# ESSAY

# ETHICAL SURVEILLANCE IN VACCINE PASSPORTS

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*ABSTRACT*

*This Essay explores the interrelated privacy and equality risks of deploying surveillance technology used in COVID-19 vaccine passports. The type of vaccine passport that governments implement has significant human rights ramifications. This Essay discusses how different vaccine passport designs can curb or exacerbate risks, providing a roadmap to guide policymakers in their app selection to mitigate unintended consequences. Vaccine passports should work on a decentralized system and use the least invasive data possible. Further, vaccine passports should be based solely on government vaccine data, be implemented only in places where vaccines are widely available for free, track location only when they are scanned, and provide a non-digital option. Governments should have clear sunset clauses for the app and the data collected.*



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## *I. INTRODUCTION*

This Essay explores the ethics of immunity passports' surveillance and, in particular, the risk these passports pose for magnifying existing inequalities. A balancing assessment underpins the analysis, purposed with contributing to legal research and guiding policymakers, judges, employers, and individuals tasked with making difficult containment choices.

Vaccine passports attest to the bearer's inoculation against COVID-19 and to the type of vaccine the person received. These digital immunity passports can be designed narrowly, to verify only vaccination status, or more broadly, to include other information such as recent testing and recovery. Vaccine passports help tailor COVID-19-related restrictions to part of the population, such as allowing only those holding a passport to travel or engage in leisure activities.

Vaccine passports are breaking new ground. While vaccine attestations have existed for centuries, this is the first time that the world addresses a pandemic by deploying surveillance technology to contain its spread.[1] Immunity passports will continue to be relevant as long as any fraction of the population refuses COVID-

1. As a qualifier, governments used digital technology to some extent (although a much lower extent) for tracing during the 2009 swine flu health crisis. See Laura Dyrda, *From Swine Flu to the Coronavirus: How Tech Is Helping Flatten the Curve This Time Around,* BECKER'S HEALTH (Mar. 18, 2020), https://www.beckershospitalreview.com/healthcare-information-technology/from-swine-flu-to-the-coronavirus-how-tech-helps-to-flatten-the-curve-this-time-around.html [https://perma.cc/9CNU-82QD]. For an early example of immunity passports, see Lawrence Alexander Sawchuk & Lianne Tripp, *Managing an Epidemic in Imperfect Times: Encampment and Immunity Passes in 19th Century Gibraltar*, 6 BMJ GLOBAL HEALTH (2021).

19 vaccines,[2] given the importance of widespread vaccination for virus containment and the disparate rates of hospitalization between vaccinated and unvaccinated individuals.[3] As Omicron has demonstrated, even relatively small percentages of unvaccinated people can disproportionately affect, and ultimately overwhelm healthcare systems. Contemporary policy decisions made about vaccine passports may lead to path dependency for future health crises and have consequences for generations in terms of health policy, human rights, surveillance, and inequality.

All types of surveillance come with risks. Governments should be cognizant that the material benefits associated with vaccine passports are accompanied by drawbacks and limitations. Governments should mitigate those drawbacks in their choices and design of vaccine passports. Most research published on immunity passports thus far has been from a scientific perspective, leaving a rich discussion on their ethics to be explored.

Decision-makers must clearly identify and limit these drawbacks when making implementation decisions to enable effective policy responses to the current health crisis. This approach can assist governments in developing containment policies that are widely accepted,[4] while minimally encroaching on human rights.

## *II. THREE DISTINCTIONS AMONG IMMUNITY PASSPORTS*

### *A. Scope*

Immunity passports offer data-based assessments of COVID-19 immunity status. They aim to identify those with immunity to allow countries to (relatively) safely open the economy,[5] allowing

2. *See* Ana Santos Rutschman & Timothy Wiemken, *Vaccine Hesitancy: Experimentalism as Regulatory Opportunity*, 4 BUS. ENTREPRENEURSHIP & TAX L. REV. 227 (2020).

3. Washington State Department of Health, *COVID-19 Cases, Hospitalizations, and Deaths by Vaccination Status* 5-6 (Feb 2, 2022), https://www.doh.wa.gov/Portals/1/Documents/1600/coronavirus/data-tables/421-010-CasesInNotFullyVaccinated.pdf [https://perma.cc/M2MJ-EQ3P].

4. *See* Sebastian Guidi et. al., *Depolarizing the COVID-19 Vaccine Passport*, YALE L. J. FORUM (forthcoming 2022).

5. Aaron Schwid & Tom Frieden, *How to Reopen the Economy Safely? Immunity Passports,* WASH. POST (Dec. 21, 2020),

those certified as immune to engage in more activities than those who are not. Such data-based assessments mean that immunity passports can collect and aggregate information about immunity from health databases. The passports can be distinguished in three ways: what they are used for, how they store the data, and what data they collect.

