

Assessment of Covid-19 Response in Brazil, Colombia, India, Iran, Lebanon and South Africa

Efficacy and Impact of Contact Tracing
Applications and Alternative Covid-19
Measures: Insights and Recommendations

July 2021

Table of Contents

Executive Summary	3
Introduction	12
Overview of Covid-19 Measures	15
Contact Tracing Apps	15
Alternative Measures	23
Country Insights	26
Pillar 1 - Public Health Efficacy of Covid-19 Response	26
1. Contact tracing apps and technology-based alternative measures were often deployed in countries with poor or unequal access to the internet and mobile technology	26
2. Apps were often disconnected from the broader public health response and affected by low uptake	28
3. Multiple and multipurpose apps were deployed	29
4. Alternative measures often had a greater public health impact than the apps	30
Pillar 2 - Increased Social Control	31
1. Legal frameworks: weakening of checks and balances to combat Covid-19	31
2. The countries of focus have nascent, sometimes unenforced, data protection regimes	35
3. Contact tracing apps suffered from a lack of public trust and awareness	38
4. Impact on vulnerable communities	40
Pillar 3 - Equal Access to Society	42
1. The tech-based Covid-19 response enhanced the digital divide and inequalities	42
2. Acute impact on vulnerable communities	43
Recommendations per Country	46
Brazil	46
Colombia	48
India	50
Iran	52
Lebanon	53
South Africa	56
Annex: Contact Tracing Apps - Key Technical Features	58

Executive Summary

The Covid App project is a civil society initiative that stemmed from a research interest in Covid-specific interventions – especially contact tracing applications (hereafter ‘apps’) – in countries outside Europe and North America. This shared research interest drew together six civil society organizations: ALT Advisory (South Africa), Internet Democracy Project (India), InternetLAB (Brazil), Karisma (Colombia), SMEX (Lebanon), and United for Iran. AWO, a data rights agency, provided coordination support.

Covid-19 prompted governments across the globe to apply measures that have ranged from traditional epidemiological measures, such as mask mandates and social distancing, to a number of unprecedented technological responses, most notably contact tracing apps. Over 40 countries have official contact tracing apps, each differing in context and characteristics. Contact tracing apps were not deployed in a vacuum: other technological responses include the use of drones, CCTV, the creation of new databases, and the acquisition of data from private companies. This combination of alternative measures – from drones to contact tracing apps to lockdown – built an ecosystem for the Covid-19 response, some of which are likely to remain in place after the pandemic. The interaction between these measures is considered throughout the present report.

In this report, an assessment is made of the Covid-19 response in six countries: Brazil, Colombia, India, Iran, Lebanon and South Africa based on three pillars. These are: How effective contact tracing apps have been from a public health perspective (Pillar 1); How contact tracing apps interact with structural, institutional and legal infrastructure (Pillar 2); and How contact tracing apps are experienced by vulnerable and historically marginalized populations (Pillar 3)

Overall, in all the countries reviewed, contact tracing apps are not as prominent a part of government Covid-19 response as might have been predicted. Nevertheless, the “proliferation of these new and emerging technologies has significantly expanded states’ toolkit for repression and social control, leading to gradual deterioration of human rights protections in this area over the past two decades.”¹ As such, we have identified a number of insights and recommendations that may foster better protect marginalized and vulnerable groups during public health crises, bolster human rights, democracy, and rule of law, and strengthen ongoing and future pandemic responses.

Insights

Pillar 1 - Public Health Efficacy of the Covid-19 Response

1. Contact tracing apps and technology-based alternative measures were often deployed in countries with poor or unequal access to the internet and mobile technology

Many governments introduced technological measures in response to Covid-19 despite the pre-existing disparities regarding internet access and mobile technology adoption. The importance of this problem cannot be understated since unequal access to smartphone technology can “exacerbate existing inequities and raise ethical concerns.”² Furthermore, by making social security services available predominantly through online platforms, vulnerable communities that are more likely to have poor internet access and no mobile devices may be deprived of vital assistance.

2. Apps were often disconnected from the broader public health response and affected by low uptake

The fate of contact tracing apps is closely tied to an uncoordinated overall pandemic response. In Brazil, Coronavirus SUS is largely disconnected from the rather sporadic public health strategy, and the federal government has not given priority to using its data effectively. In Colombia, CoronApp was one of many technological measures that were not aligned with the needs of the public health system, which is especially evident in the lack of data-sharing between the National Institute of Health and municipal entities. In South Africa, digital rights activists have commented that the adoption of a contact tracing app is merely a box-ticking exercise to show that the South African government engages in tech-based responses to the pandemic.

3. Multiple and multipurpose apps were deployed

In many countries, different contact tracing app proliferate. In India, there are over 70; in Brazil, at least eight smartphone apps were introduced by state governments with functionalities beyond contact tracing, such as providing remote healthcare. In Colombia, CoronApp – the only national contact tracing app – is accompanied by several regional apps, a consequence of limited inter-institutional coordination and a decentralized public health system. The array of Covid-19 official contact tracing apps in these countries is possibly diluting their overall adoption, although in India's case, this is mitigated to a certain extent by greater investment in promoting the Aarogya Setu app, whose use is mandatory in certain instances.

¹ European Parliament. (April 2021) *Digital technologies as a means of repression and social control*. p.4.
Available at:

[https://www.europarl.europa.eu/RegData/etudes/STUD/2021/653636/EXPO_STU\(2021\)653636_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2021/653636/EXPO_STU(2021)653636_EN.pdf).

² Nature. (January 21, 2021). *Tracking and promoting the usage of a Covid-19 contact tracing app*.
Available at: <https://www.nature.com/articles/s41562-020-01044-x>.

4. Alternative measures often had a greater public health impact than the apps

While contact tracing apps attract attention and public debate, alternative measures often have greater reach. In the early stages of the pandemic, for several months before the launch of COVID Alert SA, South Africa mainly relied on mass screening, targeted testing and lockdown measures.³ This involved mobilizing 28,000 health workers to screen over seven million people in May 2020, which helped maintain positive cases at around 3%.⁴ In India, the first national lockdown introduced in March 2020 forced over a billion people to quarantine, compared to the 120 million people who downloaded Aarogya Setu. Based on these numbers and data analyzed by MIT, it can be argued that lockdowns have done more to suppress the virus than contact tracing apps.⁵

Pillar 2 - Increased Social Control

1. Legal frameworks: weakening of checks and balances to combat Covid-19

To respond to Covid-19, a number of countries around the world expanded their emergency powers. In fact, since the World Health Organization (WHO) designated Covid-19 a global health emergency, over 100 countries have declared a state of emergency. However, recourse to such emergency laws in the countries studied is limited - existing extraordinary powers are rather used in order to tackle the pandemic.⁶

a. Limited recourse to emergency laws which facilitate the securitization of Covid-19 response

During the period of study, not all the countries of focus declared a national emergency. For those that did, the legal basis for implementing various measures derived from specific provisions within the country's constitution or legal framework. This typically means that, subject to certain conditions and rules, powers can be exercised by the state whilst derogating from the usual human rights standards. This was the case in Colombia where a state of emergency can only be declared for up to 30 days with the proviso that the Constitutional Court may judicially review decisions made during that timeframe.⁷ However, a state of emergency can negatively impact certain vulnerable communities, especially where the measures implemented encode and exacerbate existing discriminatory practices.

b. Extended use of extraordinary powers and increased surveillance

For those countries that did not declare a state of emergency, ordinary legislative provisions together with extraordinary powers were relied on. This differs from declaring a state of emergency given that the basis of such powers lies in pre-existing legislation, typically public health laws, permitting certain measures to be implemented without necessarily being tied to a type of emergency. This may not always be in accordance with explicit provisions in the constitution or legal framework, and therefore gives rise to the possibility that broad powers are exercised without the appropriate checks and balances in place.

