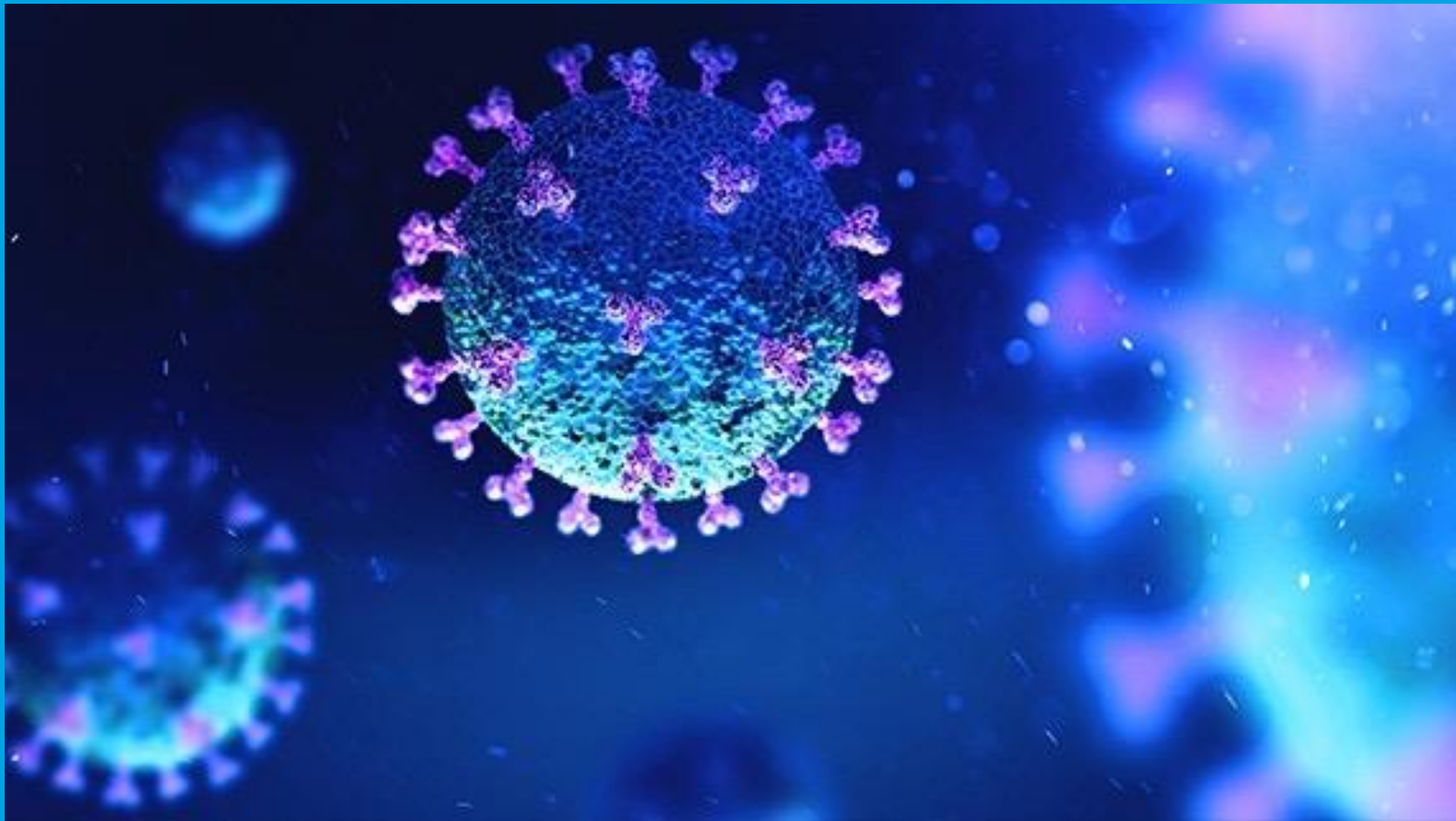


WP3-D1 Rapid Evidence Review of Data-driven Responses to Public Health Emergencies

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The Role of Good Governance and the Rule of Law in Building Public Trust in Data-Driven Responses to Public Health Emergencies

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This project, at the intersection of law, ethics, citizen deliberation, public health and data science, aims to develop a distinct values-based framework to help understand and address the challenges posed by data-driven responses to public health emergencies and the need to build public trust.

In their COVID-19 responses, states have relied on data-driven approaches to justify far-reaching measures, including closing entire business sectors and categories of travel, curtailing personal liberties and requiring compliance with new technologies for contact tracing and social distancing. To be effective, such measures must be internationally co-ordinated, nationally adopted and adhered to by a high proportion of the public. Trust underpins both national adoption and public adherence: trust in international institutions, in the measures adopted, and in their scientific foundations.

This project examines two critical enablers of that trust: good governance and the rule of law. It aims to provide practical guidance on how international and national institutions can build public trust in the processes by which they design and implement data-driven responses to public health emergencies. The research consists of four interconnected work packages which examine:

- (1) International governance frameworks for public health emergencies.
- (2) Values-based principles to guide data-driven responses by national institutions including governments, parliaments, courts and police.
- (3) UK case studies and a literature review of data governance (national and international) in relation to the use of data driven technologies in the pandemic emergency
- (4) A citizen jury deliberation on the trustworthiness of data-driven measures and what additional safeguards may be needed.

This report forms part of Work Package 3. This work package examines how good governance and rule of law principles can help to build public trust in data-driven technologies introduced in response to public health emergencies. The work package outputs address a range of technological responses to Covid-19 by discussing the legal frameworks that govern them and identifying the issues and challenges that they give rise to from a public trust perspective. The outputs comprise:

- Rapid Evidence Response Review of Data-Driven Responses to Public Health Emergencies (WP3-D1)
- 'No jab, no job'? Employment Law and Mandatory Vaccination Requirements in the UK (WP3-D2A)
- 'Venue Check-In' or 'Presence' Apps (WP3-D2B)
- Judicial Scrutiny of COVID-19 Regulations in the UK: Addressing Deference to Data-Driven Decision-Making in Human Rights Cases (WP3-D2C)
- Policy Brief: Good Governance and Rule of Law Principles for Data-Driven Technologies in Public Health Emergencies (WP3-D3)

The law is stated as of September 22, 2021. However, it has been possible to take account of some later events. We acknowledge very helpful comments from Prospect Union and from Nyasha Weinberg, although all views expressed are those of the WP3 team.

Rapid Evidence Review of Data-driven Responses to Public Health Emergencies

WP3-D1

Why are governments adopting data-driven technologies to address public health emergencies?

The last ten years have seen a surge of data-driven progress and discovery. We are in an era of discovering the sheer power of data. It is no surprise, then, that we have faced the Covid-19 pandemic with powerful data-driven tools.

Covid has touched nearly every aspect of public life, or indeed life in public. From the mass shut down of public spaces, to the work-from-home shift wherever possible, to increased measures by all necessary public venues - perspex screens, hand sanitizer, caps on number of customers - shifts have occurred across every facet. Beyond the mere desire for pre-pandemic normality, there has been a necessary shift in citizens' mindset to minimize transmission and infection as much as possible. Yet physical, viral safety inevitably comes at a trade-off against economic prosperity, mental health, and freedom.¹ Clearly policy-makers decisions should, as much as possible, be informed ones – which means having access to the underlying science of Covid-19 itself, but also to ever-changing variables such as infection rates, vaccination numbers, and economic trade-offs.

Of the data-driven tools used, a variety of approaches have been employed. These have included conventional data analysis, community data sharing, and a spectrum of automation:² from human in the loop approaches such as digital information and statistics, to those that may have humans out of the loop with digital immunity passports, predictive pandemic modelling, and contact tracing.³ From this range of approaches, data-driven technologies have provided a spectrum of information for policy makers and scientists alike. These start with such practical concerns as being able to provide remote services, to the ability to interpret trends from large swathes of data.⁴ Continuation of services has included necessities such as remote court hearings, medical assessments, and home working.⁵ Broader domestic programmes have included data flow from central locations to public sector entities,

¹Ole F. Norheim, Joelle M. Abi-Rached, Liam Kofi Bright, Kristine Bærøe, Octávio L. M. Ferraz, Siri Gloppen & Alex Voorhoeve, 'Difficult Trade-Offs in Response to COVID-19: The Case for Open and Inclusive Decision Making', [2021] *Nature* 21(1), 10-13

²Rachel Allsopp, 'Mapping the Data-Driven Landscape' (*OMDDAC*, 25 January 2021) <<https://www.omddac.org.uk/news/mapping-the-data-driven-landscape/>> accessed 17 September 2021

³ Though humans may be involved in some cases, such as those uploading vaccination data, creating the models, or doing manual contact tracing (NHS, 'NHS COVID-19' <<https://www.nhs.uk/apps-library/nhs-covid-19/>> accessed 17 September 2021)

⁴ 'Mapping the Data-Driven Landscape' (*supra* n2)

⁵ 'Mapping the Data-Driven Landscape' (*supra* n2)

such as the shielding program.⁶ International cooperation has grown to include cross-border data sharing, very beneficially in the form of vaccines⁷ and treatments.⁸

This rapid evidence review covers three data-driven technologies that inform and are shaped by policy decisions: i) contact tracing apps, ii) vaccine passports, and iii) aggregated use of data and vaccine allocation apps. It reviews the literature (academic articles, government and civil society reports, media pieces, blogs, and social media posts, etc.) discussing those three types of technologies, up to September 2021. While the focus is on the UK, the review covers, with a comparative aim, technologies used across the world. As such the review of the three approaches includes several country studies as well as key good governance concerns.

Those three technologies cover the tracking of individuals, travel, and access to spaces, both domestically and internationally, and the allocation of public health investment via vaccines. Other technologies and data responses may interact with these three, but they provide a nexus for public health concerns.