There are two contexts for using immunity passports: domestic and international.[6] Most passports for vaccine certification are designed to be used domestically, shown to businesses or other parties as a condition for admission, and usually cross-reference the app with patient data in government records.[7] Some examples of domestic immunity passports are Denmark's CoronaPass,[8] Brunei's BruHealth,[9] Saudi Arabia's Tawakkalna,[10] Quebec's VaxiCode,[11] and Israel's recently canceled Green Pass.[12] The second type of apps are designed to certify passengers' vaccination status for international travel. Examples

https://www.washingtonpost.com/opinions/2020/12/21/tom-frieden-covid-immunity-passports/ [https://perma.cc/WE8X-XYF5].

6. *See, e.g.,* Department of Health and Social Care, *Using Your NHS COVID Pass for Travel Abroad and at Venues and Settings in England*, GOV.UK (May 7, 2021) https://www.gov.uk/guidance/nhs-covid-pass.

7. Karen Weintraub & Elizabeth Weise, *New York Launches Nation's First 'Vaccine Passports.' Others Are Working on Similar Ideas, But Many Details Must Be Worked Out*, USA TODAY (Apr. 1, 2021), https://www.usatoday.com/story/news/health/2021/03/26/covid-vaccine-passports-new-york-first-vaccination-proof-system/6976009002/ [https://perma.cc/HB2Z-8PRF].

8. *Protecting Lives and Livelihoods*, CORONAPASS, https://www.coronapass.org/home [https://perma.cc/7JN4-N9QB].

9. *BruHealth,* MINISTRY OF HEALTH BRUNEI DARUSSALAM, https://www.moh.gov.bn/SitePages/bruhealth.aspx [https://perma.cc/A3BQ-7FWV] (last visited Jan. 26, 2022); Shareen Han, *Gov't Rolls Out BruHealth Contact Tracing App as Restrictions Loosened*, SCOOP (May 14, 2020), https://thescoop.co/2020/05/14/govt-launches-bruhealth-contact-tracing-app/ [https://perma.cc/5SND-KKPH].

10. Tuqa Khalid, *Coronavirus: How to Use Saudi Arabia's 'Tawakkalna' App to Get Movement Permits*, ALARABIYA NEWS (May 26, 2020), https://english.alarabiya.net/coronavirus/2020/05/26/Coronavirus-How-to-use-Saudi-Arabia-s-Tawakkalna-app-to-get-movement-permits [https://perma.cc/89MD-C3P5].

11. *COVID-19 Vaccination Passport,* SANTÉ QUÉBEC, https://www.quebec.ca/en/health/health-issues/a-z/2019-coronavirus/progress-of-the-covid-19-vaccination/covid-19-vaccination-passport [https://perma.cc/SW4J-3QHG] (last visited Jan. 26, 2022).

12. *Finance Minister Calls for Cancellation of COVID 'Green Pass'*, TIMES OF ISRAEL (Jan. 18, 2022), https://www.timesofisrael.com/liveblog_entry/finance-minister-calls-for-cancellation-of-covid-vaccine-green-pass/ [https://perma.cc/3GBY-UBPS].

include Malaysia's Immunitee Health Passport,[13] Singapore's SafeEntry and TraceTogether,[14] the EU Digital Covid Certificate (used for travel among member states),[15] and the International Air Transport Association's Travel Pass.[16]

### *B. Data Treatment*

These apps can also be distinguished by their data storage models. Centralized immunity passports store all reference data in one database, which is made accessible through an app. Decentralized passports authenticate data without storing it centrally, often encrypting it. If someone with a decentralized immunity passport goes to a vaccination site, the site generates a code to represent a proof of vaccination. That code can then be stored and encrypted so that, when the person boards a plane, the airline can verify the code's authenticity without accessing other data.[17]

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13. Roy Chiang, *Malaysia's First Health Passport, Immunitee Formally Accepted in Singapore,* MOBI HEALTH NEWS (Mar. 1, 2021), https://www.mobihealthnews.com/news/asia/malaysia-s-first-health-passport-immunitee-formally-accepted-singapore#:~:text=In%20collaboration%20with%20Affinidi%2C%20a,Affinidi's%20Unifier%20digital%20credential%20platform [https://perma.cc/PAH5-49PR].

14. Hariz Baharudin, *Nearly All in Singapore Are on COVID-19 Contact Tracing Programme TraceTogether,* STRAITS TIMES (Jan. 20, 2022), https://www.straitstimes.com/singapore/politics/nearly-all-in-singapore-are-on-covid-19-contact-tracing-programme-tracetogether [https://perma.cc/6QZH-33S3]; Tham Yuen-C, *Police Can Use TraceTogether Data for Criminal Investigations*, STRAITS TIMES (Jan. 5, 2021), https://www.straitstimes.com/singapore/politics/police-can-use-tracetogether-data-for-criminal-investigations-0 [https://perma.cc/7SGP-WZZV]; *Vaccinated Status for Travel to Singapore*, IMMIGRATION CHECKPOINTS AUTHORITY SINGAPORE, https://safetravel.ica.gov.sg/health/vtsg (last visited Mar. 2, 2022).

