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Covid-19 and Contact Tracing: A Study in Regulation by Technology

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Abstract

A common theme of regulatory responses to Covid-19 has been the use of technology: in attempts to map the virus and its transmission, relax lockdowns and restart economies, and search for a vaccine to end the pandemic, technologies have held centre stage. Using the example of contact tracing, this Comment considers the significance of states' reliance on technologies to achieve their regulatory objectives and some of the issues it raises. While most of the discussion around contact tracing systems has focused on privacy and data protection, their use also has wider implications for individuals and communities, particularly in the case of mobile apps. These concern legality, moral responsibility and community, autonomy, and democracy, which even expansive conceptions of privacy and data protection may not fully accommodate.

1 Introduction

In the regulation of Covid-19, technologies have held centre stage. From the humble face mask, invented as an anti-epidemic measure in the early 20th century,[1] to more advanced

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[1] Christos Lynteris, 'Plague Masks: The Visual Emergence of Anti-Epidemic Personal Protection Equipment' (2018) 37 *Medical Anthropology* 442–457.

technologies as befit the current digital and genomic age,[2] they have been central to governments' Covid-19 strategies.[3] Especially prominent among the latter have been the range of data-driven technologies in use around the world to support manual and automated contact tracing: to map the virus and its spread (by tracing peoples' contacts), understand the virus and how it manifests (by tracking peoples' symptoms), and identify people for testing, isolation, and certifications of immunity.[4] As countries seek to reopen their economies and encourage people back to work, contact tracing technologies are likely to remain a focus of Covid-19 strategies in Europe and elsewhere.

From a regulatory perspective, however, contact tracing technologies raise serious issues of legitimacy at risk of being overshadowed by considerations of efficacy owing to the importance of their public health objectives.[5] To be effective they need to: (a) be widely adopted;[6] (b) collect and process large volumes of data, including about peoples' contacts

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[2] Christos Lynteris and Branwyn Poleykett, 'The Anthropology of Epidemic Control: Technologies and Materialities' (2018) 37 *Medical Anthropology* 433–441, 443.

[3] A growing number of companies and other organisations are also introducing contact tracing systems, including automated systems. See Laura Miller, 'Governments are enforcing their own contact tracing to track employees', *WIRED UK* 22 June 2020, https://www.wired.co.uk/article/contact-tracing-offices-coronavirus; Julian Morris and Adrian Moore, 'The COVID-19 Status App: A Risk-Based Tool to Enable Businesses to Reopen While Limiting the Spread of SARS-COV-2' (July 2020), https://reason.org/wp-content/uploads/coronavirus-response-4-status-app-limit-spread.pdf.

[4] For an overview of contact tracing, see ECDC, 'Contact tracing for COVID-19' (April 2020), https://www.ecdc.europa.eu/sites/default/files/documents/COVID-19-Contract-tracing-scale-up.pdf. On the automated systems in use or development in Europe and elsewhere currently, see Patrick Howell O'Neill, Tate Ryan-Mosley and Bobbie Johnson, 'A flood of coronavirus apps are tracking us', *MIT Technology Review* 7 May 2020, https://www.technologyreview.com/2020/05/07/1000961/launching-mittr-covid-tracing-tracker/?itm_source=parsely-api; European Global Navigation Satellite Systems Agency, https://www.gsa.europa.eu/GNSS4Crisis. On immunity certificates specifically, see Siddharth Venkataramakrishan, 'Start-ups across Europe race to develop immunity passports', *The Financial Times* 26 May 2020, https://www.ft.com/content/a5721020-5180-4cb4-ac7e-a464c65f3028.

[5] On the efficacy of contact tracing systems, see Rory Cellan-Jones and Leo Kelion, 'Coronavirus: The great contact-tracing apps mystery', *BBC News* 22 July 2020, https://www.bbc.co.uk/news/technology-53485569 (mobile apps); Matt Burgess, 'Government faces court over NHS Test and Trace privacy failings', *WIRED UK* 3 July 2020, https://www.wired.co.uk/article/nhs-test-and-trace-data-protection (the UK's web-based manual system).

[6] How widely contact tracing systems need to be adopted in order to be effective is unclear. A prominent academic study of mobile apps suggested that while 60 per cent usage would be required to stop the pandemic, a single infection might be averted by every one or two app users: https://www.research.ox.ac.uk/Article/2020-04-16-digital-contact-tracing-can-slow-or-even-stop-coronavirus-transmission-and-ease-us-out-of-lockdown. A more recent study suggests that mobile apps will need to be used by more than 75 per cent of the population, and in conjunction with large-

and health; (c) make that data accessible to governments, as well as to doctors, health officials, and research scientists;[7] and (d) support rapid decision-making and regulatory intervention. Where the data are stored or processed using proprietary systems or services, they may also be accessible to private industry.[8] And so the question can be been asked whether the use of contact tracing systems is consistent with liberal democracy, or whether it marks a shift to tech-authoritarianism.[9] What will be the effects of using them in European countries, and how should their legitimacy as part of a government's or organisation's Covid-19 strategy be assessed?

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scale manual contract tracing, if they are to reduce the Covid-19 reproduction number to below 1: Isobel Braithwaite et al, 'Automated and partly automated contract tracing: a systematic review to inform the control of COVID-19', *The Lancet Digital Health* 19 August 2020, (last accessed 4 October 2020).