2. The countries of focus have nascent, sometimes unenforced, data protection regimes

In the countries of focus, comprehensive data protection laws are either not yet in force, are still going through the legislative process, or simply do not exist. South Africa falls into the first category, with the substantive provisions of the Protection of Personal Information Act of 2013 only becoming enforceable beginning July 1, 2021.⁸ In Brazil, the General Data Protection Law has been delayed to August 2021,⁹ and a similar situation exists in Lebanon where Law No. 84 of 2018 on Electronic Transactions and Personal Data is yet to be implemented.¹⁰ In India, a joint parliamentary committee has not to date submitted its report on the 2019 Personal Data Protection Bill.¹¹ There is currently no data protection law in Iran.¹² Colombia stands out as the only country with an existing law, although these rules have been relaxed during the pandemic to allow public authorities to collect personal information without the usual restrictions.¹³ In general, stronger data protection regimes may strengthen oversight across the countries in question.

a. Increased and non-transparent data sharing between public authorities

Public authorities collecting and sharing data in response to the pandemic is common across governments around the world. The main reason given is to facilitate and approve applications for

³ The Financial Times. May 5, 2020). *South Africa's mass screening helps stem the coronavirus tide*. Available at: <https://www.ft.com/content/98d0d7c6-9bfb-4a64-bcab-19e0854a3b4d>.

⁴ Ibid.

⁵ Mint. (August 5, 2020). *Are contact-tracing apps helping tame the pandemic?* Available at: <https://www.livemint.com/news/india/are-contact-tracing-apps-helping-tame-the-pandemic-11596611635201.html>.

⁶ Verfassungsblog. (April 19, 2020). *The State of Emergency Virus*. Available at: <https://verfassungsblog.de/the-state-of-emergency-virus/>.

⁷ Verfassungsblog. (April 17, 2020). *Pandemic and Executive Powers in Colombia: A Problem and a Modest Proposal*. Available at: <https://verfassungsblog.de/pandemic-and-executive-powers-in-colombia-a-problem-and-a-modest-proposal/>.

⁸ Hunton Andrews Kurth. (29 June 2020). *South Africa's Protection of Personal Information Act, 2013, Goes into Effect July 1*. Available at: <https://www.huntonprivacyblog.com/2020/06/29/south-africas-protection-of-personal-information-act-2013-goes-into-effect-july-1/>.

⁹ Data Guidance. (12 June 2020). *Brazil: President promulgates law postponing LGPD enforcement provisions*. Available at: <https://www.dataguidance.com/news/brazil-president-promulgates-law-postponing-lgpd-enforcement-provisions>.

¹⁰ SMEX. (May 5, 2021). *Lebanon Country Report: Covid-19 and Social Control*. p. 20. Available at: <https://smex.org/wp-content/uploads/2021/05/SMEX-Lebanon-COVID-APPS-Report-1.pdf>.

¹¹ Data Guidance. (25 March 2021). *India: Committee seeks extension for report on Personal Data Protection Bill*. Available at: <https://www.dataguidance.com/news/india-committee-seeks-extension-report-personal-data-0>.

¹² DLA Piper. *Data Protection Laws of the World*. Available at: <https://www.dlapiperdataprotection.com/index.html?t=law&c=IR&c2=>.

¹³ Karisma. (May 5, 2020). *Useless & Dangerous: A critical exploration of Covid apps and their human rights impacts in Colombia*. p.31. Available at: <https://web.karisma.org.co/useless-and-dangerous-a-critical-exploration-of-covid-applications-and-their-human-rights-impacts-in-colombia/>.

internal travel whilst quarantine measures are in place. This involves combining pre-existing datasets as well as those datasets generated specifically for Covid-19. However, the absence of comprehensive data protection laws or other regulatory checks gives rise to function creep and adverse impacts on certain vulnerable communities through the sharing of sensitive personal data with law enforcement and restricting the movement of those typically unable to access online platforms to apply for travel permissions.

b. Rise of public-private partnerships and lack of transparency

Governments often try to leverage their relationships with private sector entities to achieve various policy ends. Covid-19 is no exception; many governments choose to use the Google/Apple Exposure Notification system to build their digital contact tracing apps; some countries look to telecommunications companies to acquire data to create heat maps and track the spread of the virus; governments also install camera systems to monitor compliance with quarantine rules, thus expanding state surveillance apparatus. However, often these partnerships are cloaked in secrecy or, in the context of Covid-19, exploit the emergency context to escape the usual regulatory constraints that serve to ensure that rights are protected.

3. A lack of public trust and awareness affects contact tracing apps

Adoption of contact tracing apps is hampered by either a lack of public trust or public awareness in all of the countries under review. Part of this stems from poor campaigning around the app, as is the case in South Africa where the absence of focused and targeted communications from the government contributed to public confusion around COVID Alert SA. Additionally, some apps suffer from concerns around surveillance and privacy. In Colombia, for instance, there is a history of abuse of surveillance powers by law enforcement and intelligence services, impacting journalists, opposition leaders, judges, and human rights activists.

4. Impact on vulnerable communities

a. Discrimination against marginalized groups

In Punjab India, people were encouraged to report lockdown violators to public authorities via the Cova app, which contains a feature that allows users to report mass gatherings and inter-state travelers in their area. However, this can have grave consequences for marginalized groups, with members of society asked to carry out surveillance on behalf of the state without the commitments to equality that states must usually follow. Indians were thus given the opportunity to unfairly penalize certain individuals or even whole groups.

b. Suppression of protests

Protests broke out across Colombia in reaction to the insufficient aid provided by national and local governments to mitigate the problems invoked by lockdowns and other Covid-related measures.

In Bogotá¹⁴ and Medellín,¹⁵ the police used disproportionate force to suppress protestors impacting children, the sick, and older people in particular.