Both the World Health Organisation (WHO) and agencies of the European Union (EU) have proposed guidelines for decision-making about data-driven responses to Covid-19. The WHO states that proximity tracing should not be mandatory, because 'such uses of data may also threaten fundamental human rights and liberties during and after the COVID-19 pandemic'.⁹ The EU states that public health, data-driven technologies, and human rights are not incompatible. The EU's approach appears to try to combine the potential benefits of automated decision-making systems with respect for privacy, human rights, and democratic checks and balances. The processing of personal data for public health emergencies is not incompatible with the GDPR, according to the European Data Protection Board, however, 'even in these exceptional times, the data controller and processor must ensure the protection of the personal data of the data subjects'.¹⁰ As early as April 2020, the European Commission issued a Recommendation 'on a common Union toolbox for the use of technology and data to combat and exit from the COVID-19 crisis', in particular concerning mobile applications and the use of anonymised mobile data.¹¹

Studies have been carried out as to the public's view of data-driven technology in the pandemic response. The UK government's Centre for Data Ethics and Innovation survey, commissioned between June and December 2020, found that

72% felt that digital technology had the potential to be used in response to the outbreak, with majorities in favour of specific use cases such as wearable tech to support social distancing... [However, sizeable minorities agreed that there could be problems with people and organisations being able to use the technology (39%) and problems with the technology itself

⁶ Department of Health and Social Care & Public Health England, 'Guidance on Shielding and Protecting People Who Are Clinically Extremely Vulnerable from COVID-19' (16 September 2021) <<https://www.gov.uk/government/publications/guidance-on-shielding-and-protecting-extremely-vulnerable-persons-from-covid-19/guidance-on-shielding-and-protecting-extremely-vulnerable-persons-from-covid-19>> accessed 17 September 2021

⁷ 'NHS COVID-19' (*supra* n3)

⁸ Mark Say, 'Public Backs Data Driven Tech in Pandemic Response' (*UKAuthority*, 5 March 2021) <<https://www.ukauthority.com/articles/public-backs-data-driven-tech-in-pandemic-response/>> accessed 17 September 2021

⁹ World Health Organisation, 'Contact Tracing in the Context of COVID-19: Interim Guidance' (1 February 2021) <<https://www.who.int/publications-detail-redirect/contact-tracing-in-the-context-of-covid-19>> accessed 17 September 2021

¹⁰ European Data Protection Board, 'Statement by the EDPB Chair on the Processing of Personal Data in the Context of the COVID-19 Outbreak' <https://edpb.europa.eu/news/news/2020/statement-edpb-chair-processing-personal-data-context-covid-19-outbreak_en> accessed 17 September 2021

¹¹ Commission Recommendation (EU) 2020/518 of 8 April 2020 on a common Union toolbox for the use of technology and data to combat and exit from the covid-19 crisis, in particular concerning mobile applications and the use of anonymised mobility data' [2021] OJ L 114/7

(17%). 24% also expressed misgivings over existing governance of data driven interventions, although 43% said it is sufficient.¹²

Essentially, the 'UK public is in favour of the use of data driven technology in response to Covid-19 but is reserving judgment on whether it is making things better.'¹³ This is indeed specific to the UK, as only the UK public were surveyed, but showcases a broad awareness for the potential acceptability of proper, careful, and well-targeted use of technology, but also a high degree of awareness of potential for misuse of personal data.

The spectrum of data-driven technologies

Contact tracing apps

Contact tracing apps can come in a variety of forms but are basically apps that collect and transmit information about an individual's whereabouts, either by location, or proximity to an infected person. Apps are usually installed on personal smartphones or work in conjunction with smart cards, dongles, lanyards, or wristbands ('wearables'). Apps that collect data about presence at a venue which may be a site of infection are now often distinguished as a separate category of 'presence' rather than 'proximity' apps (see below). Some such apps are described as 'quarantine' or 'self-isolation' apps. For example, if an individual has travelled into an area, they might be tracked to ensure they do not leave a designated (quarantine) space. Most frequently, apps provide functionality such that that if one individual has tested positive, individuals who may have come into contact with that person - either at the same time or within a space in a given time frame - can be notified in order to stop a potential spread.

The data these apps gather - and thus their impact on rights like privacy, autonomy, and freedom of assembly - can vary drastically.¹⁴ Apps can require personal data such as name, immediate location, health status, mandated check-ins, and other very personal data. Apps can, however, be designed with a higher or lower level of privacy preservation. For example, collecting an anonymised identifier rather than direct collection of location or identifying personal data. 'Check-in' (presence) apps may collect presence at a location rather than consistently tracking people as they move around. Ways that data is stored and 'matches' made also vary - data might be gathered via phones or wearables but then stored in a central database (a 'centralised' solution); or gathered and stored only on a user's phone (a 'decentralised' solution). The latter limits or excludes the ability of the state to use the app as a 'bug' with which to pervasively track users and reduces risks of reuse of state surveillance even after the end of the emergency. Connectedly, even in centralised solutions, data might be stored only for a limited amount of time - this limitation, however, would be hard to police. Apps might be mandated by law or might rely on voluntary self-reporting.

This range of possibilities for tracing apps generated a high level of concern about their potential for misuse by the state and the private sector near the start of the pandemic. The threat of grossly expanded state surveillance via ubiquitous smartphone use, even after the end of the pandemic emergency, is seen as a very real one, given natural tendencies of populations to want to help reduce infection, and assist state and medical authorities in the middle of a crisis. Broadly, '[a]uthoritarian countries have made full use of the digital surveillance systems they already had in place, and even added further equipment and devices to deliver [data-driven] solutions that strongly prioritise public health and safety concerns over individual rights.'¹⁵ They do not, however, have a monopoly on raising

¹²'Public Backs Data Driven Tech in Pandemic Response' (*supra* n8)

¹³'Public Backs Data Driven Tech in Pandemic Response' (*supra* n8)

¹⁴ See, Alanoca and others, 'Digital contact tracing against COVID-19: a governance framework to build trust', Oxford University Press Public Health Emergency Collection, 2021, 11(1) 3-17 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8135999/>

¹⁵Fabio Chiusi, 'ADM Systems in the COVID-19 Pandemic: A European Perspective' (Automating Society Report 2020, Special Issue, *AlgorithmWatch*, 1 September 2020) <<https://algorithmwatch.org/en/wp->

human rights concerns, as evidenced by Amnesty International's alarm over Norway's contact tracing.¹⁶ Nonetheless, as a broad trend there seem to be correlations between a country's level of individual human rights concern and their approach to contact tracing. Distinctions were also regularly drawn, possibly wrongly, between Asian countries which were seen as preferring communitarian to individualistic values, even when democratic (see below), and Western countries where human rights concerns went mainstream as populist concerns.

The design, deployment and governance of contact tracing apps has thus been conflicted and controversial throughout the course of the pandemic¹⁷ The Ada Lovelace Institute identified four key questions about the way in which such apps function: i) whether data is centralised or decentralised; ii) what legislation has been introduced to bring in the tracking function; and iii) percentage of population uptake; and iv) efficacy.¹⁸ We suggest that the following sets of questions should be explored when considering the balance of public safety versus respect for human rights:

- *Data.* What data does the app need to collect to reduce infection and protect the public? Does it need to collect absolute location rather than mere proximity, and personal identifiers rather than anonymised or pseudonymised data? Does any data need to be collected and stored centrally? How long should collected data be stored, how should it be used and to whom could, or should it be shared? This point relates to issues of 'scope creep' and 'sunsetting'.
- *Effectiveness.* Does contact tracing work to reduce infection, as a trade-off to any incursion into human rights? How can an app be at its most effective while at its least privacy-endangering? Do apps only need to provide data about specific contacts to infected individuals, or is it also justifiable to collect more data (e.g. general epidemiological trends)?
- *Specific risks.* Are there specific dangers about requiring contact tracing in specific contexts, such as at work or in education? Are some domains likely to be abused (e.g. by discriminating against certain groups)?
- *Legal and ethical safeguards.* Another distinction across the globe is that some countries (e.g. many civilian legal system countries, Australia) passed specific statutes or amendments authorising and providing safeguards relating to their apps; while others (e.g. UK, US and other common law countries) have largely relied on existing legal safeguards such as data protection law and also equality law, employment law and human rights. How should safeguards be developed, and these apps scrutinised, especially in tumultuous times of pandemic? Which regulators should act? Beyond law, ethical frameworks also remain very emergent.¹⁹

Perhaps the principal objections to contact tracing apps globally have been based on privacy and data protection rights. At its most invasive, contract tracing can automatically identify an individual who has tested positive, their specific location, using biometrics, and hold such information in a centrally kept database. At its least invasive, contact tracing can rely on self-reported cases, anonymised data exchanged between phones that have been in proximity, and an individual's willingness to self-isolate

content/uploads/2020/08/ADM-systems-in-the-Covid-19-pandemic-Report-by-AW-BSt-Sept-2020.pdf> accessed 17 September 2021

¹⁶ 'Bahrain, Kuwait and Norway Contact Tracing Apps most dangerous for privacy' (*Amnesty International*, 16 June 2020) <<https://www.amnesty.org/en/latest/news/2020/06/bahrain-kuwait-norway-contact-tracing-apps-danger-for-privacy/>> accessed 17 September 2021

¹⁷ See for very diverse insights, Linnet Taylor, Gargi Sharma, Aaron Martin, and Shazade Jameson (eds), *Data Justice and COVID-19: Global Perspectives* (Meatspace Press, 2020)

¹⁸ Ada Lovelace Institute, 'COVID-19 digital contact tracing tracker' <<https://www.adalovelaceinstitute.org/project/covid-19-digital-contact-tracing-tracker/>> accessed 17 September 2021

¹⁹ See Claudia Pagliari, 'The ethics and value of contact tracing apps: International insights and implications for Scotland's COVID-19 response' [2020] 10(2) *Journal of Global Health* 020103, published online 21 July 2020 [10.7189/jogh.10.020103](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7510337/)
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7510337/>

when it is advised they do so. The battle over centralised v decentralised designs, as a solution to the problem of privacy, are tracked below.

Scope creep is a major issue. Several countries - such as Singapore²⁰ and Australia²¹ - have used track and trace data for non-health purposes, though Australia later made such uses criminal.²² Even with legislative updates, there is well-warranted concern around the use of personal data for purposes beyond its original purpose, law enforcement or otherwise.

Significant concerns have been raised as to the efficacy of track and trace, such as in the case of the NHS app, which it was said 'had little effect on public health due to a lack of data collection.'²³ Other problems were that in voluntary systems, many incentives exist not to self-isolate and indeed not to download the app - the fear of losing income if made to stay at home and not work being the most obvious. More recent data has, however, been used to argue that contact tracing apps have saved many thousands of lives.²⁴

Despite some instances of regulator activism (as in Norway and Lithuania, see below) much of the activism around apps and human rights has come from civil society rather than state bodies. Technology and civil society organisations took a very active role in assessing and warning about various countries' contact tracing apps and approaches. Five who have been particularly visible include the Civil Liberties Union for Europe, the Ada Lovelace Institute, Algorithm Watch, the MIT Technology Review, and Amnesty International. The Civil Liberties Union for Europe focuses on lessons to be learned for the future use of technology in fighting societal challenges.²⁵ The Ada Lovelace Institute has monitored development, uptake, and efficacy of attempts worldwide to use smartphones and other devices for contact tracing in a useful tracker.²⁶ Algorithm Watch's 'Tracing the tracers' project is '[m]onitoring and analyzing automated decision-making systems', including 'contact tracing and exposure notification apps'.²⁷ The MIT Technology review compares apps around the world, capturing details on each. They have so far captured 25 significant efforts, their methods, and policies and processes around them. So far, they have found 'no central repository of information... [no] single, standard[ized] approach'.²⁸ Amnesty International has reviewed contact tracing apps from Europe, the Middle East, and North Africa, including detailed analysis of apps in Algeria, Bahrain, France, Israel, Kuwait, Lebanon, Norway, Qatar, Tunisia, and the United Arab Emirates.²⁹ Amnesty International has flagged the Bahraini, Kuwaiti, and (initial) Norwegian approaches as the most concerning in terms of mass surveillance.³⁰ In the UK, organisations such as the Open Rights Group, Privacy International

²⁰ Andreas Illmer, 'Singapore Reveals Covid Privacy Data Available to Police', BBC News (5 January 2021) <<https://www.bbc.com/news/world-asia-55541001>> accessed 17 September 2021