15. *The E.U.'s Digital COVID Certificate Is Now Live but What Is It and Which Countries Are Accepting It?*, EURONEWS (Feb. 1, 2021), https://www.euronews.com/travel/2021/07/01/digital-covid-certificate-eu-wide-travel-pass-officially-comes-into-force [https://perma.cc/2WGM-QYM4].

16. Justin Meneguzzi, *Will You Need An 'Immunity Passport' To Travel?*, BBC *(*Aug. 31, 2020), https://www.bbc.com/travel/article/20200831-coronavirus-will-you-need-an-immunity-passport-to-travel [https://perma.cc/7JJB-A7UF]; *IATA Travel Pass Initiative*, IATA https://www.iata.org/en/programs/passenger/travel-pass/ [https://perma.cc/FKZ7-JRLA] (last visited Jan. 26, 2022).

17. Laura Ricci et al., *Blockchains for Covid-19 Contact Tracing and Vaccine Support: A Systematic Review*, 9 IEEE ACCESS 37936, 37944 (2021); Wei Yan Ng et al., *Blockchain Applications in Health Care for COVID-19 and Beyond: A Systematic Review*, 3 THE LANCET DIGITAL HEALTH 819, 824 (2021).

Many immunity passports are encrypted end-to-end, whereby only the communicating users can access the messages, while others have been criticized for their lack of encryption.[18] Most passports use a QR code, and in some of them the code changes at regular intervals to keep the information updated. Some store this data in the Blockchain,[19] a system of recording information that makes it difficult or impossible to change the record, and that allows users to share information on their immunity status through the app.

Besides the question of how data are stored, what data are stored is also relevant. Some immunity passports continuously track users' location through GPS, which is unnecessary for their certification function, while others do not. For example, Saudi Arabia's Tawakkalna app requires a constant GPS connection to function,[20] whereas the EU Digital Covid Certificate does not connect to GPS, and even has an option to be printed—making it impossible to track user's location outside the moments when the QR code is scanned.[21] Although it is possible to pinpoint users' location from an immunity passport that does not connect to GPS by matching it to a scanning device with known location, the risk is lower in the second case with no cost to functionality.[22]

### *C. Sources of Immunity*

The third and potentially most important distinction is what sources of information about immunity these passports certify. An immunity passport can report information on: (a) who was vaccinated; (b) who had a recent negative PCR test (which detects

18. Matthew Comb, *Many vaccine passports have security flaws – here's how to make them safer*, CONVERSATION (Dec. 1, 2021), https://theconversation.com/many-vaccine-passports-have-security-flaws-heres-how-to-make-them-safer-172556 ("[T]he contents of the certificate are not encrypted, so anyone with access to the barcode (and the necessary skills) can decode it and retrieve the personal information contained within.").

19. *European Consortium Develops Blockchain COVID-19 Immunity Passport,* LEDGER INSIGHTS (Feb. 2021), https://www.ledgerinsights.com/european-consortium-develops-blockchain-covid-19-immunity-passport/ [https://perma.cc/7JXD-4CKE].

20. *Tawakkalna Privacy Policy*, SAUDI DATA & A. I. AUTH., https://ta.sdaia.gov.sa/en/privacy-en [https://perma.cc/FL8D-YED9] (last visited Jan. 26, 2022).

21. Georgios Karopoulos et al., *A Survey on Digital Certificates Approaches for the COVID-19 Pandemic*, 9 IEEE ACCESS 138003, 138019 (2021).

22. Ignacio Cofone, *Immunity Passports and Contact Tracing Surveillance*, 24 STAN. TECH. L. REV. 176, 190-91 (2021).

the presence of the virus' genetic material) and is thus unlikely to be infected; (c) who tested negative in a recent rapid diagnostic antigen test (which detects proteins that exist on the surface of the coronavirus) and is also thus unlikely to be infected; (d) who tested positive on a PCR test and subsequently recovered and is thus likely to be protected; or even (e) who was shown to have antibodies in a serology test (a blood test to detect immune response to the virus) and is also thus likely to be protected.

Immunity passports around the world accept different sources of information about immunity. The most common are vaccine passports. From the apps discussed above, for example, those from Bahrain, Brunei, Quebec, and Saudi Arabia are based on vaccine data only. But the Danish app recognizes vaccines and negative PCR results—and was initially designed to recognize proof of antibodies, although this feature has not been implemented.[23] The EU Digital Covid Certificate recognizes vaccine status and recent PCR results (positive or negative), thus also providing information of recent negative status and COVID-19 recovery.[24]

As discussed in the next section, the choice about which data to use is highly consequential for equality.

## *III. PASSPORT ERRORS AND SOCIAL INEQUALITY*

### *A. Types of Passport Errors*

When evaluating errors, one must distinguish between two types: false positive and false negatives. In immunity passports, a false positive is an error indicating that someone is protected against COVID-19 when in fact they are not—mistakenly or falsely answering "yes" to the question "is this person protected?" A false negative is an error indicating that someone is *not* protected against COVID-19 when they are in fact protected—mistakenly answering "no" to the question about whether they have

23. *The CoronaPass App FAQ*, CORONASMITTE (Jan. 16, 2021), https://en.coronasmitte.dk/faq-about-covid-19/the-corona-passport-app [https://perma.cc/3RXN-DH8D].