In Lebanon, protests escalated in response to the government's alleged mishandling of the economic crisis during the pandemic.¹⁶ Protests were also fueled by the lack of government support during national lockdowns, exacerbating the downturn experienced by many.¹⁷ Demonstrations led to numerous casualties during clashes with security forces as authorities attempted to suppress protests, including during the national lockdown that began in January 2021.¹⁸

Pillar 3 - Equal Access to Society

1. The tech-based Covid-19 response enhanced the digital divide and inequalities

The disparities in relation to internet access and the use of mobile technology, as discussed in Pillar 1, also has an impact on individuals' access to society during the pandemic. This proves to be a critical issue since unequal access to such resources can "exacerbate existing inequities and raise ethical concerns."¹⁹ Furthermore, by making social security services available predominantly through online platforms, vulnerable communities, many of whom lack adequate internet access and have few mobile devices, may be deprived of essential services, such was the case in Colombia. However, even where platforms are physically accessible, their design can have negative implications that extend beyond vulnerable communities. For instance, South Africa's contact tracing app is only available in English despite it being only one of many local languages.²⁰

2. Acute impact on vulnerable communities

a. Migrants and Refugees

¹⁴ Karisma. (May 5, 2020). *Useless & Dangerous: A critical exploration of Covid apps and their human rights impacts in Colombia*. p.58. Available at: <https://web.karisma.org.co/useless-and-dangerous-a-critical-exploration-of-covid-applications-and-their-human-rights-impacts-in-colombia/>.

¹⁵ Twitter. (June 16, 2020). *Más y más agresiones a jóvenes en Medellín... @AquinoTicias1*. Available at: <https://twitter.com/AquinoTicias1/status/1272682948211458049>; Twitter. (June 15, 2020). *Capturas ilegales, agresiones a manifestantes... @AquinoTicias1*. Available at: <https://twitter.com/AquinoTicias1/status/1272614496067092481>.

¹⁶ France24. (May 1, 2020). *Lebanese protest against rescue plan as government seeks IMF help*. Available at: <https://www.france24.com/en/20200501-lebanese-protest-against-rescue-plan-as-government-seeks-imf-help>.

¹⁷ SMEX. (May 5, 2021). *Lebanon Country Report: Covid-19 and Social Control*. p. 18. Available at: <https://smex.org/wp-content/uploads/2021/05/SMEX-Lebanon-COVID-APPS-Report-1.pdf>.

¹⁸ Ibid.

¹⁹ Nature. (January 21, 2021). *Tracking and promoting the usage of a Covid-19 contact tracing app*. Available at: <https://www.nature.com/articles/s41562-020-01044-x>.

²⁰ Statistics South Africa. (May 28, 2019). *General Household Survey 2018*. Available at: <http://www.statssa.gov.za/publications/P0318/P03182018.pdf>.

While Covid-19 measures, particularly national lockdowns and stringent border controls, impact whole populations, migrants and refugees are at a heightened risk of exclusion or discrimination. However, ensuring that vulnerable communities are protected from these risks is not always well-managed, as seen in the focus countries. Many people struggle with travel restrictions, especially when permission to travel could only be obtained via digital platforms. Some even have difficulties in finding housing in the midst of national lockdowns, as was the case in Brazil.

b. Informal Settlements

Covid-19 has intensified the challenges facing rural people and those in informal sectors of the economy.²¹ In South Africa where, apart from the threat of the virus itself, insufficient water supply and overcrowding are “but a few of the many challenges faced by many indigent people.”²² This is in addition to the contentious use of quarantine camps, where migrants were kept in isolation for 14 days without being tested for Covid-19 and denied the opportunity to self-isolate. In May 2020, AfriForum (a civil rights organization) succeeded in a legal challenge against the South African government regarding these camps, declaring that they should be closed immediately.²³

Recommendations

Pillar 1: Public Health Efficacy of Covid-19 Response

Coordinated response and inclusion of vulnerable populations

- Develop a unified government response to the Covid-19 pandemic, taking into account both national and local-level government bodies.
- Maintain access to vital services for vulnerable populations (particularly refugees and migrant workers).
- Provide increased aid to people in need in a more efficient manner and limit the role of the army to prevent the securitization – or even perception of securitization – of the public health response.
- Strengthen cooperation and coordination between the public and private sector to ensure hospital preparedness.

Communication strategy

- Improve communication with the media. Content should be scientific and delivered in a professional manner to increase public awareness and education.

²¹ Mail & Guardian. (April 12, 2020). *Covid-19 and the call for solidarity: Challenges for informal settlements*. Available at: <https://mg.co.za/article/2020-04-12-Covid-19-and-the-call-for-solidarity-challenges-for-informal-settlements/>.

²² Alt Advisory. (March 5, 2021). *Covid-19 Apps: South Africa Project Report*. p. 36. Available at: <https://altadvisory.africa/wp-content/uploads/2021/05/South-Africa-Covid-App-Project-final.pdf>.

²³ AfriForum. (May 6, 2020). *AfriForum Wins Case Regarding Covid-19 Quarantine Camp*. Available at: <https://afriforum.co.za/en/afriforum-welcomes-judgement-on-Covid-19-quarantine-camp/>.

- Encourage the media to engage with other sectors, specifically academia, the technical community, and civil society to ensure the publication of information that is true, accurate, and fair.

Pillar 2: Increased Social Control and Pillar 3: Equal Access to Society

Regarding applications and technology to fight the pandemic

- Provide clear information regarding the type of data collected and for what purpose, where and for how long data will be stored, with whom the data will be shared and for what purposes, as well as the security protocols for all of these functions.
- Approach application development using a privacy by design framework.
- Clearly frame data-sharing practices between different government entities as well as with the private sector.
- Release into the public domain the terms of the partnership for all apps developed through public-private partnership.
- Remove requests for location data from any contact tracing applications to protect privacy.
- Publish more detailed privacy policies (written in all local languages) and explicitly name any third parties who have access to data.
- Make all existing Covid-related apps open source on all platforms. By making the server-side codes publicly accessible and auditable, people can collaborate, check the codes for vulnerabilities, and start a peer-review system.
- Make all Covid-related apps purely voluntary across all sectors, and ensure that non-participating individual are not penalized, or denied access to any service, public or private.
- Offer a clear and easy-to-access option to delete an account and information from the app, as well as from the server.
- Minimize the amount of data collected to what is strictly necessary, particularly personal or identifiable data; this includes eliminating the need for GPS location.

Oversight and review mechanisms

- Oversight bodies must be involved from the outset, prior to the deployment of data-driven technological tools to ensure the protection of individuals' rights.
- Regular monitoring is also necessary to ensure proportionality of the measures in the long run.

Recognition of the impact of Covid-19 responses on various rights

- The impact of Covid-19 responses on various rights, including their potential to exclude and discriminate against vulnerable communities and their impact on the freedom of the press, should be assessed and evaluated by governments, taking into account the legal framework that guides the government's approach. These evaluations should be conducted over the short-, medium- and long-term in a manner that reveals the successes, challenges, and mistakes of the policy approaches chosen.

- In future crises, human rights impact assessments should inform the legal framework, including guidelines for states of emergency and states of disaster, indicating what is necessary and justifiable in any given situation.