[7] Data security requirements, including under Regulation (EU) 2016/679 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data [2016] OJ L 119/1, as corrected (GDPR) Art. 5.1(f), have been said to require the sharing of contact tracing data with intelligence agencies. See, e.g., Consent to Activities Related to the Security of NHS and Public Health Services Digital Systems (Coronavirus) Directions 2020 (requiring the disclosure to the UK intelligence agency GCHQ of data processed by the National Health Service (NHS) Covid-19 app to support 'any activities carried out by GCHQ for the purpose of supporting and maintaining the security of any [NHS, public health, or related] network and information system': https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/879049/Security_of_NHS_and_Public_Health_Services_Digital_Systems_Coronavirus_Directions_2020.pdf.

[8] Depending on the nature of the systems or services and the terms of their provision. In the UK this has been a source of controversy with respect to the NHS's automated and manual systems: see, e.g., Eerke Boiten, 'We need to know more about the government's COVID-19 data project – and the companies working on it', *The Conversation* 24 June 2020, https://theconversation.com/why-we-need-to-know-more-about-the-uk-governments-covid-19-data-project-and-the-companies-working-on-it-141078 (regarding the NHS Covid-19 app); Matt Burgess, 'The Government admits that NHS Test and Trace programme is unlawful', *WIRED UK* 20 July 2020, https://www.wired.co.uk/article/nhs-test-and-trace-unlawful-data (regarding the NHS Test and Trace program). Criticism has also been directed at governments for failing to make sufficient use of private sector expertise: see, e.g., Sarah Neville, 'Covid-19 unmasks weaknesses of English public health agency', *The Financial Times* 22 July 2020, https://www.ft.com/content/e149101a-1c93-4b0a-bc12-14ca8bf11b0e; also Austill Stuart, 'In Early Stages of Coronavirus Fight, the Private Sector Was Ready to Help, But the Federal Government Didn't Let It', *reason foundation* 23 March 2020, https://reason.org/commentary/in-early-stages-private-sector-was-ready-to-help-fight-coronavirus-but-federal-government-didnt-let-it/.

[9] On the nature of tech-authoritarianism, and the use of networked platforms by states to surveil and control their citizens specifically, see Rebecca MacKinnon, 'Liberation Technology: China's 'Networked Authoritarianism'' (2011) 22 *Journal of Democracy* 32–46; Tobias Burgers and David RS Robinson, 'Networked Authoritarianism is on the Rise' (2016) 1 *Security and Peace* 248–252; also Nicholas D. Wright, 'Artificial Intelligence and Domestic Political Regimes' in *Artificial Intelligence, China, Russia, and the Global Order* (Air University Press 2019) 21–34.

2 Privacy and Data Protection Rights

To date, discussions of the legitimacy of contact tracing technologies have focused largely on individual rights of privacy and data protection.[10] Undoubtedly, there are significant issues here. By collecting, storing, sharing, and using personal data, they interfere with Article 8 of the European Convention on Human Rights[11] and Articles 7 and 8 of the European Charter of Fundamental Rights.[12] Under each instrument, the mere storage of data regarding an individual's private life interferes with her rights, regardless of their subsequent use.[13] If the data are stored without her knowledge, the interference is especially serious. As explained by the Court of Justice in the *Digital Rights Ireland* case, the reason is the feeling that such retention 'is likely to generate in the minds of [people] … that their private lives are the subject of constant surveillance'.[14] This and related decisions underline the dignitarian basis of European privacy and data protection laws, in which even subjective feelings of vulnerability to exploitation by others can impede an individual's liberty sufficiently to trigger legal protection.[15]

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[10] From a vast and growing literature, see, e.g., Hyunghoon Cho, Daphne Ippolito and Yun William Yu, 'Contact Tracing Mobile Apps for COVID-19: Privacy Considerations and Related Trade-offs', *arXiv:2003.11511v2* (30 March 2020), https://arxiv.org/abs/2003.11511v2; Burgess (n. 5). Cf. Ada Lovelace Institute, 'Exit through the App Store?' (20 April 2020), https://www.adalovelaceinstitute.org/our-work/covid-19/covid-19-exit-through-the-app-store/ (considering the wider societal implications of contact tracing apps).

[11] European Convention for the Protection of Human Rights 1950 (entered into force 3 September 1953), as amended (ECHR). Article 8.1 provides that '[e]veryone has the right to respect for his private and family life, his home and his correspondence', and Article 8.2 prohibits the interference by a public authority with the exercise of this right 'except such as is in accordance with the law and is necessary in a democratic society in the interests of national security, public safety or the economic well-being of the country, for the prevention of disorder or crime, for the protection of health or morals, or for the protection of the rights and freedoms of others'.

[12] Charter of Fundamental Rights of the European Union [2012] OJ C 326/391 (CFR). Article 7 provides that '[e]veryone has the right to respect for his or her private and family life, home and communications', and Article 8 provides that '[e]veryone has the right to the protection of personal data concerning him or her' (Art. 8.1), that '[s]uch data must be processed fairly for specified purposes and on the basis of the consent of the person concerned or some other legitimate basis laid down by law' (Art. 8.2), that '[e]veryone has the right of access to data which has been collected concerning him or her, and the right to have it rectified' (Art. 8.2), and that '[c]ompliance with these rules shall be subject to control by an independent authority' (Art. 8.3).