24. *Questions and Answers - Digital COVID Certificate*, EUROPEAN COMM'N (June 1, 2021), https://ec.europa.eu/commission/presscorner/detail/en/QANDA_21_2781 [https://perma.cc/CHZ7-J94T].

protection.[25] Distinguishing these two types of errors is important because they have different social costs.

In vaccine passports (immunity passports that only log vaccines as a source of immunity), these errors are relatively rare because vaccine error rates are rare.[26] A false negative would be created when someone who is protected does not log their immunity status into the app, so the app says they are not immunized when in fact they are. This is unlikely to occur because logging immunity is the point of downloading the app. Someone who is unknowingly protected, for example by having recovered from an asymptomatic infection recently, also creates a false negative because the app will not be able to certify the fact that they are protected.

False positives are even less varied than false negatives in vaccine passports. False positives occur when a vaccine fails to immunize an individual—an infrequent event after a second or third dose.[27] So, the app shows the individual as immunized when scanned (because they received the vaccine) but they in fact are not (because the vaccine failed to produce antibodies).

Governments can and sometimes do widen the scope of immunity passports, for example to include PCR results, and this choice affects errors. While lack of immunization from a vaccine is rare,[28] tests are more accurate at detecting the virus than they are at guaranteeing that the virus is absent. Rapid antigen tests, in particular, have a high error rate when the individual is asymptomatic.[29] False positive results in those types of apps occur

25. These definitions of error exist irrespective of whether anything in the passport was done incorrectly or wrongly. They depend only on the disconnect between reality and what the passport reflects.

26. Peter Doshi, *Pfizer and Moderna's "95% Effective" Vaccines – Let's be Cautious and First See the Full Data*, BMJ OPINION (Nov. 26, 2020), https://blogs.bmj.com/bmj/2020/11/26/peter-doshi-pfizer-and-modernas-95-effective-vaccines-lets-be-cautious-and-first-see-the-full-data/ [https://perma.cc/W7X8-QJPL].

27. Clara Munro, *Covid-19: 40% of Patients with Weakened Immune System Mount Lower Response to Vaccines*, 374 BMJ 2098 (2021), https://www.bmj.com/content/374/bmj.n2098 [https://perma.cc/4ET8-PWXT] (explaining that this can happen for people with particular medical conditions).

28. Marc Lipsitch & Natalie E. Dean, *Understanding COVID-19 Vaccine Efficacy*, 370 SCIENCE 763 (2020).

29. Zishan K. Siddiqui et al., *Implementation and Accuracy of BinaxNOW Rapid Antigen COVID-19 Test in Asymptomatic and Symptomatic Populations in a High-Volume Self-Referred Testing Site*, 9 AM. SOC. FOR MICROBIOLOGY 01008 (2021).

more frequently in two scenarios. First, there is test error: a PCR or antigen test can falsely indicate that the individual is not infected and a blood test can falsely indicate that the individual has the requisite antibodies, for instance because the sample was collected improperly. Second, there are time effects: PCR tests can only detect the virus after a day since infection, so the results might mistakenly indicate that a person is not infected if an infection happened very recently; and a serology test could positively indicate antibodies when they had in fact subsequently worn off.[30]

### *B. Consequences of Errors*

False positives in terms of immunity certification lead people who are not protected, and those around them, to erroneously think that they are. This may lead people to: engage in activities that they should not engage in, such as attending a restaurant; pursue behavior that they would otherwise not, such as seeing friends in close environments without a mask; or to not quarantine when they should, such as after arriving from international travel, allowing the virus to propagate. An app with many false positives could indeed be worse than no app at all.[31]

False negatives, on the other hand, have a detrimental effect on people's mental health by having them isolate and take unnecessary measures, which include corollaries of a lockdown such as increased domestic violence and lockdowns' perverse distributional effects.[32] They also have a detrimental effect in the economy by reducing the number of people that participate in social and commercial activities. At a macro level, they may delay lifting economically costly measures such as shutdowns and

30. *See* Alexandra L. Phelan, *COVID-19 Immunity Passports and Vaccination Certificates: Scientific, Equitable, and Legal Challenges*, 395 LANCET 1595, 1597 (2020).

31. *Coronavirus (COVID-19) Scaling Up Our Testing Programmes,* U.K. DEP'T OF HEALTH & SOC. CARE (Apr. 4, 2020) https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/878121/coronavirus-covid-19-testing-strategy.pdf [https://perma.cc/59AU-EUXE].