²¹ Byron Kaye, 'Australia Will Make It a Crime to Use Coronavirus Tracing Data for Non-Health Purposes', Reuters (24 April 2020) <<https://www.reuters.com/article/us-health-coronavirus-australia-idUSKCN2253UA>> accessed 17 September 2021

²² 'Australia Will Make It a Crime to Use Coronavirus Tracing Data for Non-Health Purposes' (*ibid*)

²³ Rachel Allsopp, Claire Bessant, Charlotte Emmett, Matthew Higgs, Ardi Janjeva, Marion Oswald, Guangquan Li, Selina Sutton, Mark Warner, 'OMDDAC Snapshot Report 2: Tech-Driven Approaches to Public Health' (18 May 2021), 3

²⁴ 'New Nature research highlights the epidemiological impact of the NHS COVID-19 app' (*The Alan Turing Institute*, 12 May 2021) <<https://www.turing.ac.uk/news/new-nature-research-highlights-epidemiological-impact-nhs-covid-19-app>> accessed 17 September 2021

²⁵ European Liberties Platform, 'Civil Liberties Union for Europe' <<https://www.liberties.eu/en>> accessed 17 September 2021

²⁶ 'COVID-19 digital contact tracing tracker' (*supra* n18)

²⁷ 'New project launched: Tracing the tracers. Monitoring and analyzing ADM systems used to respond to the COVID-19 pandemic' (*Algorithm Watch*) <<https://algorithmwatch.org/en/project-launch-tracing-the-tracers-adm-covid/>> accessed 17 September 2021

²⁸ Patrick Howell O'Neill, Tate Ryan-Mosley, and Bobbie Johnson, 'A Flood of Coronavirus Apps Are Tracking Us. Now It's Time to Keep Track of Them' (*MIT Technology Review*, 7 May 2020), <<https://www.technologyreview.com/2020/05/07/1000961/launching-mitttr-covid-tracing-tracker/>> accessed 17 September 2021

²⁹ 'Bahrain, Kuwait and Norway Contact Tracing Apps most dangerous for privacy' (*supra* n16)

³⁰ 'Bahrain, Kuwait and Norway Contact Tracing Apps most dangerous for privacy' (*supra* n16)

and Big Brother Watch, with a background in technology and data rights, have been prominent. In Europe, an informal consortium of technology and law academics known as DP3-T has emerged as pivotal in development of privacy-preserving contact tracing³¹.

Contact tracing apps: country studies

1) Centralised systems

China was one of the earliest countries to use tracking technologies and automated decision making in its apps to try to control the pandemic. Apps gathered and repurposed large amounts of personal and sensitive data to profile citizen movements, and a colour-based 'traffic lights' model drew automated conclusions as to whether an individual was a contagion risk.³² Citizens fill out a form with their personal details, and are provided with a colour: green means unrestricted movement, yellow means staying home for seven days, and red means a two-week quarantine.³³ The underlying technology is the Alipay Health Code, and the rating system is both automated and opaque.³⁴ This is combined with facial recognition technology 'to scan crowds for fever and identify individuals not wearing masks', and smart glasses that can assess thermal readings to enforce social distancing.³⁵

Singapore was another early developer in the field and was more conscious of privacy and human rights issues than China, but still the design decisions behind the app suggest that societal safety was prioritised over the preservation of individual rights. Nonetheless, it pioneered the use of Bluetooth rather than GPS location data to try to reduce privacy impact. The app purportedly does not collect or use geolocation, but uses mobile numbers and proximity to others, measured through Bluetooth. The Singapore system uses not only apps on smartphones but also physical dongles or wearables, both to improve enforcement, and to allow for issues with digital exclusion, e.g. among the old. For example, it uses bracelets to enforce quarantine orders. Alongside the phone system there is also a 'tag-tracing system,' wherein a 'TraceTogether' token is carried by the individual, exchanging Bluetooth signals with nearby tags, logging the interactions for 25 days before deletion, with the individual returning the tag to be traced if they tested positive.³⁶ The Singaporean app allows data from the TraceTogether programme to be used 'for the purpose of criminal investigation'.³⁷

Norway's first go at a contact tracing app, 'Smittestopp' app, was launched in April 2020, but was suspended in June 2020 following a Data Protection Authority warning that raised concerns about user privacy.³⁸ The app used a centralized approach that registered data from Bluetooth contacts and location into a central database. This solution was intended to fulfil two purposes: notifying close contact of individuals with confirmed Covid-19 infection, and analysing movement patterns and population behaviour during the pandemic. In June 2020, Smittestopp v1 was shut down by the Norwegian Data Protection Authority (Datatilsynet) due to privacy concerns, specifically regarding the centralized storage of locational GPS data and Bluetooth contacts. Subsequently, Norway developed a new app

³¹ Michael Veale, 'Sovereignty, Privacy and Contact Tracing Protocols' in Linnet Taylor, Gargi Sharma, Aaron Martin, and Shazade Jameson (eds), *Data Justice and COVID-19: Global Perspectives* (Meatspace Press, 2020), 35

³² Paul Mozur, Raymond Zhong, and Aaron Krolik, 'In Coronavirus Fight, China Gives Citizens a Color Code, With Red Flags', *New York Times* (1 March 2020) <<https://www.nytimes.com/2020/03/01/business/china-coronavirus-surveillance.html>> accessed 17 September 2021

³³ 'ADM Systems in the COVID-19 Pandemic' (*supra* n15)

³⁴ 'ADM Systems in the COVID-19 Pandemic' (*supra* n15)

³⁵ Sarah Dai, 'Covid-19: Hangzhou park security uses AI-powered smart glasses to detect people with fever', *The Star* (27 March 2020) <<https://www.thestar.com.my/tech/tech-news/2020/03/27/covid-19-hangzhou-park-security-uses-ai-powered-smart-glasses-to-detect-people-with-fever>> accessed 17 September 2021

³⁶ 'Singapore Reveals Covid Privacy Data Available to Police' (*supra* n20)

³⁷ 'Singapore Reveals Covid Privacy Data Available to Police' (*supra* n20)

³⁸ Natasha Lomas, 'Norway Pulls Its Coronavirus Contacts-Tracing App after Privacy Watchdog's Warning' (*TechCrunch*, 15 June 2020) <<https://techcrunch.com/2020/06/15/norway-pulls-its-coronavirus-contacts-tracing-app-after-privacy-watchdogs-warning/?quccounter=1>> accessed 17 September 2021

(Smittestopp v2) based on the Google/Apple Exposure Notification (GAEN) API, which uses a decentralized approach and allows international integration.³⁹ The app now works in the same way as other GAEN apps (see below) which are broadly privacy preserving but do not collect the extra epidemiological data originally desired. Privacy regulators were active in a small but significant number of countries in demanding changes to or replacement of apps – e.g. *Lithuania's* contact tracing app was also suspended by the country's data authority for failing to comply with the EU's General Data Protection Regulation (GDPR).⁴⁰

England and Wales' creation of a contact tracing app, as in Norway and Lithuania, was troubled. The first version of the app was based on a centralised system designed by NHSX, the innovation arm of the NHS which claimed to be more effective, less prone to error (e.g. when contacts were on a bus or otherwise obstructed, say by a wall) and better at collecting epidemiological data than similar apps.⁴¹ Trials in May 2020, however, showed the app would not perform well on iPhones due to the adoption by Apple of privacy preserving measures, and a second version of the app pivoted to following most of Europe in using the GAEN protocol (see below).⁴² Other parts of the UK, such as Scotland and Northern Ireland, had already taken this path.⁴³

The first version of the app was unusual in explicitly having an ethical oversight board, modelled on medical ethics committees but without any actual power.⁴⁴ This partly filled the gap left by the absence of any enabling legislation to authorise the app - the government argued none was necessary, given the existence of existing data protection and equality laws. This argument was not seen as entirely satisfactory in the eyes of some academics and the Joint Committee on Human Rights, both of whom drafted statutes that provided safeguards.⁴⁵

The English app v 2.0 was also unusual in trying to integrate several extra functions such as venue check-in as well as basic contact tracing into the same app. It was hypothesized that combining a mandatory venue check in app with the voluntary contact tracing app would push up downloads of the latter, necessary for the app to be effective. This later caused issues: an attempted update to the app was blocked by Google and Apple for asking users to upload venue check-in logs rather than the original method of storing them on the user's phone. This breached the privacy policy that went along with use

³⁹ Hinta Meijerink, Elisabeth H. Madslie, Camilla Mauroy, Mia Karoline Johansen, Sindre Møgster Braaten, Christine Ursin Steen Lunde, Trude Margrete Arnesen, Siri Laura Feruglio, Karin Nygård, 'The first GAEN-based COVID-19 contact tracing app in Norway identifies 80% of close contact in "real life" scenarios' (medrxiv, 7 May 2021) <<https://www.medrxiv.org/content/10.1101/2021.05.06.21253948v1.full-text>> accessed 17 September 2021

⁴⁰ Alex Pugh, 'Lithuanian contact-tracing app suspended' (*Global Data Review*, 28 May 2020) <<https://globaldatareview.com/coronavirus/lithuanian-contact-tracing-app-suspended>> accessed 17 September 2021. As of November 2020 a new app was adopted, Korona Stop LT app, which 'does not use any geolocation or motion data, but works through Bluetooth to detect nearby devices' (World Health Organisation Covid-19 Health System Response Monitor, 'Policy responses for Lithuania' <<https://www.covid19healthsystem.org/countries/lithuania/livinghit.aspx?Section=1.3%20Isolation%20and%20quarantine&Type=Section>> accessed 17 September 2021

⁴¹ Public Accounts Committee, COVID-19: test, track and trace (part 1) (HC 2019-2021 932), <<https://committees.parliament.uk/publications/4976/documents/50058/default/>.

⁴² See Dan Sabbagh and Alex Hern, 'UK abandons contact-tracing app for Apple and Google model', *The Guardian* (18 June 2020) <<https://www.theguardian.com/world/2020/jun/18/uk-poised-to-abandon-coronavirus-app-in-favour-of-apple-and-google-models>> accessed 17 September 2021

⁴³ StopCOVID NI and ProtectScotland both operate on the basis of the GAEN protocol.