[13] *S. and Marper v. The United Kingdom* [2008] ECHR 1581 [67], http://hudoc.echr.coe.int/fre?i=001-90051.

[14] Joined Cases C-293/12 and C-594/12, *Digital Rights Ireland Ltd v. Minister for Communications, Marine and Natural Resources* ECLI:EU:C:2014:238 (8 April 2014) [37].

[15] On dignitarian conceptions of privacy in Europe, see James Q. Whitman, 'The Two Western Cultures of Privacy: Dignity Versus Liberty' (2004) 113 *The Yale Law Journal* 1152–1221; Bart van der Sloot, 'A

Nonetheless, even in Europe it has generally been accepted that contact tracing technologies can meet privacy and data protection objections if designed and regulated appropriately.[16] Under the ECHR, this requires their data processing to be consistent with law, pursue a legitimate aim, and be necessary in a democratic society.[17] Under the CFR, it requires that they be governed by 'clear and precise' legal rules, and restricted by 'minimum safeguards … to what is strictly necessary' to meet their legitimate objective.[18]

In recognition of this, companies devising contact tracing technologies have been concerned from the outset to emphasize the privacy and security protections built into their systems;[19] with bigger players, such as Apple and Google, also requiring that data controllers and processors using their systems abide by the companies' own privacy and data security standards.[20] So too in seeking to engender public support for contact tracing systems, governments have underlined their individual rights protection. In England for example, the NHS assured the public early on that its Covid-19 app would 'not hold any personal information about [users; would not be] able to track [users'] location [or] be used for monitoring [and would not be able to] access [users'] personal identity or … other information [from their] phone[s]'.[21] However, the app did record the first half of users' post codes, their phones' unique Bluetooth IDs, and the IDs of all the other devices their phones

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New Approach to the Right to Privacy, or How the European Court of Human Rights Embraced the Non-Domination Principle' (2018) 34 *Computer Law and Security Review* 539–549. On republican conceptions of liberty and the importance of subjective attitudes and feelings to them, see Philip Pettit, 'Liberalism and Republicanism' (1993) 28 *Australian Journal of Political Science* 162–189, 182–183.

[16] See, e.g., Ada Lovelace Institute (n. 10) 18 ("the deployment of digital means to monitor and track the spread of a disease, if implemented proportionately and with appropriate safeguards, may meet the thresholds which make them legitimate under human rights law"). For proposals on how to integrate privacy-by-design principles into contact tracing technologies, see Justin Chan et al, 'PACT: Privacy Sensitive Protocols and Mechanisms for Mobile Contact Tracing' *arXiv:2004.03544* (7 May 2020), https://arxiv.org/abs/2004.03544.

[17] Art. 8.2 ECHR (n. 11); also *S. and Marper* (n. 13) [95]–[104].

[18] Opinion 1/15, *Draft agreement between Canada and the European Union* ECLI:EU:C:2017:592 (26 July 2017) [39].

[19] Venkataramakrishan (n. 4).

[20] Patrick McGee et al, 'Coronavirus apps: the risk of slipping into a surveillance state', *The Financial Times* 28 May 2020, https://www.ft.com/content/d2609e26-8875-11ea-a01c-a28a3e3fbd33. For details regarding the Apple and Google technology see https://www.apple.com/uk/newsroom/2020/04/apple-and-google-partner-on-covid-19-contact-tracing-technology/.

[21] https://covid19.nhs.uk/privacy-and-data.html.

came into contact with. For this reason, and contrary to the assurance given,[22] it did involve the processing of users' personal data, albeit 'rendered anonymous in such a way that the data subject is not or no longer identifiable', so as to fall within the scope of the European Data Protection Regulation.[23] In addition, it was expected that users would record their symptoms through the app: to enable people needing testing to be identified, and their recent contacts to be traced and automatically notified. If a person tested positive, human contact tracers were also able to access the personal details of their recent contacts from the central site where the data were stored, and to follow up with them separately under the Government's manual (Test and Trace) program.[24] Since the app's redevelopment this has changed: a user who tests positive for Covid-19 can use the app to identify and notify her contacts automatically, but must elect to do so. If she does not, human contact tracers must contact her via Test and Trace, and require her to disclose the details of her recent contacts manually, by phone or through the Test and Trace website.[25] More generally, and in contrast to Test and Trace (participation in which is compulsory[26]) use of the Covid-19 app is voluntary, consistent with European Data Protection Board guidance.[27] Early on however,

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[22] See also Andrea Downey, 'NHS partners with tech giants to develop Covid-19 data platform', *digitalhealth* 6 April 2020, https://www.digitalhealth.net/2020/04/nhs-partners-with-tech-giants-to-develop-covid-19-data-platform/ (quoting a statement by NHSX CEO, Matthew Gould, that '[a]ll the data in the data store is anonymous').