Introduction

As countries around the world rushed to deploy contact tracing apps to combat Covid-19, there was limited evidence to support (and, by extension, to disclaim) the use of these technologies. Around 80 countries use contact tracing apps,²⁴ and a smartphone app quickly became the flagship policy choice to tackle the pandemic. Apps are deployed in countries with very different contexts and characteristics – including population density, smartphone penetration, public health infrastructure and political contexts.

Over a 7-month period, from August 2020 to February 2021, the group studied the real-world impacts of the apps as well as alternative measures in six countries: Brazil, Colombia, India, Iran, Lebanon and South Africa. The six civil society organizations involved in the study are: ALT Advisory (South Africa), Internet Democracy Project (India), InternetLAB (Brazil), Karisma (Colombia), SMEX (Lebanon) and United for Iran.

The research is guided by the following principles:

- **Geographical scope:** In the early days of the pandemic, the discussion of contact tracing apps was primarily focused on countries in Western Europe and North America, although countries worldwide were quick to deploy these technologies. This initiative aims to expand the evidence-based considerations used to assess the impact of contact tracing apps.
- **Use of evidence-based methods:** The group uses various methods to assess the apps and their real-world impact. The methodology is described below.
- **Focus on both public health and rights-based perspectives:** The project recognizes that these apps are ostensibly deployed with a public health objective, and it assesses whether the technology does, in fact, meet this objective. Equally, it considers the apps' impacts on human rights and data protection.
- **Consideration of alternative means:** Contact tracing apps are a commonly-discussed tool in the fight against Covid-19, but alternative interventions are used, as well. These include traditional methods applied by epidemiologists (e.g., manual contact tracing), as well as new, technology-based approaches (e.g., crowd control devices and new medical technologies). Our research considers alternative means alongside contact tracing apps. By implementing this comparative approach – namely the assessment of the impact of both contact tracing apps and alternative measures – the group aims to provide the most objective conclusions and findings.

²⁴ Ada Lovelace Institute. (July 9, 2020). *Digital Contact Tracing Tracker*. Available at: https://docs.google.com/spreadsheets/d/1GallN3lnfu_azCG_mND0ljqx2BDZyR234FGd0WK8hYE/edit#gid=0.

The research is organized in three pillars:

- How effective are the apps and alternative measures from a public health perspective?
- How do apps and alternative measures interact with structural, institutional and legal infrastructures?
- What are the impacts of apps and alternative measures as experienced by populations, including vulnerable and marginalized populations?

On the basis of on-the-ground research, country-specific recommendations are proposed, including those tailored to stakeholders involved in the pandemic response, such as government authorities, legislators, the technology industry, and social and human rights advocacy organizations. In this context, the group hopes that the outcome of this evidence-based research can be turned into actionable items for advocacy purposes.

The report offers a synthesis of key insights and recommendations presented in the six country reports as well as in the technical review. Links to the full country reports and the technical review are available below:

- Brazil: <https://www.internetlab.org.br/pt/privacidade-e-vigilancia/privacy-and-data-protection-in-the-pandemic/>
- Colombia: <https://web.karisma.org.co/the-covid-app-project/>
- India: <https://internetdemocracy.in/reports/virus-detected>
- Iran: <https://united4iran.org/irancovid19report>
- Lebanon: <https://smex.org/Covid-19-and-social-control-in-lebanon-report/>
- South Africa: <https://altadvisory.africa/2021/05/05/the-covid-apps-project/>
- Technical review (conducted by independent experts as part of the project): <https://www.awo.agency/files/report-on-the-privacy-risks-of-Covid-19-software.pdf>

As regards to methodology, the group reviewed contact tracing apps as well as alternative measures and assessed their interaction with public health, human rights, privacy, and data protection. It conducted interviews, filed freedom of information requests and extensively reviewed public documentation to produce in-depth country reports. The qualitative research is complimented by an independent technical review, conducted by academic researchers who assessed privacy risks associated with seven contact tracing apps selected in the six countries of focus. The contact tracing apps were chosen based on a number of criteria: they were official, federal government apps; they had high uptake (when compared to other apps in the respective

country); and they were all publicized as having contact tracing functionality. For a full discussion of app selection, please refer to the individual country reports.

The group hopes that this report will support the critical evaluation of contact tracing apps and other measures deployed as part of the pandemic response. In addition, the group intends to foster a discussion of safeguards that will better protect individuals during public health crises, including marginalized and vulnerable groups; bolster human rights, democracy and rule of law; and strengthen ongoing and future pandemic responses.

Overview of Covid-19 Measures

The Covid-19 pandemic saw the implementation of public health measures including rolling out contact tracing apps, although other alternative measures also came to the fore including non-technological, more traditional epidemiological interventions, such as lockdowns social distancing, mask mandates, mass testing campaigns and the use of personal protective equipment (PPE). These were complemented by various technology-based measures, for example the use of drones or the creation of new databases to track the spread of the virus.

Contact Tracing Apps

Background

While manual contact tracing has long been an epidemiological tool,²⁵ digital contact tracing is relatively new and its adoption at this scale is unprecedented.²⁶ Contact tracing apps were introduced in all our countries of focus. Five countries introduced apps by the end of July 2020, with South Africa introducing its contact tracing app last, in September 2020.

Context of apps deployment in the six countries

Brazil

Brazil registered its first case of Covid-19 in February 2020 and is one of the countries where the virus has spread the fastest with over 16 million cases resulting in nearly half a million deaths by May 2021—the second highest rate worldwide after India.²⁷ Federal level laws passed in February 2020 allow public authorities to adopt measures that include restricting activities and mandatory isolation. However, during 2020, over 3,000 laws related to Covid-19 were introduced throughout the Brazilian federation²⁸, including measures limiting the role of the legislature.

Brazil launched its app, Coronavirus SUS, in July 2020 for Apple and Android devices. Developed by DATASUS (Ministry of Health), the app provides contact tracing and features such as a news feed containing official news and relevant data on the pandemic. Coronavirus SUS uses the decentralized GAEN API for its contact tracing system.

²⁵ Careband. (May 21, 2020). *History of Contact Tracing: From the Black Death to Covid-19*. Available at: <https://www.carebandremembers.com/history-of-contact-tracing-from-the-black-death-to-Covid-19/>.

²⁶ Ada Lovelace Institute. (July 9, 2020). *Digital Contact Tracing Tracker*. Available at: https://docs.google.com/spreadsheets/d/1GallN3lnfu_azCG_mND0ljqx2BDZyR234FGd0WK8hYE/edit#gid=0.

²⁷ Google News. *Brazil*. Available at: <https://news.google.com/covid19/map?hl=en-GB&gl=GB&ceid=GB%3Aen&mid=%2Fm%2F015fr>.

²⁸ InternetLAB. (April 2021). *Privacy and Data Protection in the Pandemic: Report on the Use of Apps and Alternative Measures in Brazil*. p.5. Available at: https://www.internetlab.org.br/wp-content/uploads/2021/04/Privacy-and-Data-Protection-in-the-Pandemic_05.pdf.