⁴⁴ See 'Report on the work of the Ethics Advisory Group to NHSx on the COVID-19 Contact Tracing App (25 August 2020) <<https://covid19.nhs.uk/pdf/ethic-advisory-group-report.pdf>> accessed 17 September 2021

⁴⁵ Lilian Edwards et al, 'Coronavirus Safeguards Bill 2020: Proposed protections for digital interventions and in relation to immunity certificates' (13 April 2020) <<https://osf.io/preprints/lawarxiv/vc6xu/>> accessed 17 September 2021; Joint Committee on Human Rights, 'A Bill to make provision for the regulation of the processing of information in respect of contact tracing for Covid-19; and for connected purposes' (7 May 2020) <<https://publications.parliament.uk/pa/jt5801/jtselect/jtrights/correspondence/Letter-to-Rt-Hon-Matt-Hancock-MP-Secretary-of-State-for-HSC-Draft-Bill.pdf>> accessed 17 September 2021

of the GAEN protocol and shows vividly the power private tech companies now exert over the design of software used by states to fulfil public purposes.⁴⁶

Another interesting part of the English experience is that the app became to some extent a victim of its own success. The combination of relatively high download rates, combined with massively rising infections in summer 2021 led to what became known as a ‘pingdemic’, where many hundreds of thousands of people (700,000 in one week in July⁴⁷) received alerts that they had been in contact with infected people. This had not happened in previous stages of the pandemic, either because of lack of testing or because infection rates pre-vaccination had not been allowed to rise out of control by intervening lockdowns, which also limited the opportunities for strangers to be in proximity and trigger a ‘ping’, and other mitigations; this lockdown policy came to an end in England in the so-called ‘Freedom Day’ (see below). The effect was to create havoc in the economy and society, as huge numbers of workers, students etc were asked to self-isolate. Consequently, under public pressure the app was ‘tweaked’ to reduce the number self-isolating by sending alerts only to those who had been in contact in the previous two days to an infected person.⁴⁸ This change showed that the wider policy consequences that flow from tracing apps need not be based solely on scientific best practice but may also be driven by economic factors.⁴⁹

There are challenges with these types of private processing of health data: successful data protection from both state and business interests, and partnerships between them.⁵⁰ Such partnerships have been a point of concern to date, such as Huawei’s AI-backed technologies provided to Algeria, Botswana, Ghana, Ivory Coast, Kenya, Morocco, Nigeria, Rwanda, Uganda, Zambia, and Zimbabwe, raising ‘data colonialism’ issues.⁵¹ Even countries attempting to develop proprietary apps, such as France, have run into functionality issues due to restrictions on Apple phones.⁵²

Other problematic examples include North Dakota’s contact tracing app, which shared location and identifier data with multiple technology companies, including Google.⁵³ Further, programs by Apple and Google in the Global South have brought on backlash regarding ‘data colonialism’ from the Global North.⁵⁴

As a general rule, the richer the dataset – i.e. the more features and information it has - the more helpful it can be, particularly when helpful data points such as loss of smell or taste may not be initially known to be informative. However, the more complex the dataset, the greater ‘the capacity of data to be used

⁴⁶Leo Kelion, ‘NHS Covid-19 app update blocked for breaking Apple and Google’s rules’, BBC News (12 April 2021) <<https://www.bbc.com/news/technology-56713017>> accessed 16 September 2021. See section below ‘Key Good Governance and Rule of Law Concerns of Data-Driven Technologies’

⁴⁷ ‘NHS Covid app “pings” fall after changes’, BBC News (19 August 2021) <<https://www.bbc.co.uk/news/technology-58165482>> accessed 17 September 2021

⁴⁸ ‘England changes COVID-19 app so fewer people need to isolate’, Reuters (3 August 2021) <<https://www.reuters.com/world/uk/england-changes-covid-19-app-so-fewer-people-need-isolate-2021-08-02/>> accessed 17 September 2021

⁴⁹ The government did argue that cutting the number of days of contact still meant ‘high risk’ contacts would be caught. Nonetheless the change was clearly economically rather than data driven.

⁵⁰ Social Science Research Council, ‘Surveillance and the “New Normal” of Covid-19’ Public Health, Data, and Justice’ (January 2021) <<https://covid19research.ssrc.org/public-health-surveillance-and-human-rights-network/report/>> accessed 17 September 2021

⁵¹ Ulises Ali Mejias and Nick Couldry, ‘Resistance to the New Data Colonialism Must Start Now’, Al Jazeera, (29 April 2020) <<https://www.aljazeera.com/opinions/2020/4/28/resistance-to-the-new-data-colonialism-must-start-now>> accessed 17 September 2021. See also Michael Kwet, ‘Digital Colonialism: US Empire and the New Imperialism in the Global South’, [2019] 60(4) Race & Class 60, 3–26.

⁵² ‘Surveillance and the “New Normal” of Covid-19’ (*supra* n50)

⁵³ Steven Melendez, ‘North Dakota’s COVID-19 App Has Been Sending Data to Foursquare and Google’, Fast Company (21 May 2020) <<https://www.fastcompany.com/90508044/north-dakotas-covid-19-app-has-been-sending-data-to-foursquare-and-google>> accessed 17 September 2021

⁵⁴ *Supra* n51

beyond its initial purpose, which increases the risk of data misuse'.⁵⁵ Scope creep is a serious concern in such areas, as is the proposed eventual dismantling of such systems. This can be seen in the Singaporean government's acknowledgment that data from the 'TraceTogether' app could in fact be accessed by law enforcement to support criminal investigations, 'despite earlier assurances that data would only be used if an individual tested positive'.⁵⁶ The ensuing outcry prompted the Singaporean government to limit the use to specific serious offences such as kidnapping or terrorism.⁵⁷

2) Decentralised systems; beyond the nation state to platform power

On 10th April 2020, Apple and Google in an unprecedented joint move, announced they would collaborate to offer a decentralised privacy-preserving protocol to states for contact tracing, so such apps could be built more efficiently for Android and Apple phones.⁵⁸ The soft power of their stranglehold on the smartphone market led to almost every country in Europe adopting (or in England, Germany and Norway's case, switching to) the new GAEN protocol approach. The advantage of the GAEN model is that its decentralized architecture reduces almost to zero the chances of abusive individual tracking, data collection and post-emergency continuing state surveillance. Apple and Google, however, in an apparent act of philanthropy also effectively trumped the sovereign power of the nation state to make its own rules re app design, since the choice came down to a GAEN app that worked, or a 'home grown' one that did not (at least with Apple phones). Some have argued this meant that a balance was struck favouring individual privacy over public safety which was incorrect. Others have pointed out that long term what has been cemented is platform power, exerted by two non-democratically elected actors through their ubiquitous infrastructure, which may bode ill for human rights long term.⁵⁹ As Milan et al argue, apps like these controlled by private rules, 'constitute governance by data infrastructure, diverting action and control away from elected legislators'.⁶⁰

Vaccine Passports

Vaccine passports have been around for decades, and International Health Regulations have since 1969 made extensive provision for Yellow Fever vaccination certificates for international travel.⁶¹ Until now, however, they have been largely in paper form. For current concerns, vaccine passports are methods that identify a user as being a lesser risk to having or spreading Covid-19. This can be through either having had a recent negative Covid test; having received one or both vaccination doses; or having had Covid-19 recently enough to still have antibodies. Vaccine passports are intended to help manage risk both domestically and internationally, with potential uses ranging from allowing individuals to use certain services and locations, to the ability to travel across borders. They are currently required by governments in some areas, and by businesses in others. There is not a single definition as to what a vaccine passport may look like, and debates often include whether the vaccine passport should be digital or analogue; how much personal information should be linked; who should hold personal

⁵⁵ 'Surveillance and the "New Normal" of Covid-19' (*supra* n50)

⁵⁶ Eileen Yu, 'Singapore Police Can Access COVID-19 Contact Tracing Data for Criminal Investigations', ZDNet (4 January 2021) <<https://www.zdnet.com/article/singapore-police-can-access-covid-19-contact-tracing-data-for-criminal-investigations/>> accessed 17 September 2021

⁵⁷ 'Singapore Police Can Access COVID-19 Contact Tracing Data for Criminal Investigations' (*ibid*)

⁵⁸ Apple, 'Apple and Google partner on COVID-19 contact tracing technology' (10 April 2020) <<https://www.apple.com/uk/newsroom/2020/04/apple-and-google-partner-on-covid-19-contact-tracing-technology/>> accessed 17 September 2021

⁵⁹ See Michael Veale, 'Privacy is not the problem with the Apple-Google contact-tracing toolkit', The Guardian (1 July 2020) <<https://www.theguardian.com/commentisfree/2020/jul/01/apple-google-contact-tracing-app-tech-giant-digital-rights>> accessed 17 September 2021

⁶⁰ Stefania Milan, Michael Veale, Linnet Taylor, Seda Gürses, 'Promises Made to Be Broken: Performance and Performativity in Digital Vaccine and Immunity Certification' [2021] 12(2) European Journal of Risk Regulation 382, 382

⁶¹ World Health Organisation, 'Interim Position Paper: Considerations Regarding Proof of COVID-19 Vaccination for International Travellers' (5 February 2021) <<https://www.who.int/news-room/articles-detail/interim-position-paper-considerations-regarding-proof-of-covid-19-vaccination-for-international-travellers>> accessed 17 September 2021

information; and how it should be stored. The strongest arguments raised in favour of vaccine passports are that they would help end the need for generalised lockdowns.

At the beginning of pandemic, in April 2020, the WHO warned that scientific evidence did not support immunity certification.⁶² In March 2021, the WHO clarified that it is in favour of vaccine certificates, although not as a prerequisite for international travel, as this may result in discrimination against people who are not able to get vaccinated.⁶³ In March the WHO also released the first version of 'Interim guidance for developing a Smart Vaccination Certificate' for interoperability standards.⁶⁴ The Smart Vaccine Certificates are not intended to serve as an 'immunity passport,' and the recommendations include that Covid vaccination status should still be recorded through the paper-based International Certificate of Vaccination or Prophylaxis.⁶⁵ The guidance released will have three versions prior to the final issue, with public feedback and input on all three.

Several organizations have been working on developing their own vaccine passport, including: the International Air Transport Association (IATA); IBM; the World Economic Forum (WEF) and the Commons Project Foundation; and the Linux Foundation in partnership with the Covid-19 Credentials Initiative. The IATA Travel Pass is an entirely digital app, but is currently limited to airlines participating in the trial run.⁶⁶ The app '[e]nables passengers to (1) create a "digital passport", (2) verify their test/vaccination meets the regulations and (3) share test or vaccination certificates with authorities to facilitate travel'.⁶⁷ The IBM version is a digital health pass for public locations, built on IBM's blockchain technology.⁶⁸ The health pass can use multiple data types, including temperature checks, virus exposure notifications, test results, and vaccine status.⁶⁹ The WEF and Commons Project Foundation effort is a digital health passport called CommonPass, which generates a QR code that provides test status or vaccine information to an authority.⁷⁰ The Linux Foundation and Covid-19 Credentials Initiative (CCI) is also working with IBM and CommonPass, with CCI having created a collective of more than 300 people from five continents, with the idea of creating a universally accessible and equitable standard for vaccine credential apps. Other private groups suggesting or requiring vaccine passports include Etihad Airways and Emirates Airline, both of which will start using the IATA digital pass.⁷¹ This expanding list of privately run vaccine certificate schemes was one of the drivers for the creation in the EU of a harmonised, interoperable EU Green Pass scheme (see below).