[23] As pseudonymous data: GDPR Recital 26. See also the NHS's Data Protection Impact Assessment of the version of the app trialed on the Isle of Wight: *NHS Covid-19 App Pilot Live Release Isle of Wight Version 1.0* (6 May 2020) https://faq.covid19.nhs.uk/DPIA%20COVID-19%20App%20PILOT%20LIVE%20RELEASE%20Isle%20of%20Wight%20Version%201.0.pdf. A revised Data Protection Impact Assessment has been published for version 2 of the NHS Covid-19 app: https://www.gov.uk/government/publications/nhs-covid-19-app-privacy-information/the-nhs-test-and-trace-app-early-adopter-trial-august-2020-data-protection-impact-assessment#the-data-controller (last accessed 4 October 2020).

[24] Test and Trace is a web-based program established by Public Health England to enable the identification and contacting of people who may have been infected with Covid-19. People contacted under the program are required to disclose a range of personal information about themselves and the people they've been in contact with. For details (and the website), see https://contact-tracing.phe.gov.uk and https://contact-tracing.phe.gov.uk/help/privacy-notice.

[25] https://www.gov.uk/guidance/nhs-test-and-trace-how-it-works (last accessed 4 October 2020).

[26] Effective since 2 July 2020, this extends also to organisations in a range of sectors, which are required to collect details and maintain temporary records of staff, customers and visitors to their premises for provision to NHS Test and Trace on request: https://www.gov.uk/guidance/maintaining-records-of-staff-customers-and-visitors-to-support-nhs-test-and-trace.

[27] EDPB Guidelines 04/2020 on the use of location data and contact tracing tools in the context of the COVID-19 outbreak (21 April 2020) para. 8, https://edpb.europa.eu/sites/edpb/files/files/file1/edpb_guidelines_20200420_contact_tracing_covid_with_annex_en.pdf (advising that all contact tracing systems be made voluntary on privacy and data protection grounds).

the Government suggested it might also be made compulsory if an insufficient number of people used it voluntarily.[28] In that case, the legal basis of its data processing would shift from user consent to protection of the public's or individuals' 'vital' interests,[29] with the requirements for its substantive justification essentially unchanged. Even if the Government does not make use of the app compulsory, it remains open to organisations to do so, in an effort to secure the safety of their premises. In this case, the organisation would join the Government as 'data controller' for data protection purposes.

As this discussion reflects, key issues when considering the implications of European privacy and data protection laws for contact tracing technologies are whether the systems they support are manual or automated, involve centralised or de-centralised data storage and processing, and are voluntary or compulsory. What matters ultimately for EU and ECHR purposes are that the technologies pursue a legitimate aim by proportionate means, and ensure a sufficient level of data security.[30] To date, apps have struggled to fulfil these requirements. In June 2020 for example, the Norwegian Government withdrew its Smittestopp app from public use and undertook to delete the data it had generated following an assessment by the local Data Protection Authority that the app failed to meet them. In the Authority's assessment, it collected too much data, including continuous data about users' location and contacts; was insufficiently effective to reduce Covid-19 re-transmission, owing to its limited take-up and the low presence of Covid-19 in the community; and involved processing for scientific (analytic and research) purposes that users were not able properly to reject.[31] Among other things, the assessment highlights the paradoxical situation facing European governments deploying contact tracing technologies, including in support of manual tracing. Such systems need to be sufficiently

[28] James Gallagher, 'Coronavirus: Test and trace system will start on Thursday', *BBC News* 27 May 2020, https://www.bbc.co.uk/news/health-52820592.

[29] GDPR Art. 5.1(a) (requiring that personal data be 'processed lawfully, fairly and in a transparent manner in relation to the data subject') and Art. 6.1(a) (permitting data processing with data subjects' consent), (d) (permitting data processing in the vital interests of data subjects or other natural persons), (e) (permitting data processing in the public interest). Data processing in the public interest must be supported by Union or domestic law: Art. 6.2. For data processing by private organisations, see also Art. 6.1.(f) (permitting processing where necessary for the purposes of the legitimate interests pursued by the controller or by a third party, subject to the interests or fundamental rights and freedoms of the data subject).

[30] See GDPR Art. 5.1 (principles relating to processing of personal data).

[31] EDPB National News, 'Temporary suspension of the Norwegian Covid-19 contact app' (22 June 2020), https://edpb.europa.eu/news/national-news/2020/temporary-suspension-norwegian-covid-19-contact-tracing-app_en.

(demonstrably[32]) effective to be deemed necessary, and are more likely to be if their use is mandatory and, in the view of some,[33] if their data are stored and processed centrally, each of which entails a more serious interference with privacy and data protection rights. Hence the ongoing focus of public debates on the efficacy of contact tracing systems.

In England, the Government ended the trial of its original NHS Covid-19 app in June 2020, before announcing a delay in the app's general roll out owing to technical problems with its operation, including its ability to identify contacts among Apple devices.[34] Soon after, the Government reported its intention to move from a system of centralised data storage and processing to a decentralised system, as exists in Germany, Italy, Poland and Iceland, among other states, and to adopt the technology developed by Apple and Google.[35] At the same time, it de-emphasised the app's centrality to its Covid-19 strategy, and shifted attention to Test and Trace and compulsory face coverings instead.[36] It also changed its work guidance from 'work from home where possible' to 'do as your employer requests', and directed employers to ensure that on-site conditions are Covid-19 safe,[37] shifting responsibility for managing the pandemic to employers and private industry. Already some organisations had been introducing their own contact tracing systems to supplement Test and Trace,[38] raising questions about how they would seek to resolve the tension between efficacy and

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[32] GDPR Art. 5.2 (requiring that data controllers 'be responsible for, and be able to demonstrate compliance with' the principles relating to the processing of personal data in Art. 5.1., including necessity).