Colombia

The National Institute of Health in Colombia activated its Public Health Emergencies Operation Centre not long after the first case of Covid-19 was registered in March 2020. That same month the national government began to implement measures related to the pandemic, including initiating a lockdown, which was one of the longest in the world, lasting six months.²⁹ The lockdown and other restrictive measures caused unrest, giving rise to police violence and the militarization of vulnerable neighborhoods.³⁰ Moreover, there was a lack of coordination on certain measures between state entities and the national health system. By May 2021, the country had registered over three million cases of Covid-19 and over 86,000 deaths.³¹

In March 2020, Colombia released its contact tracing app CoronApp, available for both Apple and Android smartphones. The app, created by the Colombian government in collaboration with the National Institute of Health, utilizes a centralized system developed by Bluetrace, which is an open-source protocol developed by Singapore Government Digital Services.

India

In January 2020, the State of Kerala confirmed the first case of Covid-19 in India³² with the first death recorded in Karnataka in March 2020.³³ By May 2021, the country had recorded over 27 million cases and over 300,000 deaths.³⁴ The National Institute of Virology and the Indian Institute of Medical Research Responsibility were charged with researching and developing methodologies to combat Covid-19; however, the Integrated Disease Surveillance Programme (IDSP) was not included, despite the fact that after the SARs outbreak it was created to track diseases and pandemics. The government implemented its first national lockdown in March 2020,³⁵ affecting 1.3 billion people, making it the largest lockdown in the world. This entailed the halting of all international and domestic flights, public transport and interstate and intrastate travel.

²⁹ ABC News. (November 8, 2020). *Colombia implemented a six-month lockdown to control coronavirus but there was a steep price to pay*. Available at: <https://www.abc.net.au/news/2020-11-09/colombia-six-month-coronavirus-lockdown-price-to-pay/12855242>.

³⁰ Karisma. (May 5, 2020). *Useless & Dangerous: A critical exploration of Covid apps and their human rights impacts in Colombia*. p.52. Available at: <https://web.karisma.org.co/useless-and-dangerous-a-critical-exploration-of-covid-applications-and-their-human-rights-impacts-in-colombia/>.

³¹ Google News. *Colombia*. Available at: <https://news.google.com/covid19/map?hl=en-GB&gl=GB&ceid=GB%3Aen&mid=%2Fm%2F01ls2>.

³² The Hindu. (January 30, 2020). *India's first coronavirus infection confirmed in Kerala*. Available at: <https://www.thehindu.com/news/national/indias-first-coronavirus-infection-confirmed-in-kerala/article30691004.ece>.

³³ Healthworld. (March 13, 2020). *Karnataka announces India's first coronavirus death*. Available at: <https://health.economictimes.indiatimes.com/news/industry/state-minister-announces-indias-first-coronavirus-death/74604253>.

³⁴ Google News. *India*. Available at: <https://news.google.com/covid19/map?hl=en-GB&gl=GB&ceid=GB%3Aen&mid=%2Fm%2F03rk0>.

³⁵ Narendra Modi, March 24, 2020. *From midnight, entire country shall go under complete lockdown: PM Modi*. Available at: <https://www.narendramodi.in/text-of-prime-minister-narendra-modi-s-address-to-the-nation-on-vital-aspects-relating-to-the-menace-of-Covid-19-548941>.

Among the many apps developed in India, Aarogya Setu is the country's flagship Covid-19 contact tracing app and is available for Apple and Android devices. It was developed by the NITI Aayog (a Government of India policy think-tank) and contains features beyond contact tracing, including self-diagnosis, risk status, and updates on best practices related to Covid-19, telemetry and real-time statistics about the spread of the virus, ePass integration, information on labs with testing facilities, and an open API service to query information about the health status of employees. Aarogya Setu was released in April 2020; its contact tracing system is underpinned by a custom-built centralized protocol and uses an algorithm to calculate how at risk of infection users are.

Another relevant Indian app is Cova, which assists citizens with preventive care information and provides advisories in the State of Punjab. Among its features are a real-time dashboard for the Punjab and global stats, a symptoms checker, self-assessment functionality, Corona Awareness, travel instructions, prevention products, information on local hospitals, a FAQs section, and call support. However, it is not clear whether Cova is designed primarily for contact tracing; documentation from Google Play suggests that it is not, whereas the Punjab Government contends that the app does contact tracing of positive cases. The app was released in March 2020 and was the first Covid-related app to be released in India.

Iran

Iran was one of the first countries to experience a major outbreak of Covid-19 and has struggled to contain the virus ever since. The government structure means that religious and technocratic sectors control different aspects of public administration; the conflicts between these two have led to a disorganized pandemic response. In particular, both factions disagreed over the closure of holy shrines and the cancelling of Friday prayers in March 2020.³⁶ However, as Covid-19 spread, the Supreme Leader sanctioned the creation of the National Headquarters to Fight Coronavirus and made it the highest authority for policy development, adoption and enforcement. Holy shrines, universities and other public places were eventually closed in March 2020,³⁷ though a full national lockdown has never been implemented.

Mask is Iran's contact tracing app, providing citizens with information, notification and movement-tracing services. The app was developed by a team of volunteers from Sharif, Amirkabir and Shahid Beheshti Universities and eventually adopted by the Iranian government after it had developed AC19, a self-diagnosis app, which was later abandoned due to concerns about the collection of sensitive data on users. The key features of Mask include an infection-risk map, official Covid-19 information, and a self-assessment and proximity-based risk notification service. The app uses a custom-built centralized protocol for its contact tracing system and was released in April 2020.

³⁶ Al-Monitor. (March 22, 2020) *Why some Iranians are opposed to closing religious shrines to fight coronavirus*. Available at: <https://www.al-monitor.com/originals/2020/03/iran-religious-shrines-closing-coronavirus-opposition.html>.

³⁷ Aljazeera. (March 17, 2020). *Coronavirus pandemic ‘could kill millions’ in Iran*. Available at: <https://www.aljazeera.com/news/2020/03/17/coronavirus-pandemic-could-kill-millions-in-iran/>.

Lebanon

Covid-19 first reached Lebanon in February 2020, when the government started taking measures to halt its spread through curfews, restrictions on movement within the country, closing schools and shutting down airports. Curfew measures were eased during May and June, with airports eventually opening back up in July. However, cases began to rise again in the second week of July and by the end of the month the government had implemented a national lockdown. The Beirut explosion in August 2020, which killed over two hundred people and left more than three hundred homeless, caused cases to surge even higher and further complicated the government's response.³⁸ Rapid inflation and increasing poverty and unemployment rates also added to the difficulties, with economic pressure leading to a period of political chaos, a string of resignations in late 2020 and a government yet to be formed.³⁹ By May 2021, Lebanon had registered around half a million cases and almost 8,000 deaths from Covid-19.