32. Lisa Austin et al., *Test, Trace, and Isolate: Covid-19 and the Canadian Constitution* 12 (May 22, 2020) (Rsch. Paper), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3608823 [https://perma.cc/CVJ4-QKZD].

curfews, such as the one in place in Quebec from December 2021 to February 2022.[33]

Deciding who should qualify for immunity passports is a question of balancing false positives and false negatives. False positives are, on average, more socially costly than false negatives, which allow the disease to spread as people believe they are immune when they are not.[34] Immunity passports should therefore seek to minimize the risk of false positives with less concern for—but not completely overlooking—false negatives. One way to do so is having them rely exclusively on vaccine data—as opposed to individuals' testing history.

### *C. How Error Distribution Affects Inequality*

Algorithmic error is rarely distributed evenly,[35] which is likely to disproportionately harm vulnerable people in two discrete ways.

The known harms of oversurveillance may make exclusion from an immunity passport system sound desirable, but it is not. Low accuracy may mean that excluded groups disproportionately suffer from the side effects of uneven surveillance. Errors produced by uneven surveillance exclude people from access to services, increasing social inequality by often falling on the most vulnerable.[36] Groups with precarious living conditions, such as the elderly living in care facilities or homeless people are also less likely to own a smartphone that is compatible with these apps if a printed option is unavailable.[37] In places where immunity passports are used domestically, vulnerable groups without access to the technology or subjected to reduced accuracy are unduly excluded from broader societal and commercial participation.[38]

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33. Press Release, Government of Quebec, COVID-19 Pandemic - Additional Measures Will Come Into Force Tomorrow (Dec. 30, 2021), https://www.quebec.ca/en/news/actualites/detail/covid-19-pandemic-additional-measures-will-come-into-force-tomorrow-37242 [https://perma.cc/B48Z-633C].

34. Rebecca C.H. Brown et al., *Passport to Freedom? Immunity Passports for COVID-19*, 46 J. MED. ETHICS 652 (2020).

35. Ignacio N. Cofone, *Algorithmic Discrimination Is an Information Problem,* 70 HASTINGS L.J. 1389, 1406 (2019).

36. Cofone, *supra* note 23, at 219-21.

37. *Id.* at 222-23.

38. *Id.* 219-21 (discussing false negatives).

This issue leads to a tension that has been pointed out for other technologies, whereby being excluded from a technology and its surveillance leads to harmful lower accuracy for some groups.[39] This problem is similar to the one that racialized individuals experience with facial recognition: they are identified with less accuracy than non-racialized individuals, which creates difficulties at workplaces that rely on facial recognition and increases the risk of wrongful arrest.[40] With less access to testing, vaccines, and smartphones, vulnerable groups that receive less surveillance from immunity passports, similarly, are more likely to suffer from the apps' side effects in terms of individually costly false negatives.

## *IV. INTENDED PURPOSES AND SOCIAL INEQUALITY*

### *A. How Passports' Intended Purpose Affects Inequality*

Immunity passports, to some extent, worsen existing inequalities even if we assumed the error rate was zero. The history of a previous epidemic in the United States—the yellow fever, which ebbed and flowed from 1793-1905—provides an insightful precedent. During much of the nineteenth century, people in Louisiana were divided between those who had recovered from the fever (called "acclimated") and those who had not (called "unacclimated").[41] The acclimated carried an immunity certification and the unacclimated were restricted from work, living in certain neighborhoods, and marrying.[42] Immunity became a privilege that divided citizens along race and class.[43]

The passports' purpose, like immunity certification during the yellow fever epidemics, is to give those who are certified as

39. Clare Garvie & Jonathan Frankle, *Facial-Recognition Software Might Have a Racial Bias Problem*, ATLANTIC (Apr. 7, 2016), https://www.theatlantic.com/technology/archive/2016/04/the-underlying-bias-of-facial-recognition-systems/476991/ [https://perma.cc/FC4W-DLL6].

40. Woodrow Hartzog & Evan Selinger, *The Inconsentability of Facial Surveillance*, 66 LOY. L. REV. 101 (2020).

41. Kathryn Olivarius, *Immunity, Capital, and Power in Antebellum New Orleans,* 124 AM. HIST. REV. 425, 425-455 (2019).

42. *Id*.

43. Natalie Kofler & Françoise Baylis, Comment*, Ten Reasons Why Immunity Passports are a Bad Idea*, 581 NATURE 379 (2020).

immune certain benefits that are otherwise unavailable to others, such as going to stores, restaurants, or events.[44]

This generates two added layers of privilege.[45] The first layer relates to excluding vulnerable people who are less likely to own a smartphone that can support immunity passports. Providing people with a non-digital alternative, such as a card with a QR code for scanning, reduces this problem—although if people have to use technology to get the non-digital QR code, the problem persists.[46]

Another layer of privilege comes into play if the passports recognize PCR or antigen test results—and if social activities are made conditional on them. This certification method only exists for those who have access to verified testing: free testing is unavailable to many across the globe, so incorporating testing data into the passport means giving more options to engage in social and economic activities to those who can afford private testing than those afforded to those who cannot.