[33] See, e.g., https://www.ncsc.gov.uk/blog-post/security-behind-nhs-contact-tracing-app.

[34] UK Government Press Release, 'Next Phase of NHS coronavirus (COVID-19) app announced' (18 June 2020), https://www.gov.uk/government/news/next-phase-of-nhs-coronavirus-covid-19-app-announced. For discussion, see Gian Volpicelli, 'What's really happening with the NHS Covid-19 app trial', *WIRED UK* 16 June 2020, https://www.wired.co.uk/article/contact-tracing-app-isle-of-wight-trial; Rowland Manthorpe, 'Coronavirus: The inside story of how government failed to develop a contact-tracing app', *sky news* 21 July 2020, https://news.sky.com/story/coronavirus-the-inside-story-of-how-government-failed-to-develop-a-contact-tracing-app-12031282.

[35] UK Government Press Release (n. 34).

[36] The wearing of face masks in shops was made compulsory in Scotland and England in July 2020, after previously been made compulsory on public transport.

[37] Effective 1 August 2020: see Jim Pickard, Daniel Thomas and Chris Giles, 'Boris Johnson encourages cautious return to work in offices', *The Financial Times* 17 July 2020, https://www.ft.com/content/f5256294-ad5f-4104-9bce-e53e38e6ec90.

[38] N. 3. For example, the University of Oxford proposed early on to introduce a manual contact tracing system for students and staff from September 2020: https://www.ox.ac.uk/coronavirus/planning/michaelmas-2020/health.
It also encourages students to use the redeveloped NHS Covid-19 app: https://www.ox.ac.uk/coronavirus/students/health (last accessed 4 October 2020).

legitimacy, including whether they would make their systems compulsory, initially or after a period.

As of September 2020, the contact tracing systems available for use by organisations to secure the safety of their premises include the redeveloped NHS Covid-19 app. In addition to its peer-to-peer storage system, the app differs from its predecessor in significant respects. When downloaded, it assigns the device a randomly generated identification number, which changes daily. The app also generates a second code, which changes every 15 minutes. Both identification numbers and codes are automatically deleted from the device on which they are stored after 14 days. If two devices on which the app has been downloaded come into contact, they exchange their codes, the time of contact, and their signal strength (indicating their distance) via Bluetooth. This information is then used to determine algorithmically the risk of the encounter. If a user registers Covid-19 symptoms, the app identifies her as 'feeling unwell' and, with her consent, shares her device's daily codes with the people she has had recent 'high risk' encounters with, via a central government server, with a request that they self-isolate. Codes shared with the government are again deleted automatically from its server after 14 days. In the meantime, the symptomatic user is also asked to self-isolate, and invited to order a test. If she orders a test, she enters the Test and Trace program. If she does not order a test, an assessment of the likelihood of her being infected is made on the basis of the number of her identified contacts reporting symptoms. In addition to this alert and testing procedure, the app provides users with information designed to enable them to assess their risk of exposure to Covid-19, including information regarding its prevalence in different geographical locations. The app also enables users to register their attendance at a venue by using their device to scan a QR code, so that the venue can be notified if a visitor registers symptoms or tests positive.

There is no doubt that the privacy and data protection issues presented by contact tracing systems are significant. They have also proved difficult to assess, particularly in the case of automated systems, owing to the opacity of their operation and underlying technology, and the fast-changing environment of Covid-19. Another issue in this respect, as much conceptual as empirical, concerns the impact of the systems on the social lives of individuals and wider public interests, and the uncertainty regarding its accommodation within traditional privacy and data protection analyses. In what follows, certain aspects of this impact are considered. It is argued that even if contact tracing apps are able to meet legal standards sufficiently to justify the interference with privacy and data protection rights that they entail, important issues regarding their legitimacy may remain, for reasons of legality, moral responsibility and community, autonomy, and democracy.[39]

[39] Cf. Tamar Sharon, 'Self-Tracking for Health and the Quantified Self' (2017) 30 *Philosophy & Technology* 93–121 (discussing self-tracking for health, and arguing that the debates there have been

3 Legality

As with other technologies, contact tracing apps share many features of law, which is what makes them such effective regulatory mechanisms. Like law, they are rule-based systems, and like law, they guide social behavior: directly, by alerting people to the need for testing and quarantine; and indirectly, by giving people the confidence they need to leave their homes, and informing wider lockdown and other regulatory policies. However, unlike the legal systems of liberal democratic regimes, the means by which they operate, and the regulatory decisions they support and generate, are often opaque and insusceptible to formal challenge. For this reason, they are at risk of lacking the essential rule of law qualities on which legal systems depend for their existence and legitimacy. Only if the technologies' design and code are fully open to public scrutiny, and the decisions they support and generate are subject to challenge and human review on appropriate substantive and procedural grounds, might they overcome this objection.

