieve a sense of belonging, which is at the heart of human flourishing and prosperity.[269] The elderly, particularly those who are sick or without support systems, may have difficulties functioning or interacting with society if municipal, state, or federal programs stop running.[270] At this point, after more than a year of dealing with the coronavirus, a lockdown will probably inflict more harm than provide any benefit, and it may not be ethically justified.[271]

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266. *See* Elizabeth Fernandez & Nicholas Weiler, *Initial Results of Mission District COVID-19 Testing Announced*, UCSF (May 4, 2020), https://bit.ly/3EHrvqM [https://perma.cc/HQ7T-G7JQ].

267. *See generally* Lee Elliot Major & Stephen Machin, Covid-19 and Social Mobility (May 2020) (unpublished manuscript) (on file with author).

268. *See id.* at 5.

269. *See generally* Bernstein et al., *supra* note 24.

270. *See generally id*.

271. *See* Alberto Giubilini, *The (Absent) Ethics of Lockdown*, SPECTATOR (Nov. 7, 2020), https://bit.ly/3EET4AX [https://perma.cc/39KH-JN9R]; *see also The Big Debate: Is Lockdown Wrong*? SPECTATOR (May 26, 2020, 4:52 AM), https://bit.ly/2Zb3ibU [https://perma.cc/TQQ3-JEQG].

When it comes to actual quarantine and movement restrictions, DTAs offer a more efficient and proportionate solution to minimize peripheral violations of an individual's freedom of movement that otherwise occur during lockdowns. Only users exposed to people diagnosed with COVID-19 would have to self-isolate while non-exposed users could move freely. DTA-based policy could therefore be considered constitutional and more proportionate than shelter-at-home policy, albeit it may be less effective in cutting chains of transmission.

### *2. DTA-Based Policy*

A DTA-based policy may not physically restrict movement and therefore only minimally burdens the freedom of movement and enables the economy to keep operating. However, DTAs survey the entire user population whether healthy, carriers of the virus, or sick (rather than surveying only infected individuals like the traditional methods do). DTA use implicates the right to privacy (to be free of surveillance), to freedom of association, and to peaceful assembly—which are constitutional rights and even forms of positive or welfare rights.[272]

The suitability of privacy-preserving DTAs for the narrow purpose of stopping COVID-19 transmissions depends on user compliance. If users comply and self-isolate after receiving an alert, the DTA policy can be effective. However, it remains unclear whether diagnosed individuals are likely to report that they are positive for COVID-19. DTAs do not operate in a vacuum—real life pressures can impede user compliance. A telephone poll by the American Association for Public Opinion Research asked people whether they would use an app that relied on people anonymously reporting to the app that they have been diagnosed with the coronavirus.[273] 50 percent of respondents said that they would probably or definitely not rely on anonymous reporting and 40 percent said that they would be uncomfortable reporting themselves even if positively di-

272. *See* NAACP v. Ala. *ex rel.* Patterson, 357 U.S. 449, 462 (1958) (ruling that the First Amendment protects the freedom of association and that privacy of membership was an essential part of this freedom); *see also*, Roberts v. U.S. Jaycees, 468 U.S. 609, 622 (1984) ("[I]mplicit in the right to engage in activities protected by the First Amendment [is] a corresponding right to associate with others in pursuit of a wide variety of political, social, economic, educational, religious, and cultural ends.").

273. WASH. POST & UNIV. OF MD. CTR. FOR DEMOCRACY AND CIVIC ENGAGEMENT 1, 2 https://bit.ly/3EIsDdx [https://perma.cc/D297-TXZR] (last visited Sept. 26, 2021) (asking whether people will use an app that would rely on people anonymously reporting in the app that they have been diagnosed).

agnosed as carrying the virus.[274] Diagnosed users might refrain from reporting if self-isolation would deprive them of their income, if they could not afford to lose work, or if they could not secure their rights or medical leave through labor and welfare systems. Regardless of DTA effectiveness, neither DTA designers nor policymakers can neutralize social pressures such as fear of being shamed or other self-interests that may prevent compliance. If people refuse to report, DTAs will not be able to contribute to public health.