In Lebanon, Ma3an is the official contact tracing and exposure notification app that allows users to broadcast their presence anonymously to other mobile devices running the same app on both Apple and Android operating systems. Developed collectively by the Ministry of Public Health, the American University of Beirut and TedMob (a digital agency developing mobile apps), the app uses Bluetrace for its contact tracing system and was released in July 2020.

South Africa

By May 2021, South Africa had recorded 1.6 million cases of Covid-19 and around 55,000 deaths.⁴⁰ The president declared a national state of disaster in March 2020 and by the end of the month the country went into its first lockdown. A risk-based strategy is employed, with decision-making influenced by the level of infections, the rate of transmission, the capacity of health facilities, and other factors. Covid-19 has only aggravated South Africa's status as one of the most unequal societies in the world.⁴¹ The country still suffers from the painful legacy of apartheid with high levels of discrimination and unemployment as well as economic instability stemming from government interventions related to the pandemic, making it likely that the longer-term repercussions of Covid-19 will have a profound economic impact. Economic instability is closely linked to the precarious political climate, with the country wracked with corruption scandals, an accountability crisis and failing state institutions. Of particular concern is the tendency towards a single party system as the Africa National Congress has ruled since 1994 and took around 60%

³⁸ The Guardian. (November 12, 2020). *Beirut blast: a night of horror, captured by its victims*. Available at: <https://www.theguardian.com/world/ng-interactive/2020/nov/12/beirut-blast-a-night-of-horror-captured-by-its-victims>.

³⁹ Dw.com. (May 22, 2021). *Lebanon: Hariri blames president for political deadlock*. Available at: <https://www.dw.com/en/lebanon-hariri-blames-president-for-political-deadlock/a-57631083>.

⁴⁰ Google News. *South Africa*. Available at: <https://news.google.com/covid19/map?hl=en-GB&mid=/m/0hzlz&gl=GB&ceid=GB:en>.

⁴¹ CNN. (May 10, 2019). *South Africa is the world's most unequal country. 25 years of freedom have failed to bridge the divide*. Available at: <https://edition.cnn.com/2019/05/07/africa/south-africa-elections-inequality-intl/index.html>.

parliamentary seats in the 2019 national elections.⁴² Ongoing judicial investigations are underway into allegations of state capture, corruption and fraud.⁴³

COVID Alert SA is South Africa's contact tracing app, developed and released by the National Department of Health in September 2020. In addition to its contact tracing function, which uses the GAEN API, the app features a 24-hour hotline and allows users to receive their Covid-19 test results via WhatsApp.

Overview of apps reviewed as part of the research

Across the countries of focus, mobile apps were deployed as part of the strategy to combat Covid-19. While most of the apps focused on contact tracing, some countries also saw the deployment of other Covid-related apps, such as Punjab's Cova app. Contact tracing apps were a popular choice for many governments, including all those discussed here, with 28 countries around the world developing such apps⁴⁴ just a month after Covid-19 was declared a pandemic by the WHO.⁴⁵ The table below compares key features and characteristics of each of the apps deployed in the countries within the scope of the project.

⁴² The Africa Report. (July 29, 2020). *South Africa: A sophisticated failing state*. Available at: <https://www.theafricareport.com/35378/south-africa-a-sophisticated-failing-state/>.

⁴³ Transparency International. (September 4, 2020). *In South Africa, Covid-19 Has Exposed Greed And Spurred Long-Needed Action Against Corruption*. Available at: <https://www.transparency.org/en/blog/in-south-africa-Covid-19-has-exposed-greed-and-spurred-long-needed-action-against-corruption>.

⁴⁴ Linklaters. (April 16, 2020). *28 countries race to launch official Covid-19 tracking apps to reduce the spread of the virus*. Available at: <https://www.linklaters.com/en/about-us/news-and-deals/deals/2020/april/28-countries-race-to-launch-official-Covid-19-tracking-apps-to-reduce-the-spread-of-the-virus>.

⁴⁵ World Health Organization. (March 11, 2020). *WHO Director-General's opening remarks at the media briefing on Covid-19 - 11 March 2020*. Available: <https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-Covid-19---11-march-2020>.

Contact Tracing Apps Comparison Table							
Name	CoronApp	Coronavirus SUS	COVID Alert SA	Ma3an	Aarogya Setu	Cova	Mask
Country	Colombia	Brazil	South Africa	Lebanon	India	India	Iran
Launch Date	March 2020	July 2020	Sept 2020	July 2020	April 2020	March 2020	April 2020
Mandatory	N	N	N	N	Y ⁴⁶	Y ⁴⁷	N
System	C	D	D	C	C	C	C
GAEN API	N	Y	Y	N	N	N	N
Bluetooth	Y	Y	Y	Y	Y	Y	N
Location Data	Y	N	N	Y	Y	Y	Y
3rd Party Data Sharing	Y	Y	Y	Y	Y	Y	Y
Source Code Published	N	Y	N	Y	Y	N	N

C = Centralized, D = Decentralized; Y = Yes, N = No

Level of implementation of privacy by design in countries of focus

When assembling contact tracing apps, one potential problem is function creep, which is where data “collected for one purpose tends to be used for ever-expanding and undisclosed purposes.”⁴⁸ An effective way to prevent function creep is to embed privacy-by-design integrating certain privacy and data protection principles into systems that process personal data. In particular, the data should be processed for specific purposes or other compatible purposes and only the type and quantity of data needed to fulfil those purposes should be collected. In addition, the full extent of the processing operation should be communicated in an accessible manner to those whose

⁴⁶ Internet Democracy Project. (May 8, 2020). *The app was made mandatory by certain public and private bodies for purposes such as travel, education, entry into workplaces: “When and where is Aarogya Setu mandatory? We’re keeping track.* Available at: <https://internetdemocracy.in/2020/05/aarogya-setu-tracker>.

⁴⁷ NDTV. (July 6, 2020). *Use of the app is mandatory for those entering into Punjab: “Covid-19: Online Registration Must To Enter Punjab: All You Need To Know.* Available at: <https://www.ndtv.com/india-news/Covid-19-online-registration-must-to-enter-punjab-all-you-need-to-know-2257960>.

⁴⁸ International Association of Privacy Professionals. (May 27, 2020). *How function creep may cripple app-based contact tracing.* Available at: <https://iapp.org/news/a/how-function-creep-may-cripple-app-based-contact-tracing/>.

data are used. These privacy and data protection principles are usually provided for in relevant national laws. With regard to adherence to the concept of privacy-by-design, concerns have primarily focused on three decisions:

a. Centralized v. decentralized apps

With the exception of Colombia and South Africa, all the countries of focus chose to adopt centralized systems for their contact tracing apps. However, centralized systems arguably comply less with the concept of privacy-by-design than decentralized systems. In a centralized system, most of the required processing takes place on a central server operated by a public authority making sensitive personal data more accessible to those authorities. In contrast, with a decentralized system, most of the processing takes place on the users' device with most sensitive personal data also remaining locally and only pseudonymized data being shared with other devices and the central server. This is the case with the countries that used GAEN API.