The importance of legality has been recognised by European courts, and built into privacy and data protection standards. For example, Article 8 ECHR requires that any measure interfering with individuals' privacy rights 'be compatible with the rule of law', in the sense of being 'adequately accessible and foreseeable, that is, formulated with sufficient precision to enable the individual – if need be with appropriate advice – to regulate his conduct.'[40] This reflects a standard 'rule of law' conception as requiring an aspiration to fulfill maximally certain systemic criteria essential to rule-based governance: that the requirements of citizens are expressed in general rules, and that those rules are published, prospective, intelligible, consistent, feasible, stable, and predictably interpreted and enforced.[41] Consistent with this conception, the Strasbourg Court has further held that '[f]or domestic law to meet [Article 8 rule of law] requirements, it must afford adequate legal protection against arbitrariness and accordingly indicate with sufficient clarity the scope of discretion conferred on the competent authorities and the manner of its exercise.'[42] This is consistent also with EU legal requirements that any measure authorising the processing of personal data be supported by 'clear and precise' legal rules regarding the data's use, and 'minimum safeguards' restricting such use 'to what is strictly necessary' to meet its legitimate objectives.[43]

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characterised by an unhelpful polarization, and should be restructured around values enacted in practice).

[40] *S. and Marper* (n. 13) [95].

[41] See, e.g., Lon Fuller, *The Morality of Law* (Yale UP rev. ed. 1969) p. 46 *et seq*.

[42] *S. and Marper* (n. 13) [95].

[43] N. 18. Strengthening the rule of law in the EU generally has been a key objective of the European Commission since April 2019 and the basis of several EU initiatives. For details see

Given these legal requirements particularly, it is not surprising that European governments have recognised the importance of legality concerns with respect to contact tracing technologies, and taken steps to address them. In the UK for example, the NHS undertook early on to publish the key designs and source code of its Covid-19 app; though it did not publish the code for the central server on which users' data were stored and processed.[44] In addition, while the need for rapid-decision making and intervention would make it difficult for all contact tracing-related decisions to be subject to human appeal, it would be surprising from a rule of law perspective if the more intrusive decisions taken in reliance on the data they generate, such as compulsory testing and isolation, and decisions regarding immunity certification, at least were not. This applies both to decisions by public health and law enforcement officials, and to decisions by employers and other organisations that require use of the app on their premises.

4 Moral Responsibility and Community

Once again however, even if contact tracing apps do meet basic transparency and other rule of law requirements, a different kind of objection will remain. This is because, as well as asking whether rule by technology approximates rule by law sufficiently, it is important to ask whether it approximates rule by law excessively.

For some philosophers, legality confers a certain inner morality on systems, and even an external morality. By reducing the scope for arbitrary power, and enabling people to plan their lives and expect certain conduct of their fellow citizens, it treats people as responsible agents, and promotes the same values of human dignity that underpin European privacy and data protection rights.[45] At the same time however, legality has been criticised for undermining human agency and moral responsibility, by promoting an ideology of legalism that equates morality with rule following and subservience to order and authority.[46] Arguably, this is the real danger of contact tracing technologies. By using algorithmically rendered conceptions of risk and health to govern people and communities,[47] they can be

https://ec.europa.eu/info/policies/justice-and-fundamental-rights/upholding-rule-law/rule-law/initiative-strengthen-rule-law-eu_en.

[44] Boiten (n. 8). The code for the app is available at https://www.nhsx.nhs.uk/blogs/code-behind-nhs-covid-19-app/.

[45] Fuller (n. 41); Grant Lamond, 'The Rule of Law' in Andrei Marmor (ed.), *The Routledge Companion to Philosophy of Law* (Routledge 2012) 495–508, 497; John Finnis, *Natural Law & Natural Rights* (2nd edn 2011 OUP) 272–274.

[46] Judith Shklar, *Legalism* (Harvard UP 1964).

[47] Version 1 of the NHS Covid-19 app relied on a ''contact risk model' developed by NHS doctors and scientists' and was 'based on research evidence developed by epidemiologists, mathematical modellers

said to promote a kind of meta-legalism, or techno-legalism, that is even more subversive of moral capacities and responsibilities than legalism itself. Where use of the systems is compulsory, and the data they generate is stored centrally so as to be accessible by public authorities and other third parties, this danger is especially pronounced, perhaps explaining the UK Government's back tracking over the roll out of version 1 of its Covid-19 app.

This connects to a further issue, regarding the impact of contact tracing technologies on the solidarity required for moral community. In Foucauldian terms, contact tracing systems mark a dramatic step in the ongoing transformation of medicine into so-called 'techno-medicine': a technology-oriented practice that is concerned as much with managing people and their lives as with curing illness.[48] As a result, they raise important questions about the proper jurisdiction not only of technology, but also of medicine, and the social bonds on which moral communities depend. For example, and as Sandel has argued in respect of enhancement technologies, and with reference to medical insurance systems, too much information about individuals' health risks and status can undermine solidarity by depriving people of the very uncertainty about their own and others' fates on which a commitment to sharing those fates depends.[49] In this respect, contact tracing apps are similar to genetic and other enhancement technologies: by empowering individuals, they threaten the fabric of moral community.[50] And since Covid-19 does not affect people equally – with those of certain ages, socio-economic backgrounds, and ethnicities being especially vulnerable to contracting it[51] – the health-based inequalities likely to result from this can be expected to exacerbate existing social and economic inequalities.[52]

The nature of these objections makes them difficult to address. While they may well be regarded as acceptable casualties of public health protection, there is still a need to consider

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and ethicists at Oxford University's Nuffield Departments of Medicine and Population Health': https://faq.covid19.nhs.uk/article/KA-01017/en-us. Version 2 relies on the 'risk-scoring algorithm' described at https://covid19.nhs.uk/risk-scoring-algorithm.html (last accessed 4 October 2020).