Moreover, under-reporting will create a moral hazard.[275] Personal duties and obligations will often outweigh an individual's altruistic desire to benefit his or her community. Non-reporting users are often free riders who can benefit from DTAs by protecting their chosen contacts after being alerted about possible infection, without allowing the DTA to alert strangers who are exposed to them. They do not help cut the chain of transmission. Additionally, under-reporting may spur a false sense of safety in others, increase the risk of infection, and lead individuals to relax precautions designed to reduce overall transmission.[276]

### *3. Traditional Public Health Surveillance*

In comparison to the two policies analyzed above, traditional contact tracing imposes a more moderate burden on a smaller portion of the population. The traditional method limits tracing to only people who are diagnosed with COVID-19 and found through the health-care system and their transmission chains, rather than imposing surveillance mechanisms on the entire population. Traditional public health surveillance is achieved by interviewing those who report positive diagnoses and those who suspect they are positive for COVID-19. However, this method may be less efficient because it misses unidentified, exposed individuals. Moreover, policy based on traditional contact tracing is inherently broad in its design unlike DTA-based policy. Public health authorities can use the information they gather to control the pandemic and the benefits that the information would offer can be maximized. When a diagnosed individual is identified, traditional contact tracing requires that the person's specific data pertinent to public health surveillance, such as the person's detailed symptoms and health information, be reported to public health authorities.[277] That information is shared

274. *Id.* at 2.

275. *See* Soltani et al., *supra* note 145.

276. Morley et al., *supra* note 189, at 30.

277. *To Provide Individuals with an Accounting for Disclosures, Does a Covered Entity Have to Document Each Medical Record That May Be Accessed by a*

with the relevant government agency rather than private companies, and thus remains subject to HIPAA rules.[278] Information reported to public health authorities about infected individuals is not considered an unjustified privacy violation, but rather a proportionate exception to the right to privacy for public health purposes.

To conclude, traditional contact tracing lays more moderate burdens on fewer people than a DTA policy does (see Table A). It achieves a more proportionate balance between broader public health goals and minimizing the infringement of individual rights. Despite some blind spots, it is less intrusive, more equitable by inflicting privacy violations that are limited in scope and time on smaller parts of the population, and arguably produces better results than DTAs. For now, more efficient use of limited public health resources should improve simpler, "old-school" public health tools.[279]

*Public Health Authority in The Course of Surveillance Activities That Involve All Patient Records?*, U.S. DEP'T OF HEALTH & HUM. SERVS. (Aug. 28, 2003), https://bit.ly/3hR62li [https://perma.cc/4NPG-9738]. For a discussion on how information is collected in the United Kingdom, see Alex Hern, *In the UK, Public Health England Will Keep Personal Data of People with Coronavirus for 20 Years*, GUARDIAN (May 28, 2020, 9:51 AM), https://bit.ly/39uaZMp [https://perma.cc/8WCR-8S46] (noting that NHS will keep the personal data of people with COVID-19 for 20 years and the personal data of those who are in contact with them for 5 years, including their names, date of births, phone numbers, and home addresses).

278. *See supra* Part III.C.

279. For a discussion on other supporters of this view, see Soltani et al., *supra* note 145; Evan Selinger, *The Lasting Privacy and Civil Liberties Impacts of Responses to COVID-19*, FORUM NETWORK (Apr. 15, 2020), https://bit.ly/3lOeQtf [https://perma.cc/3EAG-UDRN].

TABLE A

| | Rights in question | Beneficiaries | Impact of infringement | Who carries the major burdens? | Quarantine | Consent |
|---|---|---|---|---|---|---|
| Traditional contact tracing | Privacy<br>Freedom of movement | Public health benefits<br>Policy benefits | Only confirmed cases and their chains of transmission | The government (Health-system costs). | Confirmed cases<br>Those identified by contact tracers | Not required |
| DTAs | Privacy<br>Surveillance<br>Freedom of association | Increased for users, but at some percent benefits the public.<br>Commercial benefits for private companies<br>Potential policy benefits | Mass surveillance on all users | Smartphone holders<br>(Policy based on partial data: those whose data is left outside). | Confirmed cases<br>Those alerted | Design dependent |
| Lockdown | Freedom of movement | Public | Entire population | Vulnerable populations: sick, elderly, young, low-income. | Entire population | Not required |

## IV. POLICY IMPLICATIONS

After carefully analyzing different tradeoffs in potential DTA designs and in alternative policies, the Article will now address macro considerations of DTA-based policy. These implications show an even more nuanced discourse, beyond the limited realm of privacy law.

### *A. Who Carries Responsibility for the Public?*

DTA-based policy shifts public health responsibilities from the state to the users, who must (1) download the apps; (2) report confirmed COVID-19 cases; and (3) self-isolate from their families and homes, if alerted to exposure. The public's responsibility goes beyond collaborating and obeying the government—as is the case under a lockdown policy—to include the responsibilities to implement the infrastructure for responding to challenges in the community and to allow their personal devices to collect data.