Several questions have arisen around Covid-19 certification methods such as vaccine passports, particularly given that they can be used either for proof of antibodies, or of a negative test.⁷² Such questions include:

⁶² World Health Organisation, 'Immunity passports' in the context of COVID-19' (24 April 2020) <<https://www.who.int/news-room/commentaries/detail/immunity-passports-in-the-context-of-covid-19>> accessed 17 September 2021

⁶³ Sandrine Amiel, 'WHO advises against vaccine passports as EU debates "Green Pass"', Euronews (23 March 2021) <<https://www.euronews.com/2021/03/18/who-advises-against-vaccine-passports-as-eu-debates-green-pass>> accessed 17 September 2021

⁶⁴ World Health Organisation, 'Call for public comments: interim guidance for developing a Smart Vaccination Certificate – Release Candidate 1' (19 March 2021) <<https://www.who.int/news-room/articles-detail/call-for-public-comments-interim-guidance-for-developing-a-smart-vaccination-certificate-release-candidate-1>> accessed 17 September 2021

⁶⁵ 'Call for public comments' (*ibid*)

⁶⁶ 'IATA Travel Pass Initiative' <<https://www.iata.org/en/programs/passenger/travel-pass/>> accessed 17 September 2021

⁶⁷ 'IATA Travel Pass Initiative' (*ibid*)

⁶⁸ Tariro Mzezewa, 'Coming Soon: The "Vaccine Passport"', The New York Times (4 February 2021) <<https://www.nytimes.com/2021/02/04/travel/coronavirus-vaccine-passports.html>> accessed 17 September 2021

⁶⁹ 'Coming Soon: The "Vaccine Passport"' (*ibid*)

⁷⁰ The Commons Project, 'CommonPass' <<https://thecommonsproject.org/commonpass>> accessed 17 September 2021

⁷¹ 'Bahrain, Kuwait and Norway Contact Tracing Apps most dangerous for privacy' (*supra* n16)

⁷² Lilian Edwards, 'Part 1: the Great Vaccination Passports Debate: "ID Cards on Steroids" or the Rational Way Forward?' (*BIICL Blog*, 1 April 2021) <<https://www.biicl.org/blog/22/part-1-the-great-vaccination-passports-debate-id-cards-on-steroids-or-the-rational-way-forward?preview=true>> accessed 17 September 2021 and Irene

1. Which Covid-19 test should be used?
2. For how long should the vaccine passport be considered valid?⁷³
3. To what strains of the virus should the individual be considered relatively immune?
4. Where should vaccine passports be allowed to be required (workplaces, educational institutions, etc)? How should vaccine passports be balanced against employment/discrimination law implications?
5. What should the trade-off between privacy and public health look like?

Additionally, there have been many arguments raised against vaccine passports being used to widely restrict access for social reasons:

1. Vaccine passports amount to forcing people to vaccinate, which could lead to public stigmatisation;⁷⁴
2. Their use 'legitimises inequalities between countries and people by formalising ways to distinguish between the vaccinated and non-vaccinated and to exclude the latter, thus reinforcing both mobility and connectivity divides';⁷⁵
3. There is insufficient evidence that vaccination prevents onward transmission;⁷⁶
4. There is a slippery slope in terms of data collection: it is conceivable that once infrastructure is in place to provide health credentials, other health statuses could easily be added;
5. There are many credible privacy concerns about public authorities keeping large amounts of health data secure;
6. Such measures may exacerbate existing social inequalities, particularly among already disadvantaged groups that have been taking up vaccines in smaller percentages. Relatedly, policies which discriminate against groups sharing a protected characteristic must be proportionate;
7. Widespread use of vaccine passports may unfairly discriminate [against] those who cannot receive the vaccine due to individual medical, disability, pregnancy, or youth-related concerns;
8. Feature creep: while the vaccine passports may be intended to accomplish one specific aim, they may well be used for others;
9. While one can create a certificate for a particular vaccine event, some of the data is provided to the individual at the time of vaccination on a card - all other information is contained in the individual's GP's records: a prime target for expanded data-sharing, which itself engages core concerns of confidentiality;⁷⁷
10. Other concerns relate to the protection of data privacy and human rights, given that vaccine passports would 'use sensitive personal health information, create a new distinction between

Pietropaoli, 'Part 2: Getting Digital Health Passports Right? Legal, Ethical and Equality Considerations' (*BIICL Blog*, 1 April 2021) <<https://www.biicl.org/blog/23/part-2-getting-digital-health-passports-right-legal-ethical-and-equality-considerations>> accessed 17 September 2021

⁷³ For example, the Green Passport in Israel is for 6 months.

⁷⁴ Nuffield Council on Bioethics, 'COVID-19 antibody testing and "immunity certification"' (18 June 2021) <<https://www.nuffieldbioethics.org/publications/covid-19-antibody-testing-and-immunity-certification/read-the-briefing>> accessed 17 September 2021

⁷⁵ 'Promises Made to Be Broken: Performance and Performativity in Digital Vaccine and Immunity Certification' (*supra* n60)

⁷⁶ Ada Lovelace Institute, 'What Place Should COVID-19 Vaccine Passports Have in Society?' (17 February 2021) <<https://www.adalovelaceinstitute.org/summary/covid-19-vaccine-passports/>> accessed 17 September 2021

⁷⁷ Phil, "'Vaccination Passports": State of Play' (*Infinite Ideas Machine*, 17 February 2021) <<http://www.infiniteideasmachine.com/2021/02/vaccination-passports-state-of-play/>> accessed 17 September 2021

individuals based on their health status, and be used to determine the degree of freedoms and rights one may enjoy'.⁷⁸

Arguments based on difficulty of implementation include:

1. More than one billion people worldwide cannot prove their identity, and needing to show vaccine status might heighten inequality and risk;⁷⁹
2. Technical concerns about privacy while data sharing;⁸⁰
3. The creation of long-lasting ethical technology systems that will not store data or track them takes time;⁸¹
4. A giant centralised database is an immediate privacy concern;⁸²

Many jurisdictions have either already provided vaccine passports or have committed extensive research prior to their use.

Early worries in the UK about coercive use of vaccine passports led to the production of a model statute in April 2020. The UK Coronavirus (Safeguards) Bill, a 2020 proposal by several academics, provided that '[n]o person may require the display of an immunity certificate for any other purpose, or as a condition of any activity, except where such requirement (a) is made publicly accessible, (b) any relevant data controller has issued an appropriate policy document under DPA 2018, (c) is in pursuit of the legitimate goal of diagnosis, containment, treatment, research into or reduction of coronavirus disease, (d) is necessary and proportionate to the goal in (c) above, (e) is limited in time to the minimum period necessary to achieve the goal in (c) above.'⁸³ The Bill was not however implemented.

Vaccine passports: country studies

Israel's Green Passport was the first in the world from a state and was released as an app in February 2021.⁸⁴ It was required to show a digital vaccine certificate for many daily activities, such as access to gyms, hotels, theatres, and concerts, with malls and museums being open to all.⁸⁵ There are tentative accords in place with Greece and Cyprus to expand the programme. There have been ethical concerns around the Israel parliament's agreement to give local authorities personal details regarding unvaccinated inhabitants to conduct targeted vaccination campaigns.⁸⁶ In June 2021 Israel sunsetted

⁷⁸ Ana Beduschi, 'COVID-19: Human Rights Implications of Digital Certificates for Health Status Verification' (*University of Exeter, Law School*) <<https://socialsciences.exeter.ac.uk/law/research/projects/project/?id=663>> accessed 17 September 2021

⁷⁹ 'Coming Soon: The "Vaccine Passport"' (*supra* n68)

⁸⁰ 'Coming Soon: The "Vaccine Passport"' (*supra* n68)

⁸¹ 'Coming Soon: The "Vaccine Passport"' (*supra* n68)

⁸² "'Vaccination Passports": State of Play' (*supra* n77)

⁸³ 'Coronavirus Safeguards Bill 2020' (*supra* n45)

⁸⁴ 'Difficult Trade-Offs in Response to COVID-19' (*supra* n1) Also note lower vaccination level among Israeli arabs: <https://www.haaretz.com/israel-news/.premium-a-third-of-israeli-arabs-have-yet-to-be-vaccinated-against-covid-1.10102528>

⁸⁵ Oliver Holmes, 'Covid: vaccinated israelis to enjoy bars and hotels with "green pass"', *The Guardian* (19 February 2021) <<http://www.theguardian.com/world/2021/feb/19/covid-vaccinated-israelis-to-enjoy-bars-and-hotels-with-green-pass>> accessed 17 September 2021

⁸⁶ Oliver Holmes, 'Green Pass: How Are Covid Vaccine Passports Working for Israel?', *The Guardian* (28 February 2021) <<http://www.theguardian.com/world/2021/feb/28/green-pass-how-are-vaccine-passports-working-in-israel>> accessed 17 September 2021

the Green Pass system, attributing the pause to successful lowering of Covid-19 cases.⁸⁷ The pass was revived when Israel's cases began to rise again driven by the Delta variant.⁸⁸

In the *United States*, President Biden's executive order asked government agencies to assess the feasibility of linking vaccine certificates with other related documents, and to produce digital versions of the results.⁸⁹

Canadian privacy commissioners - federal and provincial - have stated that 'governments should prove that vaccine passports are necessary, either for travel or access [to] businesses and services', and 'should contain only the information required to prove vaccination and not additional health information that could be compromised'.⁹⁰ Most notably, the commissioners' statement included that 'once the pandemic has been declared over, or proof of vaccination proves to no longer be necessary, the passports should be destroyed'.⁹¹ Independent oversight in Canada has been requested for any sort of vaccine programme, and for specific information to be provided to the public about the use and storage of their information.⁹² The province of Quebec currently provides downloadable QR codes for proof of vaccination, and Quebec's economic minister signalled that '[b]usinesses in Quebec should be able to use vaccine passports to make their workplaces safer for staff and clients'.⁹³ The federal government indicated that work is ongoing to provide a vaccine passport for international travel.⁹⁴

Case law is developing in some countries. For example, on 8 November 2021, the High Court of *New Zealand* dismissed a challenge to an order requiring aviation security service employees to be vaccinated.⁹⁵

In April 2021, *Italy* became the first country in Europe to make vaccination against Covid-19 mandatory for healthcare workers, as its government approved an emergency decree. Health workers who refuse to get vaccinated have the option to be transferred to duties that do not carry the risk of spreading the virus or to be suspended without pay.⁹⁶ In October 2021, Italy became the first European country to make digital vaccine certificates compulsory for both public and private sectors. The obligation began on 15th October and remains in force until the end of 2021.⁹⁷

⁸⁷ 'Israel to End COVID-19 Restrictions after Vaccine Success', Reuters (23 May 2021) <<https://www.reuters.com/world/middle-east/israel-end-covid-19-restrictions-after-vaccine-success-2021-05-23/>> accessed 17 September 2021

⁸⁸ Toi Staff, Israel set to expand Green Pass; TV: 3rd shot may soon be offered to over-45s', The Times of Israel (10 August 2021) <<https://www.timesofisrael.com/israel-set-to-expand-green-pass-tv-3rd-shot-may-soon-be-offered-to-over-45s/>> accessed 17 September 2021

⁸⁹ Noah Welland, 'Here's What's in Biden's Executive Orders Aimed at Curbing the Pandemic', The New York Times (21 January 2021) <<https://www.nytimes.com/2021/01/21/us/politics/biden-executive-orders-coronavirus.html>> accessed 17 September 2021

⁹⁰ Peter Zimonjic, 'Federal, Provincial Privacy Watchdogs Issue Warning about Vaccine Passports', CBC News (19 May 2021) <<https://www.cbc.ca/news/politics/privacy-commissioners-vaccine-passports-1.6033078>> accessed 17 September 2021

⁹¹ 'Federal, Provincial Privacy Watchdogs Issue Warning about Vaccine Passports' (*ibid*)

⁹² 'Federal, Provincial Privacy Watchdogs Issue Warning about Vaccine Passports' (*ibid*)

⁹³ Jonathan Montpetit, 'Vaccine Passport Could Be Required for Going to Work, Restaurants, Quebec's Economy Minister Says', CBC News (10 May 2021) <<https://www.cbc.ca/news/canada/montreal/quebec-vaccine-passports-restaurants-digital-proof-1.6019982>> accessed 17 September 2021

⁹⁴ 'Vaccine Passport Could Be Required for Going to Work, Restaurants, Quebec's Economy Minister Says' (*ibid*)

⁹⁵ Courts of New Zealand, *Four Aviation Security Service Employees v Minister of Covid-19 Response* [2021] NZHC 3012, 8 November 2021 <<https://www.courtsofnz.govt.nz/cases/four-aviation-security-service-employees-v-minister-of-covid-19-response>> (accessed 12 November 2021).