Immunity passports used to police international transit introduce the same two layers of privilege at a smaller scale. They negatively affect immigrants and refugees, as well as those from developing countries that have not received sufficient vaccines to immunize, and thus certify, their citizens[47]—many of which will not do so for years to come.[48] In short, their introduced inequality

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44. Daniel Weinstock & Vardit Ravitsky, S*hould Immunity Licences Be an Ingredient in Our Policy Response to COVID-19?*, *in* VULNERABLE: THE LAW, POLICY AND ETHICS OF COVID-19 277, 277-82 (Colleen M. Flood et al. eds., 2020).

45. Iñigo de Miguel Beriain & Jon Rueda, *Immunity Passports, Fundamental Rights and Public Health Hazards: A Reply to Brown et al*., 46 J. MED. ETHICS 660, 660-61 (2020); Natalie Kofler & Françoise Baylis, *Immunity Passports – Reopening the Economy and Repackaging Racism*, J. MED. ETHICS BLOG (July 1, 2020), https://blogs.bmj.com/medical-ethics/2020/07/01/immunity-passports-reopening-the-economy-and-repackaging-racism/ [ https://perma.cc/YNA3-YV5A].

46. This is the case under some systems like the Quebec VaxiCode which, in addition to the app, provide a PDF option to print the QR code on paper, but people still need access to a computer or phone to find the website and fill the appropriate forms, and to a printer. Paper options (versus a plasticized card that can double as an ID) also deteriorate with time. *See Showing Your Vaccine Passport,* GOVERNMENT OF QUEBEC, https://www.quebec.ca/en/health/health-issues/a-z/2019-coronavirus/progress-of-the-covid-19-vaccination/covid-19-vaccination-passport/showing-your-vaccine-passport#c117055 [https://perma.cc/R4LC-GZMS].

47. Luca Li Bassi, *Allocating COVID-19 Vaccines Globally: An Urgent Need*, JAMA HEALTH FORUM (Feb. 8, 2021), https://jamanetwork.com/journals/jama-health-forum/fullarticle/2776409 [https://perma.cc/TRG6-3ZJ5].

48. *See* Ana Santos Rutschman, *The COVID-19 Vaccine Race: Intellectual Property, Collaboration(s), Nationalism and Misinformation*, 64 WASH. U. J. L. & POL'Y 167 (2021);

is borne by the poor, similarly to yellow fever passports still used in parts of Africa and South America.[49]

Depending on what kind of data immunity passports are based on, three broad models affect the extent to which they extend systemic inequality. The next section explores these models.

### *B. Mitigating Surveillance Risk*

The first and most common passport model is vaccine passports: immunity passports that only recognize vaccination data. This type of app mirrors inequality caused by asymmetrical vaccine distribution. It does not increase inequality significantly as long as the socio-economic factors for people to have access to vaccines are present—such as no-cost access to vaccines and broader resources like information, transport, and availability.[50] This equity risk reflects patterns of medical discrimination where, for example, racialized individuals are less likely to receive vaccines.[51] Lower vaccination rates experienced by racialized groups therefore lead to lower distribution of immunity passports, further exacerbating marginalization and exclusion from social and commercial activities.

The second (and second most common) alternative is adopting immunity passports that, in addition to vaccine data, also accept data from testing to identify both who is protected against infection and who is shown not to be infected. Malaysia's Immunitee, for example, adopts this model, accepting data from

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Sam Halabi & Ana Santos Rutschman, *Viral Sovereignty, Vaccine Diplomacy, and Vaccine Nationalism: The Institutions of Global Vaccine Access*, EMORY INT'L L. REV. (forthcoming).

49. Mark D. Gershman & J. Erin Staples, *Yellow Book - Travel-Related Infectious Diseases - Yellow Fever*, CENTER FOR DISEASE CONTROL (Apr. 9, 2021), https://wwwnc.cdc.gov/travel/yellowbook/2020/travel-related-infectious-diseases/yellow-fever [https://perma.cc/22UV-TRW9].

50. *See generally* Vaughn Barry et al., *Patterns in COVID-19 Vaccination Coverage, by Social Vulnerability and Urbanicity — United States, December 14, 2020–May 1, 2021*, 70 MORBIDITY & MORTALITY WKLY. REP. 818 (June 4, 2021) https://www.cdc.gov/mmwr/volumes/70/wr/mm7022e1.htm [https://perma.cc/83U4-R49W].

51. April Dembosky, *It's Not Tuskegee. Current Medical Racism Fuels Black Americans' Vaccine Hesitancy*, L.A. TIMES (Mar. 25, 2021) https://www.latimes.com/science/story/2021-03-25/current-medical-racism-not-tuskegee-expls-vaccine-hesitancy-among-black-americans [https://perma.cc/5U8N-P8Q7].

vaccines, negative PCR tests, and antigen tests (so-called rapid tests). In terms of inequality, this model is a middle-ground between the two previous alternatives. If governments provide free access to PCR testing, however, then they avoid the layer of inequality produced by access to privatized medicine.