There are two sides to a legal scheme that thrusts the responsibility onto users. On the one hand, given recent technological innovations, there is logic in relying on smartphone-based technology in 2021 as an infrastructure to confront COVID-19. Assuming people who own smartphones always carry them, DTAs could be an easy

and useful tool to discern the public's daily whereabouts.[280] Direct measures that make compliance easier may be more important than influencing attitudes and values. In an individualistic society, where citizens are held responsible for civilian tasks such as filing their own taxes, it may be proportionate to ask them to take this step to end COVID-19.

On the other hand, approximately one in six Americans do not have smartphones.[281] Rates of smartphone ownership are much lower among seniors, who are particularly vulnerable to the symptoms of COVID-19. 53 percent of people over the age of 65 own smartphones.[282] Many children also do not have smartphones at young ages.[283] Moreover, many apps require technical features that preclude older devices.[284] People with older smartphones who cannot afford to buy newer phones would not be able to benefit from DTA system alerts.[285]

Relying on smartphones that not everyone can purchase provides a misleading database for policymaking. A smartphone-based approach paints a biased picture that systematically excludes some of the most vulnerable populations.[286] Policies based on biased information will inevitably lead to portions of the population and their interests not being accounted for.[287] Policies utilizing other methods may also be biased. A policy based on information gained from traditional contact-tracing methods, for example, may overly

280. *See* Alexandra Arici, *Location History—What Is It and How To Use It?*, AG (Sept. 28, 2018), https://bit.ly/3Av84yT [https://perma.cc/X2KQ-FCX2].

281. S. O'Dea, *Smartphones in the U.S.—Statistics & Facts*, STATISTA (Aug. 4, 2021), https://bit.ly/3onfReO [https://perma.cc/LLH9-CYAA] (stating that 291.15 million people out of the 328-million U.S. population have smartphones).

282. Timberg et al., *supra* note 164; *see, e.g.*, Morley et al., *supra* note 189, at 30 ("In the United Kingdom, around one-fifth of adults do not use a smartphone, and so might be excluded from a digital contact-tracing programme.").

283. Alex Fox, *How Many Kids Have Smartphones? Even More Than You Think*, HILL (Dec. 4, 2019), https://bit.ly/3zHK8XN [https://perma.cc/B7HP-8XLZ] ("By age 11, a little more than half of children in the United States have a smartphone.").

284. *See, e.g.*, Morley et al., *supra* note 189, at 30 ("Australia, for example, has no plans to make its app work with phones that use software older than Apple's iOS 10 or Android 6.0.").

285. *See* Tim Bradshaw, *2 Billion Phones Cannot Use Google and Apple Contact-Tracing Tech*, ARS TECHNICA (Apr. 20, 2020, 12:29 PM), https://bit.ly/3zpdmKY [https://perma.cc/79HF-TFRG] (stating that the number of smartphones around the world without the necessary features is estimated at two billion).

286. McDonald, *supra* note 41 ("Technology markets are so fragmented that it's difficult to deliver relief equally, and pandemic response isn't meant to skew towards the most fortunate.").

287. *See* Schwartz & Crocker, *supra* note 140 ("The population that carries a networked phone at all times is not representative of the overall population . . . .").

focus on either people diagnosed with COVID-19 and their contacts or people who contact public health authorities, which also provides a partial picture.[288] However, resource allocation and policy decisions based on infection rates provide relevant justifications for distinguishing between populations whose privacy is compromised.[289] The traditional method does not systematically exclude the same populations each time based on their access to digital devices because any person can get infected.[290] COVID-19 surfaced biases in the rates of sick people based on socio-economic level, race, and age—groups of people who should be more attended to by authorities.[291] A focus on those populations may correct the biases to some extent by identifying where potential health burdens are located and diverting more resources to over-burdened populations.[292]

Finally, the decision to use technology disincentivizes policymakers from searching for an alternative policy that addresses the needs of the entire population.[293] With time, policies could offer more opportunities for people with smartphones to live freely and co-exist with the virus. For example, such policies would allow them to go to work, school, and theatres, and in extreme cases, people without smartphones would be deprived of certain social goods as long as the pandemic is not over. For those without smartphones to be entitled to the same social goods, supplementary mechanisms would need to be in place, such as fast testing as a condition to

288. *See, e.g.*, Cynthia Cox et al., *How Have Healthcare Utilization and Spending Changed So Far During the Coronavirus Pandemic?*, PETERSON-KFF HEALTH SYS. TRACKER (Mar. 22, 2021), https://bit.ly/3tXWxFU [https://perma.cc/3X3U-VLBB] (noting that calls to health care providers increased during the pandemic).

289. *See* Tussman & tenBroek, *supra* note 101, at 346 ("A reasonable classification is one which includes all persons who are similarly situated with respect to the purpose of the law.").