⁹⁶ Marta Paterlini, 'Covid-19: Italy makes vaccination mandatory for healthcare workers', *BMJ* 2021 373 n. 905 <<https://www.bmj.com/content/373/bmj.n905>>

⁹⁷ Angela Giuffrida, 'Italy braced for unrest as Covid passes become mandatory for all workers', The Guardian, 14 October 2021 <<https://www.theguardian.com/world/2021/oct/14/italy-braced-for-unrest-as-covid-pass-becomes-mandatory-for-all-workers>>

The *EU* announced in March 2021 their plan to have in place within three months a Digital Green Certificate to facilitate safe movement within the EU.⁹⁸ The 'EU Digital COVID Certificate' is proof that the individual has i) been vaccinated against Covid; ii) received a negative test result; or iii) recovered from Covid.⁹⁹ The certificate can be provided either digitally or on paper; provides a QR code; is free of charge; states the individual's status in both their national language and in English; and is valid in all EU countries.¹⁰⁰ It is also stated to be 'safe and secure'.¹⁰¹ There was some pushback against the Certificate by EU countries who depend heavily on tourism.¹⁰²

The EU Digital Covid Certificate Regulation entered application on 1st July 2021.¹⁰³ With this, EU citizens and residents can have their Digital COVID Certificates issued and verified across the EU. National authorities (e.g. test centres or health authorities) are in charge of issuing the certificate. The certificate can be issued in digital or paper format. Both have a QR code that contains essential information, as well as a digital signature to make sure the certificate is authentic. When the certificate is checked, the QR code is scanned, and the signature verified. The certificate contains necessary key information such as name, date of birth, date of issuance, relevant information about vaccine/test/recovery and a unique identifier. The European Commission explains that this data remains on the certificate and is not stored or retained when a certificate is verified in another Member State and is stored in a secure database in each country.¹⁰⁴

In the *UK*, opinion on vaccine passports and how if at all they should be used has been divided¹⁰⁵ and fluctuated over time. Significant factors have been increasing accessibility to, and uptake of, vaccination; reduction in the number of groups recommended not to be vaccinated; and the fact that vaccination rather than reduction of infection rates has become the main strategy of the UK government to control the pandemic and return to the 'new normal'.

In February 2021, The UK Royal Society highlighted 12 key criteria that vaccine passports should satisfy:

1. meet benchmarks for Covid immunity
2. accommodate differences between vaccines in their efficacy, and changes in vaccine efficacy against emerging SARS CoV-2 variants
3. internationally standardised
4. with verifiable credentials
5. defined uses
6. based on a platform of interoperable technologies

⁹⁸ Hanne Cokelaere and Carlo Martuscelli, 'Commission to Propose Digital Green Pass for Travel This Month', POLITICO (1 March 2021) <<https://www.politico.eu/article/commission-to-propose-digital-green-pass-for-travel-this-month/>> accessed 17 September 2021

⁹⁹ European Commission, 'EU Digital COVID Certificate', <https://ec.europa.eu/info/live-work-travel-eu/coronavirus-response/safe-covid-19-vaccines-europeans/eu-digital-covid-certificate_en> accessed 17 September 2021

¹⁰⁰ 'EU Digital COVID Certificate' (*ibid*)

¹⁰¹ 'EU Digital COVID Certificate' (*ibid*)

¹⁰² Tony Connelly, 'Teething Troubles for EU Digital Covid Certificate', RTE (7 July 2021) <<https://www.rte.ie/news/coronavirus/2021/0707/1233706-eu-digital-covid-certificate/>> accessed 17 September 2021

¹⁰³ 'EU Digital COVID Certificate' (*supra* n99)

¹⁰⁴ 'EU Digital COVID Certificate' (*supra* n99)

¹⁰⁵ For an extreme example, see 'anti-vax' protestors attacking the former BBC television centre in September 2021: Jim Waterson, 'Anti-vaccine protesters storm BBC HQ – years after it moved out', The Guardian (9 August 2021) <<https://www.theguardian.com/world/2021/aug/09/confused-anti-vaccine-protesters-storm-bbc-hq-years-after-moved-out>> accessed 17 September 2021

7. secure for personal data
8. portable
9. affordable for individuals and governments
10. should meet legal standards
11. should meet ethical (equity and non-discrimination) standards, and
12. the conditions of use should be understood and accepted by passport holders.¹⁰⁶

The UK Equality and Human Rights Commission signalled early on that vaccine certificates could lead to unlawful discrimination.¹⁰⁷ On individual liberties, the Prime Minister reassured Parliament in December 2020 that ‘it is no part of our culture or our ambition in this country to make vaccines mandatory. That is not how we do things’.¹⁰⁸ In February 2021, however, the UK Foreign Office, the Department for Transportation, and the Department for Health and Social Care announced they were planning for a certification system for travellers whose destination demanded a vaccine passport as a condition of entry.¹⁰⁹ A petition was introduced in March in the House of Commons against the rollout of vaccine passports for the British public.¹¹⁰ On 10th June 2021, the Public Administration and Constitutional Affairs Committee, who had consulted publicly to consider ‘potential ethical, legal and operational issues and the efficacy and appropriateness of a certificate system’¹¹¹ reported that they did not see that a scientific case, nor a good public interest case, had been made out by the government for COVID-status certification scheme, and that there were serious ethical concerns relating to discrimination, individual civil liberties and data protection.

Notwithstanding this, during the course of the inquiry, the government announced their intention to move forward swiftly with a scheme to facilitate *international* travel by UK citizens, citing the fact that the matter was effectively out of the UK’s hands given the evolution of schemes like the EU Green Pass.¹¹² The scheme introduced allows those travelling from the UK to display proof of full vaccination via the NHS App (in England and Wales only), the NHS website or a paper letter.¹¹³ The NHS App predated the pandemic but has been repurposed as a vaccination certificate and is notably separate from the NHS COVID-19 app used for contact tracing.¹¹⁴ The data protection impact assessment (DPIA) for the NHS App as amended to be a COVID Pass appears not to have been released publicly, although private access was requested by the Public Administration and Constitutional Affairs Committee (see

¹⁰⁶ The Royal Society, ‘Twelve Criteria for the Development and Use of COVID-19 Vaccine Passports’ (14 February 2021) <<https://royalsociety.org/-/media/policy/projects/set-c/set-c-vaccine-passports.pdf>> accessed 17 September 2021, 22

¹⁰⁷ Aubrey Allegrett and Robert Booth, ‘Covid-status certificate scheme could be unlawful discrimination, says EHRG’, *The Guardian* (14 April 2021) <<https://www.theguardian.com/world/2021/apr/14/covid-status-certificates-may-cause-unlawful-discrimination-warns-ehrc>> accessed 17 September 2021

¹⁰⁸ Cited in Jeff King, ‘United Kingdom: mandatory vaccination and vaccine conditionality’ (*Lex-Atlas: Covid-19*, 14 May 2021) <<https://lexatlas-c19.org/united-kingdom-mandatory-vaccination-and-vaccine-conditionality/>>

¹⁰⁹ Francis Elliott, Anthea Carassava, Ben Clatworthy, and Kay Law, ‘Government Plans Covid Vaccine Passports to Allow Foreign Holidays’, *The Times* (5 February 2021) <<https://www.thetimes.co.uk/article/government-plans-covid-vaccine-passports-to-allow-foreign-holidays-3mc9vd0xk>> accessed 17 September 2021

¹¹⁰ HC Deb 15 March 2021, vol 619

¹¹¹ Public Administration and Constitutional Affairs Committee, ‘Covid 19 Vaccine Certification’, <<https://committees.parliament.uk/work/1104/covid-19-vaccine-certification/publications/>> accessed 14 September 2021

¹¹² Public Administration and Constitutional Affairs Committee, *Covid-Status Certification: Second Report* (HC 2021-22 42) [75]. The Committee were unimpressed, noting that the launch of the NHS App without notification to Parliament ‘could be construed as contempt for Parliament and this Committee’ ([78]).

¹¹³ NHS Digital, ‘NHS COVID Pass’ <<https://digital.nhs.uk/services/nhs-app/nhs-app-guidance-for-gp-practices/nhs-covid-pass>> accessed 17 September 2021

¹¹⁴ ‘Using the NHS App as a COVID Vaccination Passport’ (18 May 2021) <<https://www.sussexcommunity.nhs.uk/news/using-the-nhs-app-as-a-covid-vaccination-passport/380028>> accessed 17 September 2021. By contrast, the venue check-in functionality, included as an integral part of the NHS COVID-19 app, ran into problems because of inconsistency with the Google/Apple terms of use for their Emissions Notification protocol (see WP3-D2B deliverable)

above). They recommended publication of any DPIA but the ministerial response was that DPIAs were 'internal assessments, that are routinely iterated and therefore not made public'.¹¹⁵

Whether *domestic* use of Covid certification would be mandated, encouraged, or discouraged has been more controversial than use for international travel, which has effectively been driven by actors outside the UK. The Cabinet Office initially expressed enthusiasm in spring 2021 for pilots to explore using 'vaccination passports' (based on full vaccination, negative test, or recent proof of infection) to open up the economy, in areas like pubs, hostelry and non-essential shops.¹¹⁶ However, they then held a consultation that attracted a remarkable number of 52,450 responses, almost all opposed to widespread use of vaccine passports. A brief report was released in July 2021¹¹⁷ which announced that the government would 'not mandate the use of COVID-status certification as a condition of entry for visitors to any setting at the present time';¹¹⁸ an exception was care homes, where following a consultation, rules have been brought in requiring workers to be fully vaccinated by November 2021.