The third and least common alternative is a passport that logs data on vaccine status and antibodies data to provide a more complete picture of who is protected against infection. This can be done either through serology tests, which detect antibody responses to COVID-19 (uncommon), or through a positive PCR test showing that one was infected with the virus and recovered (more common). Incorporating serology tests renders the passport more useful for individuals who can afford private testing. This builds on inequitable access to antibody testing, and also raises accuracy concerns.[52] It is the most problematic option from an equality perspective.

In a worst-case scenario, incorporating recovery data may create perverse incentives for some people without access to private testing, who might resort to infecting themselves in the hopes of developing a certified immunity.[53] For example, if someone cannot afford a private PCR test with a result within 72 hours needed to travel, she might instead choose to become infected to obtain a free government PCR (positive) test and then show recovery.

This problem occurred during the HIV epidemic, when there are records of individuals who sought infection to, among other reasons, release themselves from fear and from the restrictions of avoiding the virus—a tax on interpersonal relationships among queer people before knowledge of how the virus spreads and widespread available prophylaxis.[54] Some fear that making social participation conditional on surveillance methods for COVID-19

52. Alexandra L. Phelan, *COVID-19 Immunity Passports and Vaccination Certificates: Scientific, Equitable, and Legal Challenges,* 395 LANCET 1595, 1596 (2020).

53. Kenneth Roth & Annie Sparrow, *Should People Without Coronavirus Antibodies Be Second-Class Citizens?*, N.Y. TIMES (Apr. 28, 2020), https://www.nytimes.com/2020/04/28/opinion/coronavirus-antibody-certificate-testing.html [https://perma.cc/9HCF-EVEV].

54. Lynda J. Ames et al., *Love, Lust, and Fear: Safer Sex Decision Making Among Gay Men*, 30 J. HOMOSEXUALITY 53, 70 (1995) (discussing "bugchasers").

may encourage similar behavior.[55] The EU Digital Covid Certificate produces this problem by providing certificates to people who have recovered from COVID-19, in addition to incorporating vaccine and PCR data.[56] Countries that, besides the structure of their immunity passport (or lack thereof) accept an older positive PCR test as alternative to a recent negative PCR test as a condition for entry, as the United States does, produce this problem as well.

## *V. CHOOSING THE LEAST RESTRICTIVE INTERVENTION*

The "least restrictive intervention" is a cornerstone principle of public health ethics.[57] It means that any measure restricting rights or freedoms should only be used after having considered less restrictive alternatives.[58]

Ultimately, identifying the least restrictive intervention informs evaluations of proportionality.[59] A public health emergency should not justify suspending people's rights when doing so is either unnecessary or disproportionate to the public health benefits.[60] Accordingly, data protection authorities across the world have emphasized that governments should apply the principle of proportionality to any containment measures that may impact people's privacy.[61]

Evaluating proportionality requires determining what rights or interests must be balanced. Here, the tradeoff is not, as often

55. Teck Chuan Voo et al., *Ethical Implementation of Immunity Passports During the COVID-19 Pandemic*, 222 J. INFECTIOUS DIS. 715 (2020); Julien Nguyen Dang, *United States: Do "Covid-19 Parties", Intended to Voluntarily Transmit the Virus, Really Exist?,* FRANCEINFO (July 5, 2020).

56. Press Release, European Commission, Coronavirus: Commission Proposes a Digital Green Certificate (Mar. 17, 2021) https://ec.europa.eu/commission/presscorner/detail/en/IP_21_1181 [https://perma.cc/JT8F-22S9].

57. James Childress et al., *Public Health Ethics: Mapping the Terrain*, 30 J. L. MED & ETHICS 170 (2002).

58. R.E.G. Upshur, *Principles for the Justification of Public Health Intervention*, 93 CAN. J. PUB HEALTH, 101 (2002).

59. Nancy E. Kass, *An Ethics Framework for Public Health*, 91 AM. J. PUB. HEALTH 1776 (2001).

60. Gilad Abiri & Sebastian Guidi, *The Pandemic Constitution*, COL. J. TRANS. L. 68 (2021).

61. *Commissioner Issues Guidance on Privacy and the COVID-19 Outbreak*, OFF. OF THE PRIVACY COMM'R OF CANADA (Mar. 20, 2020), https://www.priv.gc.ca/en/for-federal-institutions/privacy-act-bulletins/pab_20200320/ [https://perma.cc/BN9V-2PT4].

claimed, between privacy and public health.[62] Rather, it is between privacy and the measures for containment that would otherwise be taken. More concretely, it is between the costs of surveillance (in terms of inequality and privacy) against the economic and psychological costs of a lockdown[63]—in other words, the human right risks of particular surveillance against the benefits of avoiding lockdown measures. The question is not *whether* to protect public health, but rather *how* to do so: by opening businesses and leveraging surveillance to allow people to participate in commercial or social activities, or by closing businesses and keeping people in their homes for longer.[64] Such a choice is not categorical (with either everything open and a maximally invasive immunity passport or a complete lockdown with no measure of digital containment), but rather exists in the margins of every containment choice regarding what activities are kept open and how to certify immunity of those who partake in them.