Google and Apple have claimed that such principles are “at the forefront” of the GAEN API and have “established strict guidelines to ensure that privacy is safeguarded.”⁴⁹ Nevertheless, the API has not always been free of privacy flaws. In April 2021, a bug was discovered in the GAEN framework which allowed data collected by contact tracing apps to inadvertently be available to other apps on Android devices.⁵⁰ For each user, GAEN uses rolling proximity identifiers (which are randomly generated every 15 minutes) that are broadcasted via Bluetooth to other neighboring devices. When a user inputs a positive Covid-19 diagnosis, the app sends that users’ Rolling Proximity Identifier (RPI) to a central server which is then broadcast out to other devices. When those other devices receive the ‘risky’ RPI, they check for a match with the list of RPIs collected by the device over a certain period of time. When a match is found, the user is then notified that they may be exposed to Covid-19 and are advised to self-isolate. The problem, identified in April, however, was that GAEN was inserting the RPIs and MAC addresses and other devices detected as well as the detecting device’s own RPI into the system log of the device. Data contained in the system log can also be accessed by other pre-installed apps on the Android device and in turn could be sent to third party servers.

b. Collection of location data

Connected to the debate around centralized and decentralized systems is the use of location data; most of the countries of focus have contact tracing apps that make use of location data although the purpose of this data collection varies. For instance, CoronApp from Colombia uses

⁴⁹ Apple/Google. (September 2020). *Exposure Notifications: Frequently Asked Questions*. Available at <https://covid19-static.cdn-apple.com/applications/covid19/current/static/contact-tracing/pdf/ExposureNotification-FAQv1.2.pdf>.

⁵⁰ App Census Blog. (April 27, 2021). *Why Google Should Stop Logging Contact-Tracing Data*. Available at: <https://blog.appcensus.io/2021/04/27/why-google-should-stop-logging-contact-tracing-data/>
The Markup. (April 27, 2021). *Google Promised Its Contact Tracing App Was Completely Private – But It Wasn’t*. Available at: <https://themarkup.org/privacy/2021/04/27/google-promised-its-contact-tracing-app-was-completely-private-but-it-wasn't>

such data to show users their location on a map and also symptom activity in their region. However, how such data is used by other apps is less clear, especially in relation to Aarogya Setu in India. This app uses Bluetooth and GPS data, which has been criticized for being excessive and disproportionate in light of the objective sought. The government argues that relying on Bluetooth alone for contact tracing would be insufficient given the country's size and low smartphone ownership. Collecting location data allows the state to track users and carry out more intrusive surveillance that extends beyond public health needs. This is of particular concern when location data can reveal "users' habits, home address, workplace data, and even religious beliefs (i.e., place of worship)."⁵¹

c. Use of third-party software developer kits (SDKs)

SDKs: These are pre-built libraries or tools that software developers can include in their applications to integrate different features or services. There are a wide variety of SDKs, including those for development support (cloud integration for example, which includes Amazon Web Services or Google Firebase), push notifications, online payments, maps and location services, authentication, social networks, analytics, and advertisements.⁵² These SDKs are frequently used by developers, thus presenting a privacy risk to end users by allowing third parties to potentially track their habits and behavior via the app.⁵³

The principle of privacy-by-design was not completely followed with respect to the SDKs deployed in the six countries of focus. A noteworthy example of this is South Africa's COVID Alert SA, which uses WhatsApp as a way for users to be notified of their Covid-19 test results and to communicate with public authorities. The concern is that using WhatsApp in this way allows a commercially minded third-party to identify those users who may have a positive Covid-19 diagnosis. While messages sent via WhatsApp are encrypted, inferences can still be drawn from the unencrypted metadata if a user engages the National Department of Health via WhatsApp. Furthermore, a commonality among all the contact tracing apps is the use of the Google Firebase Library, which provides tools for tracking and analytics. Yet, the use of this SDK, or indeed other SDKs, is not clearly outlined in the respective privacy policies. As such, it cannot be fully determined how Google Firebase is being used, in particular whether it is limited to installation analytics or used for broader tracking purposes that are more privacy-intrusive.

Main findings from the technical review

The technical review conducted as part of the project assessed the contact tracing apps based on the following: (i) the architecture used for contact tracing, if any; (ii) the presence of elements that can have a negative impact on users' privacy (use of dangerous permissions, presence of

⁵¹ *Report on the privacy risks of Covid-19 software*. (December 2020). p.14. Available at: <https://www.awo.agency/files/report-on-the-privacy-risks-of-Covid-19-software.pdf>.

⁵² Data Protection and Privacy: Data Protection and Artificial Intelligence, Hart Publishing, 2021 (pp.5-7).

⁵³ *Report on the privacy risks of Covid-19 software*. (December 2020). p.19. Available at: <https://www.awo.agency/files/report-on-the-privacy-risks-of-Covid-19-software.pdf>.

software development kits (SDKs), potential dissemination of personal data, and consistency of observed behaviors and statements of the privacy policy); and (iii) components and design choices that can affect the security of the app, such as the presence of potentially harmful behaviors or an incorrect use of hosting and communication capabilities.

All the examined apps implement a functionality for contact tracing / exposure notification. Two of them – Coronavirus SUS (Brazil) and COVID Alert SA (South Africa) – rely on the Google-Apple Exposure Notification (GAEN) API, which enforces some privacy guarantees. The remaining apps use centralized approaches that are potentially more privacy harmful, including custom implementations – Aarogya Setu (India), COVA (India), and Mask (Iran) – or based on Singapore’s BlueTrace technology – CoronaApp (Colombia) and MA3AN (Lebanon). In addition to exposure notifications, all apps include additional functionality that ranges from services offering official Covid-19 information or directions to nearby health centers to a variety of services with unclear purposes.

The five apps that do not rely on the GAEN API have access to user geolocation information. This constitutes a serious privacy risk that, coupled with the collection of unique user/device identifiers and other personal data, can enable function creep. At least one app’s privacy policy acknowledges that collected data may be used for law-enforcement purposes.

All seven apps integrate third-party software libraries with tracking and monitoring capabilities. The list includes well-known service providers such as Google’s Firebase and Google Mobile Services, and also other tracking and analytics companies such as OneSignal, Sentry, and the Iran-focused Pushe.co. Even if the inclusion of such components does not automatically imply that their services are used for user tracking, their presence constitutes a risk and reflects poor privacy practices. None of the apps acknowledges in its privacy policy that the service providers process user data. One app – COVID Alert SA (South Africa) –integrates the WhatsApp SDK to facilitate contact with the National Department of Health, entailing potential privacy risks, disclosure of sensitive data to third-parties and facilitating potential abuse.

There are deficiencies in terms of transparency in all the analyzed apps, though there are significant differences between them. Only three make their source code available for inspection. The majority use code obfuscation, reflection and other anti-analysis techniques that make it difficult to reliably determine or confirm the presence of some behaviors. Such measures negatively impact trust and are misaligned with international transparency and privacy engineering recommendations.