Nothing was said about any control being exerted over the use of Covid certification by the *private* sector - e.g. issues related to human rights, data protection and labour law.¹¹⁹ '[T]o ban certification in domestic settings would, in most cases, be an unjustified intrusion on how organisations choose to make their premises safe. Essential settings should not use certification, but others can decide to use it at their own discretion in compliance with legal obligations'.¹²⁰

Thus, in advance of unlocking or 'Freedom Day' in England on 19 July 2021, it appeared that use of the NHS COVID pass had been reduced to voluntary in the domestic sector. Furthermore, even when implemented as a requirement by a private operator (e.g. employer, venue) the NHS COVID Pass gave people who had been unable or unwilling to get vaccinated two other options for demonstrating their safe status: recent negative test or proof of recent recovery from natural infection.¹²¹ In the face of unexpectedly soaring infection rates prior to 'Freedom Day', however, the government announced plans to mandate vaccine passports in facilities or events where people are likely to be in close proximity to a large number of people from other households for a sustained period of time (e.g. nightclubs and music venues, business events and festivals, spectator sport events). Although details were not settled, this appeared to be a single requirement of proof of vaccination, rather than the three options available via the full NHS COVID pass, and thus much more prone to accusations of discriminatory treatment.

In yet another policy U-turn however, described as an 'extraordinary volte-face',¹²² Sajid Javid the Health Minister announced on 11 September that this scheme would not in fact go ahead.¹²³ The main motivation for this appears to have been dissension within Tory ranks, plus industry opposition, although data may also have played a part, as one of the clear reasons for such a scheme was to incentivise young people to get vaccinated, following the French model, and figures in fact show a roughly similar

¹¹⁵ 'Covid-Status Certification: Second Report' (supra, n112 [71])

¹¹⁶ See eg Guy Davies, 'Vaccine passports are being trialed in the UK: Why are they so controversial?', abcNews (12 April 2021) <<https://abcnews.go.com/International/vaccine-passports-trialed-uk-controversial/story?id=76976981>> accessed 14 September 2021

¹¹⁷ HM Government, 'COVID-Status Certification Review Report' (July 2021) <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/999408/COVID-Status-Certification-Review-Report.pdf> accessed 14 September 2021

¹¹⁸ 'COVID-Status Certification Review Report' (*ibid* [4])

¹¹⁹ For further details see deliverable WP3-D2A on employment law.

¹²⁰ 'COVID-Status Certification Review Report' (*supra* n117 [7])

¹²¹ UK Government, 'NHS COVID Pass' <<https://www.gov.uk/guidance/nhs-covid-pass>> accessed 17 September 2021; NHS, 'NHS COVID Pass' <<https://www.nhs.uk/conditions/coronavirus-covid-19/covid-pass/>> accessed 17 September 2021

¹²² Audrey Allegretti, 'Tory MPs fear return of Covid vaccine passports plan in England', The Guardian, (12 September 2021) <<https://www.theguardian.com/world/2021/sep/12/plans-for-vaccine-passports-in-england-ditched-javid-confirms>> accessed 15 September 2021

¹²³ Marie Jackson, 'England vaccine passport plans ditched, Sajid Javid says', BBC News (13 September 2021) <<https://www.bbc.co.uk/news/uk-58535258>> accessed 15 September 2021

uptake in the UK by the under 35s to their older counterparts. The government has reserved the right still to introduce such a scheme if it becomes necessary.

From 11 November 2021, to enter a care home, individuals need to demonstrate that they have received a complete course of their Covid-19 vaccination. Notably, the alternatives available via the NHS App of proof of recent negative test or of recent natural immunity are not acceptable. This date was chosen to allow all staff time to get both vaccination doses (if applicable) along with the four-week period for immunity to develop. Medical exemptions are available, as already noted for employers in the “COVID Green Book”, chapter 14a.¹²⁴ Under additional measures announced by the Health and Social Care Secretary on 9 November 2021, health and social care workers in England will also need to provide evidence they have been fully vaccinated against Covid in order to be deployed.¹²⁵ The government is expected to set a deadline for the beginning of April 2022 to give 103,000 still unvaccinated health workers time to get two jabs.¹²⁶

Aggregated use of data and vaccine allocation apps

These systems include AI-based systems for symptom checking, predicting the risk of infection, or tracking vaccine safety. They can provide AI analysis of aggregate mobility data. The NHS QCovid risk assessment falls somewhere between individual and aggregated data, and is used to trawl patient health records and flag individuals who should be shielded, and should be prioritised for vaccination.¹²⁷ The algorithm has been flagged for inconsistencies, as the algorithm ascribes people to the highest relevant risk category if their information is incomplete. For example if no BMI information is available, a BMI over 30 is ascribed, and if no ethnicity is provided, the black African ethnicity is ascribed (the group at highest risk).¹²⁸ The algorithm has also been accused of compounding patient list inequalities.¹²⁹ Other UK-based aggregated data technologies include Palantir’s own Q algorithm, and the new OpenSAFELY secure analytics platform for electronic health records. OpenSAFELY states that it uses ‘a new model for enhanced security and timely access to data: we don’t transport large volumes of potentially disclosive pseudonymised patient data outside of the secure environments managed by the electronic health record software company; instead, trusted analysts can run large scale computation across near real-time pseudonymised patient records inside the data centre of the electronic health records software company.’¹³⁰

¹²⁴ Public Health England, ‘COVID-19: the green book, chapter 14a’ (27 November 2020, updated 3 September 2021) <<https://www.gov.uk/government/publications/covid-19-the-green-book-chapter-14a>> accessed 15 September 2021

¹²⁵ UK Government, ‘Government to introduce COVID-19 vaccination as a condition of deployment of all frontline health and social care workers’, 9 November 2021 <<https://www.gov.uk/government/news/government-to-introduce-covid-19-vaccination-as-a-condition-of-deployment-for-all-frontline-health-and-social-care-workers>> (accessed 12 November 2021).

¹²⁶ Joseph Lee and Marie Jackson, ‘Covid-19 vaccines to be compulsory for frontline NHS staff in England’, BBC News, 10 November 2021 <<https://www.bbc.co.uk/news/health-59215282>> (accessed 12 November 2021).

¹²⁷ Linda Geddes, ‘Scientists Question NHS Algorithm as Young People Called in for Jab’, The Guardian (9 March 2021) <<http://www.theguardian.com/society/2021/mar/09/scientists-question-nhs-algorithm-as-young-people-called-in-for-jab>> accessed 17 September 2021

¹²⁸ Scientists Question NHS Algorithm as Young People Called in for Jab’ (*ibid*)

¹²⁹ Reema Patel, ‘Why the COVID-19 Shielded Patient List Might Both Compound and Address Inequalities’ (*Ada Lovelace Institute*, 18 February 2021) <<https://www.adalovelaceinstitute.org/blog/covid-19-shielded-patient-list-inequalities/>> accessed 17 September 2021

¹³⁰ ‘OpenSAFELY: Home’ <<https://www.opensafely.org/>> accessed 17 September 2021

In some cases, such databases are tied to vaccine distribution. This was the case in England, where the QCovid algorithm was used to identify those targeted for priority vaccination access based on a risk assessment.¹³¹ Distribution prioritisation approaches varied by country, however.

The United States' approach to vaccine allocation differed between federal, state, and local. Oregon, for instance, [prioritizing] teachers over the elderly for Covid shots, an approach that could help schools and businesses reopen. New Jersey has put smokers ahead of educators, which could save lives.¹³² At the federal level, vaccines were divided each week between the 50 states, based on the number of individuals over 18 years.¹³³ This has been criticised for having potentially high margins of error due to its reliance on household census data which may not include undocumented migrants or tribal communities.¹³⁴

A citizen jury run by NIHR Applied Research Collaboration, NHSX, and the National Data Guardian for Health and Social Care identified that participants were far more supportive of the Oxford/NHS collaboration 'OpenSAFELY' - which used GP patient data outputted in aggregate - over NHS Data Store and Data Platform, which is a central store of patient data.¹³⁵ Concerns were shared about the lack of transparency and open governance of the NHS Data Store, even with the background of the pandemic.¹³⁶ While other surveys indicate that '[c]ontext is a defining factor when it comes to attitudes [towards] data uses', it is also held that 'high trust in GP and NHS data uses is in danger of being diminished by the involvement of less trusted parties, such as technology companies, in health data initiatives like the NHS Covid data store.'¹³⁷

Venue check-in or QR code apps are used to track individuals by location. These can be part of a track and trace app, such as the England/Wales version, or separate, such as the Scottish version. Visitors to a venue scan the QR code at a venue and are then alerted if they may have come into contact with an individual who has tested positive for Covid. Variances in use can include whether venues' use of the posters with QR codes is voluntary or mandatory; whether app data is stored on the phone or in a central database; whether the app relies on self-reporting; and whether individuals who may have come in contact are contacted automatically.¹³⁸

¹³¹ The University of Edinburgh, 'QCovid Algorithm to Help Identify Those at High Risk from COVID-19', <<https://www.ed.ac.uk/usher/news-events/news-2021/qcovid-algorithm-validated>> accessed 17 September 2021

¹³² Natasha Singer, 'Where Do Vaccine Doses Go, and Who Gets Them? The Algorithms Decide' The New York Times, 7 February 2021 <<https://www.nytimes.com/2021/02/07/technology/vaccine-algorithms.html>> accessed 17 September 2021

¹³³ 'Where Do Vaccine Doses Go' (*ibid*)

¹³⁴ 'Where Do Vaccine Doses Go' (*ibid*)

¹³⁵ Malcolm Oswald and Louise Laverty, 'Data Sharing in a Pandemic: Three Citizens' Juries' (NIHR Applied Research Collaboration Greater Manchester) < https://www.arc-gm.nihr.ac.uk/media/Resources/ARC/Digital%20Health/Citizen%20Juries/12621_NIHR_Juries_Report_ELECTRONIC.pdf> accessed 17 September 2021, 10.

¹³⁶ 'Data Sharing in a Pandemic: Three Citizens' Juries' (*ibid*)

¹³⁷ Helen Kennedy, Mark Taylor, Susan Oman, Jo Bates, Itzelle Medina-Perea, Hannah Ditchfield, Lulu Pinney, 'Living with Data survey report (June 2021)' <<https://livingwithdata.org/project/wp-content/uploads/2021/07/living-with-data-2020-survey-full-report-final.pdf>> accessed 17 September 2021, 60

¹³⁸ For further detail, see the WP3-D2B case study on Venue Check in Apps. Also, comparators Luca (Germany) <https://algorithmwatch.org/en/tracers/vulnerability-in-german-contact-tracing-app-luca/> criticised for being centralised and insecure ('Vulnerability in contact tracing app Luca could have allowed attackers to "paralyse" health departments' (*Algorithm Watch*) < <https://algorithmwatch.org/en/tracers/vulnerability-in-german-contact-tracing-app-luca/>> accessed 17 September 2021); DP3T model app, decentralised and very privacy preserving (Wouter Lueks, Seda Gürses, Michael Veale, Edouard Bugnion, Marcel Salathé, Kenneth G. Paterson, and Carmela Troncoso, 'CrowdNotifier: Decentralized Privacy-Preserving Presence Tracing' [2021] 4 *Sciendo*, <<https://sciendo.com/pdf/10.2478/popets-2021-0074>> accessed 17 September 2021

Key governance and rule of law concerns of data-driven technologies

The Covid-19 pandemic highlights the necessity of established good governance and rule of law frameworks for data-driven methods during high impact events.¹³⁹ Data collection should be as 'light' as possible, collecting 'the least amount of data required for public health efficacy and to set purpose limitations around the use of data'.¹⁴⁰ Additionally, strict purpose limitations on already collected data can ensure rights are protected and that data is safeguarded against misuse.¹⁴¹ This can be done by several methods, one being 'sunset clauses,' which create mandatory standards for data expiration. Sunset clauses can be built into collection and storage methods by design, hard coding the set expiration.