[48] Nikolas Rose, *The Politics of Life Itself: Biomedicine, Power, and Subjectivity in the Twenty-First Century* (Princeton UP 2007); also Robbie Davis-Floyd and Gloria St. John, *From Doctor to Healer: The Transformative Journey* (Rutgers UP 1998) especially chapter 1 (discussing the tenets of the technocratic model of medicine).

[49] Michael J. Sandel, 'The Case Against Perfection', *The Atlantic* April 2004 Issue, https://www.theatlantic.com/magazine/archive/2004/04/the-case-against-perfection/302927/.

[50] See also Tim Harford, 'Reopening the economy will divide societies', *The Financial Times* 22 May 2020, https://www.ft.com/content/814d148e-9b66-11ea-adb1-529f96d8a00b.

[51] Public Health England, 'Disparities in the risk and outcomes of COVID-19' (June 2020), https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/892085/disparities_review.pdf.

[52] Harford (n. 50).

them properly. In Europe, Article 8 ECHR can also be read as requiring this. The reason is the Strasbourg Court's conception of 'private life' for Article 8 purposes as including 'multiple aspects of [a] person's physical and social identity', including her relationships with others.[53] On this conception, it can be argued that any technology that weakens the bonds of moral community in the manner described for contact tracing apps will engage Article 8. The result would be to increase the onus on those deploying contact tracing systems to demonstrate that no alternative measures address the human and economic devastation wrought by Covid-19 in a manner less damaging to values of social identity, including citizenship.

5 Autonomy

Concerns about techno-legalism are as much about autonomy as moral responsibility. So too conceiving contact tracing technologies as techno-medicine alludes to other issues of autonomy. Among the distinguishing features of techno-medicine are the localisation of medicine and illness in the human body. When Foucault first described this phenomenon in the 1960s,[54] no one could have predicted the extent to which developments in technology would support and accelerate it. For example, a defining feature of many fourth industrial revolution technologies is precisely that they have people as their object.[55] Gene-editing tools such as Crispr-Cas9 enable us literally to engineer ourselves, and AI systems seek to replicate human neurology. The result of AI particularly, as Zuboff has shown, is increasingly sophisticated data-driven technologies that target people algorithmically, as well as psychically, by predicting and modifying their behavior in support of information capitalism.[56] When accessible to governments, these technologies and the data driving them become even more dangerous for individuals, as well as for whole communities, enabling

[53] *S. and Marper* (n. 13) [66].

[54] Michel Foucault, *The Birth of the Clinic: An Archaeology of Medical Perception* (Routledge 1989), originally published as Michel Foucault, *Naissance de la clinique: une archéologie du regard medical* (Presses Universitaires de France 1963).

[55] See also H Jonas, 'Toward a Philosophy of Technology' (1979) 9 *The Hastings Centre Report* 34, 41.

[56] Shoshana Zuboff, 'Big Other: Surveillance Capitalism and the Prospects of an Information Civilization' (2015) 30 *Journal of Information Technology* 75–89; Shoshana Zuboff, *The Age of Surveillance Capitalism* (Profile 2019).

what Snowden described as 'turnkey tyranny'.[57] Hence the calls recently to '[j]ust collect less data, period.'[58]

Herein lies another cause for concern regarding contact tracing technologies. By further datafying[59] human life, they increase peoples' vulnerability to other interventions that instrumentalise information for autonomy restricting (commercial and political) ends. Fundamental rights have been argued to offer limited protection here. One reason is the conception of privacy in some jurisdictions as conferring limited rights to keep information about one's life and identity secret, which even companies can invoke to legitimate their covert practices.[60] Another is the conception of data protection, as a right largely to consent to the processing of personal data, which is of limited assistance where withholding consent results in exclusion from essential or general purpose technologies,[61] or from places of work and public spaces; and where even anonymised data, such as that described by the NHS initially to be collected by its Covid-19 app, can be combined to target individuals without re-triggering data law protections. If the EU proceeds with calls to recognise a new species of property for the 'creators' of so-called 'industrial data'[62] – a vague concept that will inevitably overlap with that of 'personal data'[63] – companies will have a new source of fundamental rights protection on their side, increasing further peoples' vulnerability to exploitative data practices. And if all else fails, governments and the companies working with

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[57] Glenn Greenwald on security and liberty: The NSA files, *The Guardian* 9 June 2013, https://www.theguardian.com/world/video/2013/jun/09/nsa-whistleblower-edward-snowden-interview-video. See further Henry A. Giroux, 'Totalitarian Paranoia in the Post-Orwellian Surveillance State' (2015) 29 *Cultural Studies*, https://www.tandfonline.com/doi/full/10.1080/09502386.2014.917118.

[58] Shira Ovide, 'Just collect less data, period.', *The New York Times* 15 July 2020, https://www.nytimes.com/2020/07/15/technology/just-collect-less-data-period.html. Cf. Steven Johnson, 'How Data Became One of the Most Powerful Tools to Fight an Epidemic', *The New York Times Magazine* (10 June 2020), https://www.nytimes.com/interactive/2020/06/10/magazine/covid-data.html.