290. *See* Schwartz, *supra* note 40 (providing that a policy chosen must not intentionally or unintentionally burden people on the basis of categories such as race, ethnicity, religion, nationality, immigration status, gender and sexuality, or disability).

291. *See, e.g.*, Michael Atalla, *What Two Neighborhoods in Chicago Show About Disparities During COVID-19*, HARVARD L. PETRIE-FLOM CTR. (Apr. 28, 2020), https://bit.ly/3hSTZnq [https://perma.cc/Y3XF-5KJB] (explaining that African Americans are infected with and dying from COVID-19 at higher rates than whites).

292. *See* Tamar Sharon, *When Google and Apple Get Privacy Right, Is There Still Something Wrong?*, MEDIUM (Apr. 15, 2020), https://bit.ly/3CxWdAH [https://perma.cc/24V6-LJU8] ("[Data corporations] effectively move from having a seat at the drawing table, where inclusion is (and should be) determined by technical expertise, to having a seat at the *decision-making* table, where inclusion should be (but hardly is) determined by democratic values.").

293. HCJ 6732/20 Association for Civil Rights in Israel v. Knesset (2021) (Isr.).

access places, and use of traditional tracing methods to inform them that they were exposed to the virus. Providing resources, testing, and manpower would increase the value of traditional public health methods.[294] For example, expanding testing to all close contacts of infected people, even if they have not developed symptoms, could increase the effectiveness of traditional contact-tracing programs by as much as 2.2 times.[295] Such an investment could make the benefit of DTAs even less significant, while limiting the derogation of rights.

### *B. The Private-Governmental Nexus*

Our current reality introduces an external non-governmental stakeholder in surveillance—"surveillance intermediaries."[296] Governments cooperate with private internet and communication infrastructure companies to regularly conduct surveillance.[297] The CDC received $500 million to create a COVID-19 "surveillance and data collection system" intended to monitor the virus by aggregating smartphone geolocation data, provided by mobile-advertising companies, to predict where the disease may spread next.[298] Geolocation data has been gathered by telecommunications operators since

294. *See* Mirjam E. Kretzschmar et al., *Impact of Delays on Effectiveness of Contact Tracing Strategies for COVID-19: A Modelling Study*, 5 LANCET PUB. HEALTH 452, 456 (2020) (arguing that optimizing testing and tracing coverage and minimizing tracing delays, for instance with app-based technology, further enhanced contact tracing effectiveness with the potential to prevent up to 80 percent of all transmissions). *But see* McDonald, *supra* note 41 (noting that people seeking more testing than they might otherwise may overwhelm health systems and require preparation of supply and logistics).

295. Temple, *supra* note 235.

296. *See* Alan Z. Rozenshtein, *Surveillance Intermediaries*, 70 STAN. L. REV. 99, 99 (2018) ("Surveillance intermediaries have financial and ideological incentives to resist government requests for user data.").

297. *See, e.g.*, Eva Galperin & Cindy Cohn, *Private Companies, Government Surveillance Software and Human Rights*, ELEC. FRONTIER FOUND. (Oct. 28, 2019), https://bit.ly/2XFToyU [https://perma.cc/YC8M-P2UT] (noting that governments around the world are known to buy private company digital surveillance software track and target people for human rights abuses); Heidi Boghosian, *The Business of Surveillance*, A.B.A. (May 1, 2013), https://bit.ly/3u2gxaw [https://perma.cc/Y7VX-BRU8] (stating that ChoicePoint, a corporate data aggregator, holds an "$8 million contract with the Justice Department [that] permits FBI agents to access the company's database of personal information on individuals" and that it has contracts with 35 other government agencies).

298. *See* Aaron Holmes, *The CDC Will Set Up a Coronavirus 'Surveillance and Data Collection System' as Part of the $2 Trillion Stimulus Bill, Which President Trump Just Signed into Law*, INSIDER (Mar. 27, 2020, 5:41 PM), https://bit.ly/39rNbsw [https://perma.cc/WP23-MTBF].

the coronavirus first broke out.[299] Companies like Microsoft, Google, Apple, and Facebook have been playing a significant role during the pandemic by providing the U.S. government with services that process location and movement data from American smartphones.[300] This collaboration is not new. A few years ago, Edward Snowden's leaks revealed that the U.S. government, through the NSA, relied on the telecommunications provider Verizon to produce daily records of metadata of international calls and relied on companies such as Google and Apple for the collection of internet communications.[301] Should the implications of public health surveillance by private companies be even more alarming than government surveillance for the sake of national security?