We must also consider the duration of surveillance measures and their staying power once the pandemic subsides. COVID-19 surveillance infrastructure should not be used to engage in location or proximity surveillance after the pandemic without a separate analysis as to whether doing so is justified. Once surveillance is implemented, it rarely fades. It is imperative to ensure that apps' surveillance will sunset once the pandemic is under control. Establishing a clear termination condition in advance is essential to this end. As of today, however, no governments have provided such guarantee. For example, the European Union announced that it will suspend the EU Digital Covid Certificate when the World Health Organization considers the pandemic to be over, but added that the system could be

62. Karen Hao, *Coronavirus is Forcing a Trade-Off Between Privacy and Public Health*, MIT TECH. REV (Mar. 24, 2020), https://www.technologyreview.com/2020/03/24/950361/coronavirus-is-forcing-a-trade-off-between-privacy-and-public-health/ [https://perma.cc/XP9C-WN9B].

63. *See* Mason Marks, *Controlled Substance Regulation for the COVID-19 Mental Health Crisis*, 72 ADMIN. L. REV. 649 (2020); Fauzi Budi Satria et al., *Can Digital Vaccine Passports Potentially Bring Life Back to "True-Normal"?,* 1 COMPUT. METHODS & PROGRAMS IN BIOMEDICINE 100011 (2021).

64. Ciro Cattuto & Alessandro Spina, *The Institutionalisation of Digital Public Health: Lessons Learned from the COVID-19 App*, 228 EUR. J. RISK REG. 233 (2020).

reactivated if a similar public health emergency arises.[65] And even if governments do guarantee that the system will be disbanded permanently once the COVID-19 pandemic ends, there is precedent to take such promise with a grain of salt. Promises that surveillance responding to a concrete crisis will be phased out once the crisis is over are often empty.[66]

If proportionality is the aim, apps should minimize data retention by working on a decentralized system. They should only collect the data they need to function, have clear data retention periods, and avoid continuous tracking.

Applying these principles to immunity passports' design and rollout is essential. Advocates argue that the benefit of implementing immunity passports is proportional to their introduced risks. The argument is that immunity passports have, compared to the baseline of a lockdown, fewer restrictions for some individuals (those who can use them to prove vaccination), even if not for everyone, being therefore less restrictive than the counterfactual lockdown.[67] On the other hand, critics contend that immunity passports fail the test of the least restrictive intervention with regards to equality even if all above-mentioned proposals were implemented.[68]

The takeaway is that a proportionality exercise that considers the principle of least restrictive intervention does not categorically reject data-driven technology to aid in containment. It rather examines how apps can assist public health in containing the pandemic while minimizing the harms that the ensuing surveillance produces. Immunity passports should be based on vaccine data, should be implemented only in places where vaccines are widely available to the population and distributed for free,

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65. Press Release, European Commission, Coronavirus: Commission Proposes a Digital Green Certificate (Mar. 17, 2021) https://ec.europa.eu/commission/presscorner/detail/en/IP_21_1181 [https://perma.cc/VXN3-TNUF].

66. Casey Ross, *After 9/11, We Gave Up Privacy for Security. Will We Make the Same Trade- Off After Covid-19?*, STAT (Apr. 8, 2020), https://www.statnews.com/2020/04/08/coronavirus-will-we-give-up-privacy-for-security/ [https://perma.cc/5ZJ6-FWC6].

67. Govind Persad & Ezekiel J. Emanuel, *The Ethics of COVID-19 Immunity-Based Licenses ('Immunity Passports')*, 323 JAMA 2241 (2020); Kevin Cope et al., *Vaccine Passports as a Constitutional Right*, ARIZONA STATE L. J. (forthcoming 2022).

68. Daniel Weinstock, *A Harm Reduction Approach to Physical Distancing, IN* THE ETHICS OF PANDEMICS (Meredith Celene Schwartz ed., 2020).

should track location only at the moment it is scanned, and should provide a paper option.

## *VI. CONCLUSION*

Immunity passports present benefits for curbing the pandemic's spread. But they also introduce surveillance risks that we must consider—both at a policy and at an individual level. The appropriate response is to identify and mitigate these risks.

This Essay explores how to do so. It identifies interrelated risks that immunity passports create due to their type of surveillance and its distribution. It discusses how different versions of apps create or avoid each of these risks, providing a roadmap for policymakers to choose among different types of apps and mitigate their unintended consequences. Legislators and judges should take measures to curb these risks. Although most concrete recommendations will be contextual, apps should work on a decentralized system. They should use the least invasive data possible, and they should have clear sunset clauses for both the app and collected data.

Crucially, immunity passports should be based on vaccine data, should be implemented only where vaccines are widely available to the population, and should track location only at the moment they are scanned. Governments should provide them in both app and hard-copy form.