[59] N. 65.

[60] Zuboff, 'Big Other' (n. 56) 82–83.

[61] Luca Belli and Cristiana Sappa, 'The Intermediary Conundrum: Cyber-Regulators, Cyber-Police or Both?' (2017) 8 *JIPITEC*, https://www.jipitec.eu/issues/jipitec-8-3-2017/4620.

[62] Javier Espinoza and Sam Fleming, 'Europe urged to use industrial data trove to steal march on rivals', *Financial Times* 14 January 2020, https://www.ft.com/content/8187a268-3494-11ea-a6d3-9a26f8c3cba4.

[63] Owing to the industrial applicability of personal data. An obvious example of data that is both "personal" and "industrial" is genetic data.

them will be able (as currently) to hide their data practices and risk being exposed by journalists or employees.[64]

6 Democracy

Beyond autonomy, datafication also threatens democracy.[65] When people become the object of technology, and everyday life and experience become grist for capitalist and political mills, important questions arise about what is humanly desirable, what it means to be human, and who gets to decide.[66] The default position is the companies, governments, and scientists who devise and control the relevant technologies. As recent experience has shown, this puts individuals and communities in extremely precarious positions. Indeed, it is the very nature of advanced technologies to generate new centres of formal and actual power that elude democratic control and remain largely inaccessible to citizens.[67] The result is precisely the types of power asymmetries that breed corporate and political authoritarianism and indifference to individuals' lives.[68] Hence the importance of law in countering this tendency; by ensuring the existence of spaces in which important social issues regarding the design and application of technologies can be addressed,[69] and by preventing technology companies from becoming 'too big'.[70] Even beyond contact tracing technologies, Covid-19 presents significant challenges here, by providing new opportunities for governments and organisations to consolidate their power at the expense of citizens.[71]

Several years ago, Winner argued that, for a mix of intellectual and social reasons, the design and development of new technologies is an insufficiently democratic activity.[72] Whether or

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[64] Much of what is known about governments' and companies' use of data currently is due to investigative journalists such as Glenn Greenwald and whistleblowing employees such as Ed Snowden.

[65] The term 'datafication' is from John Seely Brown and Paul Duguid, *The Social Life of Information* (Harvard Business School Press 2000) 11–12.

[66] Jonas (n. 55) 41.

[67] Hans Somsen, 'Regulating Human Genetics in a Neo-Eugenic Era' in Thérèse Murphy (ed.), *New Technologies and Human Rights* (Oxford UP 2009) 85–127, 94.

[68] Concerning companies, see n. 56.

[69] Maria Lee, 'The Legal Institutionalization of Public Participation in the EU Governance of Technology' in Roger Brownsword, Eloise Scotford and Karen Yeung (eds), *The Oxford Handbook of Law, Regulation and Technology* (Oxford UP 2017) 620–644.

[70] Tim Wu, *The Curse of Bigness: Antitrust in the New Gilded Age* (Penguin 2018).

[71] See, e.g., Miles Kruppa and James Fontanella-Khan, 'Big Tech goes on pandemic M&A spree despite political backlash', *Financial Times* 28 May 2020, https://www.ft.com/content/04a62a26-42aa-4ad9-839e-05d762466fbe.

[72] Langdon Winner, 'Citizen Virtues in a Technological Order' (1992) 35 *Inquiry: An Interdisciplinary Journal of Philosophy* 341–361.

not one agrees with his analysis, the proposal for greater civic involvement in each is compelling given the interests and values at stake. It may not be too late for this with respect to contact tracing technologies. According to the NHS, version 2 of its Covid-19 app was developed with input from 'diverse stakeholders', including public health and data protection authorities, civil society organisations, and 'volunteers who provided a patient and public point of view.'[73] By contrast, the development of version 1 was attributed to 'a team of world-leading scientists and doctors', drawing 'on expertise from across the UK government and industry',[74] and involving 'experts from the National Cyber Security Centre'.[75] This is consistent with the focus on the efficacy, and data security, of contact tracing systems. As I have tried to show however, the issues raised by contact tracing technologies go beyond these to include more fundamental 'public interest' questions about legality, moral responsibility and community, autonomy, and democracy, that even the most expansive conceptions of privacy may not fully address. Ultimately, these are questions that require a different kind of expertise, and wider opportunities for public involvement in social choices regarding technologies than exist even in liberal democratic regimes currently.[76] As data-driven and other technologies become increasingly central to governments' and organisations' regulatory strategies, and technology companies become increasingly powerful as a result of peoples' reliance on them, there is an urgent need to create these opportunities, and to consider the wider significance of the use of data-driven technologies particularly in the regulation of Covid-19. The greater involvement of 'diverse stakeholders' in developing version 2 of the NHS Covid-19 app represents a positive step in this direction.

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[73] https://faq.covid19.nhs.uk/article/KA-01106/en-us (last accessed 4 October 2020).

[74] https://www.covid19.nhs.uk/about-the-app.html.

[75] https://covid19.nhs.uk/privacy-and-data.html.

[76] Cf. Ada Lovelace Institute (n. 10) (supporting the establishment of a multidisciplinary Group of Advisors on Technology in Emergencies to 'act as gatekeepers of the deployment of technologies in support of a transition strategy').

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