Using this private-governmental collaboration to confront the coronavirus is a double-edged sword. On the one hand, "outsourcing" governmental data collection and processing tasks during a pandemic is efficient and may drop the costs of obtaining, keeping, and analyzing data. DTA technologies are not very different from the technologies operated by these companies on a regular basis.[302] Companies have established infrastructures and resources that systematically collect and process user information as part of their ad-targeting business models. They are better equipped to respond to requests for information and to efficiently improve and implement advanced social media and computer algorithms.[303] The pandemic has rendered these capabilities more valuable than ever.

On the other hand, HIPAA's scope is limited to covered entities, such as health-care plans or health-care providers who transmits PHI in electronic form for patient treatment or health-care operation, as defined by the Privacy Rule.[304] Federal statutes perhaps create safeguards for governmental records, but those safe-

299. *See* Kharpal *supra* note 38; Hamilton, *supra* note 38 (noting that countries have been rapidly increasing surveillance of citizens to study and to minimize the spread of COVID-19).

300. *See Cooperation or Resistance?: The Role of Tech Companies in Government Surveillance*, 131 HARV. L. REV. 1722, 1738 (2018) (explaining that technology companies can generate public information); Sheng, *supra* note 10.

301. *See generally* Edward Snowden, Permanent Record (2019).

302. *See* Jeramie D. Scott, *Selling You Out: Mass Public Surveillance for Corporate Gain*, HILL (Mar. 16, 2018, 6:30 PM), https://bit.ly/2XFEjgL [https://perma.cc/ZQ6G-ZM73].

303. *See Cooperation or Resistance?: The Role of Tech Companies in Government Surveillance*, *supra* note 300, at 1737–39.

304. *See* 45 C.F.R. § 164.306(a) (providing that covered entities business associates must ensure the integrity and protect all electronic protected health information); 45 C.F.R. § 160.103 (defining "protected health information" as individually identifiable health information transmitted or maintained by a covered entity or its business associates in any form or medium, which exempts a small number of cate-

guards do not necessarily extend to DTAs.[305] HIPAA may regulate apps owned by covered entities, but neither Google nor Apple meet the definition of a covered entity under HIPAA, and HIPAA's privacy standards do not apply to their and other companies' DTAs.[306] According to HIPAA's Security Rule, contracts between "business associates" (service vendors not covered by HIPAA) and covered entities contain specific, written safeguards on the use and disclosure of PHI pursuant to HIPAA, and the contracts permit both the sharing and protection of required information.[307] However, if a company is not an official business associate, there are no restrictions on the way its apps process data. Private companies can process data for profit without legal limitations because, unlike governmental or public organizations, they lack a system of checks and balances like those that apply to governmental or public organizations.[308] In this no man's land, the absence of significant legislative safeguards threatens privacy and permits other forms of abuse.[309]

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gories of information, such as individually identifiable health information found in employment records held by a covered entity in its role as an employer).

305. *See, e.g.*, 5 U.S.C. § 552a(u)(5)(B). Additionally, the Computer Matching and Privacy Protection Act of 1988 (CMPPA), establishes procedural safeguards regarding an agency's use of Privacy Act records in performing certain types of computer matching. According to the CMPPA, every agency conducting or participating in a matching program shall establish a Data Integrity Board to oversee agreements. *Id.* § 522a(u). However, in the public interest, the Director of the Office of Management and Budget may approve a matching agreement notwithstanding the disapproval of a Data Integrity Board. *See id.* § 522a(u)(5)(B).

306. *Cf.* Sharon Bassan, *Data Privacy Considerations for Telehealth Consumers Amid COVID-19*, 7 J.L. & BIOSCIENCES 1, 5 (2020) (discussing telehealth medicine during COVID-19 and noting that no such agreements were in place with telecommunication companies and that health information was not subjected to HIPAA protections).

307. 45 C.F.R. § 164.504(e); *see also* 45 C.F.R. § 160.103(1)(i)–(ii) (providing that business associates' roles include claims processing, data analysis, utilization review, and billing and that their services to a covered entity are limited to legal, actuarial, accounting, consulting, data aggregation, management, administrative, accreditation, or financial services).

308. Surveillance intermediaries are subject to three major statutory constraints: The Wiretap Act of 1968, governing the interception of electronic and wire communications; the Stored Communications Act of 1986, governing access to stored information; and the Foreign Intelligence Surveillance Act of 1978, governing the collection of foreign intelligence.

309. *See, e.g.*, Lauren Feiner, *Apple and Google CEOs Should Be Held Responsible for Protecting Coronavirus Tracking Data, Says GOP Sen. Hawley*, CNBC: TECH, https://cnb.cx/3lLYj9j [https://perma.cc/2343-GUBT] (Apr. 21, 2020, 5:28 PM) (reporting that Republican Senator Josh Hawley of Missouri asked the CEOs of Apple and Google to hold themselves personally liable for protecting the data collected through their contact-tracing efforts related to the coronavirus).