Further and more broadly, the unprecedented levels of surveillance and data gathering have largely been granted under extraordinary powers for a temporary emergency: '[w]hen the pandemic is over, such extraordinary measures must be put to an end and held to account.'¹⁴² The sharing of health data between private platforms is a line of inquiry that must also be pursued in this regard – from the perspective of e.g. transparency.¹⁴³

One potential measure to protect the use of data, as examined by the partnership between The Ada Lovelace Institute and the AI Council, is data stewardship.¹⁴⁴ The report produced explores three potential mechanisms: data trusts, data cooperatives, and corporate and contractual mechanisms.¹⁴⁵ The report has been endorsed by the City of London Law Society, the Open Data

¹³⁹ There are multiple institutions assessing Covid responses regarding rule of law in the UK. These include the COVID-19 Review Observatory (CVRO), which records, tracks, and assesses parliamentary reviews to the pandemic from human rights perspective, BIICL's Rule of Law in Times of Health Crisis project (<https://www.biicl.org/projects/rule-of-law-in-times-of-health-crisis>, accessed 17 September 2021) and policy brief on Principles to Uphold the Rule of Law and Good Governance in Public Health Emergencies (Joelle Grogan and Nyasha Weinberg, 'Principles to Uphold the Rule of Law and Good Governance in Public Health Emergencies' (Reconnect, August 2020)). Examples outside the UK include the Verfassungsblog, a journalistic and academic forum of debate on topical events and developments in constitutional law and politics in Germany ('Covid 19 and States of Emergency, <<https://verfassungsblog.de/category/debates/covid-19-and-states-of-emergency-debates/>> accessed 17 September 2021); In terms of assessment of rule of law, two examples include the COVID-SCORE: '[a] global survey to assess public perceptions of government responses to COVID-19,' (Jeffrey V. Lazarus et al., 'COVID-SCORE: A Global Survey to Assess Public Perceptions of Government Responses to COVID-19 (COVID-SCORE-10)', [2020] 15(10) *PLOS ONE*) and the Covid Performance Index, which looks at the impacts of geography, political systems, population size, and economic development on COVID outcomes (Lowy Institute, 'Covid Performance Index' <<https://interactives.lowyinstitute.org/features/covid-performance/>> accessed 17 September 2021). The Covid-19 review observatory at the University of Birmingham assesses reviews of Covid measures against 5 principles: 1) Independence (is the review independent of government?), 2) Rights Framing (does the review consider human rights in the questions it asks?), 3) Evidence (does the review gather appropriate evidence?), 4) Participation (does the review allow for public participation?), 5) Influence (does the review exert influence on responses to the pandemic?) (University of Birmingham, 'Principles of COVID-19 Review' <<https://blog.bham.ac.uk/cvro/principles-of-covid-19-review/>> accessed 17 September 2021). See also Ada Lovelace's citizen juries part of this project. See also Jeff King and Octávio Luiz Motta Ferraz, 'Legal, Constitutional, and Ethical Principles for Mandatory Vaccination Requirements for Covid-19' *Lex-Atlas: Covid-19*, 1 November 2021 <https://lexatlas-c19.org/vaccination-principles/>

¹⁴⁰ 'Surveillance and the "New Normal" of Covid-19' (*supra* n50)

¹⁴¹ 'Surveillance and the "New Normal" of Covid-19' (*supra* n50)

¹⁴² Privacy International, 'Tracking the Global Response to COVID-19'

<<https://privacyinternational.org/examples/tracking-global-response-covid-19>> accessed 17 September 2021

¹⁴³ 'Surveillance and the "New Normal" of Covid-19' (*supra* n50)

¹⁴⁴ Ada Lovelace Institute, 'Exploring Legal Mechanisms for Data Stewardship' (4 March 2021)

<<https://www.adalovelaceinstitute.org/report/legal-mechanisms-data-stewardship/>> accessed 17 September 2021

¹⁴⁵ 'Exploring Legal Mechanisms for Data Stewardship' (*ibid*)

Institute, and the Data Trusts Initiative, and focuses on the making use of data in a way that is fair, equitable, and focused on social benefit.¹⁴⁶

Professor Yuval Noah Harari proposes that in the face of digitalisation and surveillance, there are three basic rules that help protect the public from ‘digital dictatorships,’ even in desperate times. First, whenever data is collected, it should be used to help those individuals rather than ‘manipulate, control or harm them’. Second, surveillance must go both ways: whenever surveillance of individuals is increased, surveillance of governments and corporations should also increase.¹⁴⁷ Third, data should never be concentrated in any one place, either during or after a crisis.¹⁴⁸ While this may produce redundancies and inefficiencies, these are necessary to prevent digital dictatorship.¹⁴⁹ Political scientist Adam Przeworski adds that ‘technologies marshaled in response to the global pandemic threaten to accelerate the concerning normalization of surveillance and technological encroachments’, and that ‘governments do not easily relinquish powers they acquire during emergencies’.¹⁵⁰

Transparency is another key element of responsible data usage during a public health crisis, and crucial to building trust of policies and government.¹⁵¹ The Observatory for Monitoring Data-Driven Approaches to COVID-19 (OMDDAC) found that 75 percent of stakeholders, including data organisation, government, regulators, law enforcement, the medical profession, the legal profession, charities and the third sector, the private sector and an interdisciplinary range of academics, ‘held serious concerns around the quality, robustness and shortcomings of the underlying data itself, and the associated lack of transparency around those issues’.¹⁵² These concerns included those around the ‘underlying datasets, based upon which key decisions are being reached, often contain errors, out-dated information, and omissions which can have serious implications for the results of any analysis’.¹⁵³ There are also concerns that the data is ‘being presented as factual and objective, without being clear about any underlying uncertainties, bias, values, or assumptions involved’.¹⁵⁴

Transparency is particularly complicated in the use of data-driven technologies, as complexity translates to opacity for the public - algorithms are not so easily interpreted, and in the case of deep neural networks, might require extensive work to be understood even by their creators.

Responses to public health emergencies must be proportionate, necessary, and within a period with a fixed end, whether the endpoint is number of cases or time. This is required for all aspects of solutions, not merely the most direct measures such as vaccines. As the British Institute of International and Comparative Law (BIICL) notes on vaccine schemes,

Parliament must be satisfied that the proposed vaccine certification scheme serves a legitimate aim, and that any restrictions on the rights and freedoms protected by the ECHR are necessary and appropriate... When assessing the proportionality of

¹⁴⁶ ‘Exploring Legal Mechanisms for Data Stewardship’ (*ibid*)

¹⁴⁷ Yuval Noah Harari, ‘Lessons from a Year of Covid’, Financial Times (26 February 2021) <<https://www.ft.com/content/f1b30f2c-84aa-4595-84f2-7816796d6841>> accessed 17 September 2021

¹⁴⁸ ‘Lessons from a Year of Covid’ (*ibid*)

¹⁴⁹ ‘Lessons from a Year of Covid’ (*ibid*)

¹⁵⁰ Adam Przeworski, ‘COVID-19 Reveals the Fragility of Our Values’, The Global (16 June 2020)

<<https://theglobal.blog/2020/06/16/covid-19-reveals-the-fragility-of-our-values/>> accessed 17 September 2021

¹⁵¹ ‘Surveillance and the “New Normal” of Covid-19’ (*supra* n50)

¹⁵² ‘Mapping the Data-Driven Landscape’ (*supra* n2)

¹⁵³ ‘Mapping the Data-Driven Landscape’ (*supra* n2)

¹⁵⁴ ‘Mapping the Data-Driven Landscape’ (*supra* n2)

vaccine certification, Parliament should consider alternative solutions to the problems the Government seeks to address¹⁵⁵

BIICL further notes the trade-offs therein: that vaccine certification may help trade off against the confines of lockdown.¹⁵⁶ The potential privacy concerns around certification schemes do not disappear, but may be deemed proportionate, depending on how well the scheme addresses the rights of the individual - is privacy preserved as much as possible? Who might access such data?

An additional point concerns regulation of the private sector. While widespread coordination of data collection is exceptionally useful for pandemic response, it may also 'subject individuals to many forms of discrimination and mistreatment if that information is misused'.¹⁵⁷ Many uses of data in a pandemic will be by private companies not (directly) the state. For example, private employers may demand sight of vaccination passports; NHS data on the pandemic may be shared to private researchers to increase NHS capacity; it may be shared to commercial interests, probably in pseudonymised or anonymised form, again to increase capacity or to generate income to fund NHS activities. The UK is something of a global leader on this approach, with a history of sharing NHS data in some form to companies like DeepMind and Palantir.¹⁵⁸ In relation to digital vaccine certification, scholars argue that

they involve real-world infrastructures that, while unlikely to accomplish the task at hand, will nevertheless last a long time and be repurposed. They therefore constitute governance by data infrastructure, diverting action and control away from elected legislators to for-profit contractors.¹⁵⁹

Other related concerns include the use of the pandemic as an excuse to limit access to information; expand surveillance powers; and deploy new invasive technologies.¹⁶⁰ Technologies such as facial recognition are an ongoing privacy concern for both public and private entities, and one which has been brought in under surveillance infrastructure.

Overall, concerns around privacy, transparency and other human rights must be at the forefront of building trust between the government and the public, whether this is in managing the data gathering itself, producing appropriate safeguards, policing private companies, or simply being more transparent about its use of data-driven technologies. The norms that develop during emergencies, public health or otherwise, are difficult to re-shape after the fact, even if they were taken on solely under the guise of emergency powers.

¹⁵⁵ Katie Lines and Richard Mackenzie-Gray Scott, 'Written evidence from the Bingham Centre for the Rule of Law (CVC 881), Public Administration and Constitutional Affairs Committee, Covid 19 Vaccine Certification inquiry' (15 June 2021) <https://binghamcentre.biicl.org/documents/2118_written_evidence_submission_-_covid_19_vaccine_certification_inquiry_pacac.pdf> accessed 14 September 2021, 9

¹⁵⁶ 'Written evidence from the Bingham Centre' (*ibid*)

¹⁵⁷ 'Surveillance and the "New Normal" of Covid-19' (*supra* n50)

¹⁵⁸ Palantir, a Data Firm Loved by Spooks, Teams up with Britain's Health Service, The Economist (26 March 2020) <<https://www.economist.com/britain/2020/03/26/palantir-a-data-firm-loved-by-spooks-teams-up-with-britains-health-service>> accessed 17 September 2021

¹⁵⁹ 'Promises Made to Be Broken: Performance and Performativity in Digital Vaccine and Immunity Certification' (*supra* n60), 382

¹⁶⁰ 'Surveillance and the "New Normal" of Covid-19' (*supra* n50)

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