When data collection is outsourced to private companies without legal protections for user privacy, users have to depend on the goodwill of technology companies to avoid misusing data or violating their privacy.[310] Unlike government entities, commercial stakeholders have their own interests in surveillance that are not necessarily driven by public values or governmental goals. They develop technologies for commercial reasons that may conflict with other interests, including the interests of users.[311] Companies can be held accountable through their privacy policies and terms of use, but those terms often provide minimal privacy protection, if any. According to most privacy policies, companies often have the right, for example, to resell their software, services, and database to others or to use the information themselves for their machine's learning models.[312]

Users pay a high price for the government's outsourcing of data collection to private companies. Because of their involvement in addressing COVID-19 issues, private companies can access and collect data that is normally protected.[313] While some basic liberties are temporarily restricted and then restored (such as the freedom of movement), the right to privacy is indefinitely infringed by surveillance mechanisms that permit the re-use of data after its initial collection. Companies can take the user data they already possess, tie it with the new sensitive information they can access, and use the data in new invasive ways for their own commercial interests. In

310. *See* WASH. POST & UNIV. OF MD. CTR. FOR DEMOCRACY AND CIVIC ENGAGEMENT, *supra* note 273, at 2 (providing that 56% showed distrust in tech companies, 43% showed distrust in universities and public health agencies, and 52% showed distrust in health insurance companies when people were asked how much they trust different sectors to ensure that people who report being diagnosed with coronavirus through their smartphone app remain anonymous).

311. *See* Baker, *supra* note 204.

312. Kalev Leetaru, *Much of Our Government Digital Surveillance Is Outsourced to Private Companies*, FORBES (June 18, 2019, 8:46 PM), https://bit.ly/3CB14RK [https://perma.cc/8BPR-73EQ].

313. *See* Ceyhan, *supra* note 38, at 40–41. Surveillance raises questions beyond the context of public health crisis, such as whether the use of any form of mass surveillance mechanism is justified or not. A reference to Foucault's concept of biopoliticized security is worth mentioning. According to Foucault's biopolitics concept, surveillance is a political technology that focuses on the human body and its movements, which serves to efficiently manage populations by observing, classifying, and sorting individuals. *Id.* at 38. Such surveillance is often imposed in times of uncertainty and can be understood as a governmental form of seeking maximum efficiency for the regulation of bodies and species. Foucault's concepts of biopower as they are reflected in the implications of DTAs on political rights are beyond the scope of this article and should be further explored in future research. *See, e.g.*, *id.* at 38, 44 ("Google for instance has become the most powerful biopolitical surveillance tool as it gathers, processes, and mines large volumes of information about people and groups.").

this process, users are treated as customers whose interests are addressed through business models, risk assessment, and market analysis, rather than as individuals whose rights should be protected by the law.[314]

Most companies undoubtedly operate out of goodwill while assisting governments during the pandemic. Current DTA designs may preserve privacy, and the information retrieved from DTAs may be confidential for now. Indeed, several scholars have argued that Google is doing a relatively good job in protecting user privacy on its COVID-19-related platform.[315] However, the design could easily be changed in the future. It would be easy for companies and developers holding user data to either change their DTA designs and repurpose their platforms or to reuse the stored data for commercial purposes.[316] Apple and Google pledged not to allow any form of targeted advertising within their COVID-19-related apps.[317] However, corporations have reneged on their commitments in the past, diminishing their credibility. For example, DeepMind Health, a collaboration between Google and the NHS, produced a UK-health-related app named "Streams" that later became a Google product, thus betraying consumer trust and Google's own pledge that "data will never be connected to Google accounts or services."[318] Google has also been fined $57 million by French authorities for a lack of transparency regarding how data is collected across its services.[319]

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314. *See* Maria P., *Sample Privacy Policy Template*, PRIVACYPOLICIES, https://bit.ly/3nPmp42 [https://perma.cc/3ZPT-M29T] (June 2, 2021) (addressing privacy law as an "agreement" reflecting companies' business models and referring to users as consumers).

315. VON ARX ET AL., *supra* note 141. *But see* Jessica Davis, *EFF Warns COVID-19 Tracing Apps Pose Cybersecurity, Privacy Risks,* HEALTH IT SEC. (Apr. 29, 2020), https://bit.ly/3CwkEOU [https://perma.cc/8CB7-JWT2] (explaining that industry stakeholders are concerned that Google's contact-tracing technology may be overreaching and raises an inherent risk of cyberattacks).

316. *See* Russel Brandom, *Apple and Google Pledge to Shut Down Coronavirus Tracker When Pandemic Ends*, VERGE (Apr. 24, 2020, 12:15 PM), https://bit.ly/3hVEc7A [https://perma.cc/AL9S-PCQ3].

317. Newton, *Apple and Google Answer Our Questions*, *supra* note 193; Raphael, *supra* note 142.

318. Alex Hern, *Google 'Betrays Patient Trust' with DeepMind Health Move*, GUARDIAN (Nov. 14, 2018, 7:16 AM), https://bit.ly/3o2Zuno [https://perma.cc/HV5E-V9P5]; *see also* Julia Powles, *Why Are We Giving Away Our Most Sensitive Health Data to Google?*, GUARDIAN (July 5, 2017, 11:34 AM) https://bit.ly/2Zp1sod [https://perma.cc/XB5Z-D2F5].

319. Adam Satariano, *Google Is Fined $57 Million Under Europe's Data Privacy Law,* N.Y. TIMES (Jan. 21, 2019), https://nyti.ms/3hUHzvy [https://perma.cc/4DPM-YU7R].

Health, location, and association information is too important to be left solely to a corporation's discretion to arbitrarily declare its protection in its privacy policy. One may argue that if the DTAs are designed to ensure that information is confidential and/or regulated, then a DTA-based policy is proportionate. Yet, the mere implementation of surveillance mechanisms in society is worrisome. A policy that institutionalizes the technological capacities of private companies to survey the public during emergencies renders surveillance mechanisms legitimate and socially acceptable and may endanger our social fabric in the long run.[320] In these circumstances, advancing the public health interest might not justify such an infringement of individual rights.[321]

## CONCLUSION

To conclude, a carefully designed, digital, public health surveillance scheme is an appealing policy. However, by analyzing DTA-based policy through the doctrine of proportionality, this Article has shown that even when proven effective and beneficial, DTA-based policy is riskier and less proportionate than traditional contact-tracing methods. DTAs offer either limited benefits (if privacy-preserving designs are implemented into a narrow policy goal of contact tracing) or an infringement of rights disproportional to the benefits provided (if a broader goal of informing health authorities is considered). Moreover, privacy-preserving designs are insufficient to protect individuals from the long-term ramifications of the mass-surveillance mechanisms employed by commercial companies.

The use of DTAs during COVID-19 is a fascinating case study—it illustrates the tension between the benefits and the perils associated with the use of new technology during an emergency where the public depends on government decisions more than usual and is therefore more willing to accept any solution. But DTAs should not be implemented before society has had the opportunity to profoundly debate their implications.[322] In an ideal world, prior to embedding any surveillance technology in society, legislation should carefully temper a company's economic prerogatives with a

320. *See generally* Kim Lane Scheppele, *Law in a Time of Emergency: States of Exception and the Temptations of 9/11*, 6 U. PA. J. CONST. L. 1001 (2004) (examining how the extraordinary tends to become ordinary and how exceptional measures can become accepted norms as people adjust to a continuing emergency without promise of an end).

321. *See* Barak, *supra* note 59, at 371.

322. *See* Annette Zimmerman et al., *Technology Can't Fix Algorithmic Injustice*, BOS. REV. (Jan. 9, 2020), https://bit.ly/3zu5OXs [https://perma.cc/DVM2-ZXE6].

customer's privacy interest.[323] In reality, such legislation requires legislators to negotiate with the most influential entities in the market, and it is extremely hard to pass. Future discussions should ask when will a threat to public health be severe enough to justify a public policy that permits the collection and use of sensitive personal information, and how different goal definitions affect social perceptions of the public interest and/or individual rights. Society should decide how much it values public health, privacy, and digital surveillance, and whether it is willing to replace privacy for public health or vice versa.[324]

The doctrine of proportionality reflects the limitations of legal discourse and the benefits of a broader, more nuanced approach to law, technology, and society. Privacy law considers a limited range of micro-level issues and misses the broader macro-level picture of how technology builds society, establishes power relations, and promotes values that often contradict our assumptions about the freedom and convenience created by technology. The question of whether to dismiss technology will not arise often, and discourse on how to regulate it will occur only long after technology is available for use. The proportionality framework considers broader implications than does the traditional data and privacy law scheme, and it leads to different results. If left unregulated, technology will be subject to market forces and controlled by private companies rather than the government. Under the privacy-law approach, legal considerations are applied to the design of technology and offer micro-level technological solutions, detached from macro-level social considerations and specific social contexts. Proportionality identifies issues that are under-addressed within the privacy-law approach and offers an opportunity to examine how governments achieve and justify the acceptance and assimilation of new technological policy measures, which may take societies in new directions.

323. *See* McDonald, *supra* note 41; *see, e.g.*, Bassan, *supra* note 306, at 10–11 (suggesting expanding HIPAA coverage or using FTC § 5 for the similar case of telehealth); Matt Cagle, *Facebook, Instagram, and Twitter Provided Data Access for a Surveillance Product Marketed to Target Activists of Color*, ACLU NORCAL (Oct. 11, 2016), https://bit.ly/2Zp1lsN [https://perma.cc/PT2D-EC56] ("Social media companies should not provide data access to developers who have law enforcement clients and allow their product to be used for surveillance . . . .").

324. *See* Letter from Robert Menendez et al., U.S. Senator, to Tim Cook, CEO, Apple (Apr. 3, 2020), [https://perma.cc/2XQL-XL9Q] (writing in a letter to Apple that "Americans should not have to trade their privacy at the expense of public health needs.").

## APPENDIX A—PRIVACY-PRESERVING DESIGN SUGGESTED FOR COVID-19 DTAS

The data reported in *Appendix A* demonstrates an agreement that apps should collect, process, retain, use, store, and disclose the least amount of personal information necessary to ensure the accuracy and effectiveness of DTAs (i.e., the principle of data minimization).

| | CDC[325] | WHO[326] | Microsoft[327] | Canadian Privacy Commiss.[328] | Johns Hopkins[329] | NHS[330] | EU Parl.[331] | EU Commiss.[332] | EDPB[333] |
|---|---|---|---|---|---|---|---|---|---|
| Necessity | | | x | x | x | | | x | x |
| Authority/ lawfulness | | | | x | x | | x | | x |
| Impact | | | | | x | x | | | |
| Value/fairness | | | | | x | x | x | | |
| Community engagement | | x | | | x | | | | |
| Communication | | x | | | | | | | |
| Consent Voluntariness | x | x | x | x | x | | | | x |
| Anonymity | x | x | | x | x | | | | x |
| Transparency | x | x | | x | x | x | x | | x |
| Knowledge of terms | x | | | | | | | | |
| Accountability | | x | | x | x | x | | | |
| Privacy | x | x | | | x | x | x | | x |
| Security Safeguards | x | x | x | x | x | x | | x | x |
| Data minimization | | x | x | | x | | x | x | x |
| Limited Use/ Time | | x | x | x | x | | x | x | x |
| Restricted access | x | | x | | | | | | |
| Data Integrity | x | x | | | | | x | x | |
| User Control | x | | x | | | x | | x | |
| Privacy oversight | x | x | | | x | | | | |

325. *Covid-19 Contact Tracing for Health Departments*, CDC, https://bit.ly/3krA00S [https://perma.cc/VJ9Q-8ECW] (May 17, 2020).

326. *Ethical Considerations to Guide the Use of Digital Proximity Tracking Technologies for COVID-19 Contact Tracing*, WHO (May 28, 2020), https://bit.ly/2XKLcgw [https://perma.cc/RVL6-ETM6].

327. Julie Brill & Peter Lee, *Preserving Privacy While Addressing COVID-19*, MICROSOFT (Apr. 20, 2020), https://bit.ly/3nX9MWi [https://perma.cc/P5SJ-XAHF].

328. *Supporting Public Health, Building Public Trust: Privacy Principles for Contact Tracing and Similar Apps*, OFF. OF THE PRIVACY COMM'R OF CAN. (May 7, 2020), https://bit.ly/3nS59wI [https://perma.cc/7Q4D-5PWA].

329. DIGITAL CONTACT TRACING FOR PANDEMIC RESPONSE 78 (Jeffrey P. Kahn ed., 2020).

330. Letter from Jonathan Montgomery, Chair, NHS Ethics Advisory Bd., to Sec'y of State (Apr. 24, 2020), https://bit.ly/2YfEnDQ [https://perma.cc/9B5P-BVHT] (identifying seven principles to ensure that the COVID-19 contact-tracing app is ethical: value, impact, security, privacy, accountability, transparency, and control).

331. *See generally* Dumbrava, *supra* note 188.

332. Eur. Comm'n, *Communication from the Commission—Guidance on Apps Supporting the Fight Against COVID 19 Pandemic in Relation to Data Protection,* 2020 O.J. (C 124) (Apr. 17, 2020), https://bit.ly/3u1NLXa [https://perma.cc/4975-CQWW]; European Commission Press Release IP/20/669, Coronavirus: Guidance to Ensure Full Data Protection Standards of Apps Fighting the Pandemic (Apr. 16, 2020), https://bit.ly/3CwivTm [https://perma.cc/UJY9-UTWE].

333. Jelinek, *supra* note 229.

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