Alternative Measures

Contact tracing apps are accompanied by other alternative measures. Many of these were non-technological, more traditional epidemiological interventions, including lockdowns, social distancing, mask mandates, mass testing campaigns, and the use of PPE. All of the countries under review implemented these measures during the period of study. Around the world, national lockdowns were one of the most common public health measures introduced with China and Sri

Lanka the first countries to adopt this approach in January 2020.⁵⁴ But by the end of March 2020 over 100 countries had implemented either a full or partial lockdown.⁵⁵ Travel restrictions were also a prominent choice; in May 2020, more than 75% of countries had suspended travel from at least one other place, and only three reported no restrictions at all.⁵⁶ The key alternative measures deployed in the six countries focus are identified in the table below:

	Alternative Measures Comparison Table					
	Colombia	Brazil	South Africa	Lebanon	India	Iran
Emergency Declared	Y	Y	N	Y	N	N
Lockdown	Y	Y	Y	Y	Y	Y
Quarantine	Y	Y	Y	Y	Y	Y
Social Distancing	Y	Y	Y	Y	Y	Y
Mask Mandate	Y	Y	Y	Y	Y	Y
Testing Campaign	Y	Y	Y	Y	Y	Y
Use of PPE	Y	Y	Y	Y	Y	Y
Manual Contact Tracing	Y	N	Y	N	N	Y
Internal Travel Restrictions	Y	Y	N	Y	Y	Y
Border Controls	Y	Y	Y	N	Y	Y
Camera/ CCTV Surveillance	Y	N	N	N	Y	N
Drones	N	N	N	N	Y	N
Thermal Scanning	Y	N	N	N	Y	Y
Private Sector Data Acquisition	Y	Y	N	Y	N	N

Y = Yes, N = No

⁵⁴ BBC News. (April 7, 2020). *Coronavirus: The world in lockdown in maps and charts*. Available at: <https://www.bbc.co.uk/news/world-52103747>.

⁵⁵ *Ibid.*

⁵⁶ NPR News. (May 15, 2020). *Countries Slammed Their Borders Shut To Stop Coronavirus. But Is It Doing Any Good?* Available at:

<https://www.npr.org/sections/goatsandsoda/2020/05/15/855669867/countries-slammed-their-borders-shut-to-stop-coronavirus-but-is-it-doing-any-goo?t=1623084050292>.

Technology-based measures are not necessarily unique to the Covid-19 pandemic and nor were all such measures implemented by the countries under review. Colombia and India stand out as the countries that used the most technological measures. In March 2020, local authorities in the city of Medellín created Medellín Me Cuida, a web application that profiles families to assign social benefits, collecting data on health, housing, geolocation, profession and socioeconomic status. Another significant initiative a few days after the start of Colombia's first lockdown was the acquisition of data from mobile network operators, which was sanctioned by the Superintendency of Industry and Commerce, an oversight body in charge of competition. In India, the National Informatics Centre created a centralized portal coordinated across numerous state governments that allows users to apply for an e-pass to travel within India. The Indian government also formed the National Drone Rapid Response Force (NDRRF) to connect state officials with 400 drone pilots from 30 different companies in order to enforce the lockdown, make announcements and disinfect public spaces.

Country Insights

The report considers three distinct categories: the effectiveness of Covid-19 apps and alternative measures from a public health perspective; how these apps and measures interact with structural, institutional and legal infrastructures; and the impact of these apps and measures on populations, with an emphasis on vulnerable and marginalized populations.

Pillar 1 - Public Health Efficacy of Covid-19 Response

At this point in time, robust evidence on the efficacy of contact tracing apps is limited to modelling exercises that make assumptions about human behavior in real-word environments.⁵⁷ As the pandemic continues, the efficacy of contact tracing apps remains difficult to ascertain. As a December 2020 study points out, this is due in part to the “unprecedented nature of technology-based contact tracing, and the novelty of the disease itself.”⁵⁸ In addition, only a few assessments of the efficacy of alternative measures have been carried out. Key insights are presented below:

1. Contact tracing apps and technology-based alternative measures were often deployed in countries with poor or unequal access to the internet and mobile technology

Many governments introduced technological measures in response to Covid-19 despite the pre-existing disparities in relation to internet access and the adoption of mobile technology. This situation has a substantive impact on the efficacy of apps and technology-based alternative measures deployed.

In India, only 40% of the population has smartphones⁵⁹ and less than 36% has access to the internet.⁶⁰ Furthermore, India has one of the largest mobile gender gaps in the world; women are 20% less likely than men to own a mobile phone and 50% less likely to use the internet.⁶¹ Thus, by making Aarogya Setu mandatory in certain instances, the Indian government has made it difficult for much of the population to access livelihoods, healthcare and other essential services.

⁵⁷ Nature. (December 17, 2020). *Exploring the effectiveness of a Covid-19 contact tracing app using an agent-based model*. Available at: <https://www.nature.com/articles/s41598-020-79000-y>.

⁵⁸ Ibid.

⁵⁹ Tech Arc. (January 30, 2020). *Techinsight – At 502.2 Million Smartphone Users, It's Time For Smartphone Brands To Turn Towards Services In 2020*. Available at: <https://techarc.net/techinsight-at-502-2-million-smartphone-users-its-time-for-smartphone-brands-to-turn-towards-services-in-2020/>.

⁶⁰ Internet and Mobile Association of India Digital India: 2019 – Round 2 Report. Available at: <https://cms.iama.in/Content/ResearchPapers/2286f4d7-424f-4bde-be88-6415fe5021d5.pdf>.

⁶¹ GSMA. *Connected Women: The Mobile Gender Gap Report 2020*. Available at: <https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2020/05/GSMA-The-Mobile-Gender-Gap-Report-2020.pdf>.

Additionally, in March 2020, the Karnataka government announced that all home-quarantined persons would be required to send hourly selfies (containing the sender's GPS coordinates) using the Quarantine Watch app. Any failure to send selfies every hour made users liable to be moved to government-created mass quarantine centers.⁶² The GPS coordinates allow a district verification team to verify a user's exact location and in turn enable the administration to check that users comply with home quarantine rules. Where the device's location does not match the designated location, an alert is issued. Those without smartphones, or sufficient internet access, may therefore be penalized for failing to report on their compliance with quarantine rules via the app. As an illustration, the Karnataka State War Room website shows a very low percentage of users (0.24% by May 2021) sending the required selfies.⁶³

Over 20% of Brazilians aged ten years and over did not have a smartphone in 2018.⁶⁴ In rural areas, only 57.3% of people have smartphones compared to 82.9% in urban areas (largely because of the high cost of mobile devices in Brazil).⁶⁵ This urban/rural divide is also apparent in internet availability; 70% of people in urban areas have internet access compared to 49% in rural areas.⁶⁶ This makes Brazil's contact tracing app, which provides health information and Covid-19 guidelines, largely inaccessible for certain populations. Although the government is working to mitigate this problem, the digital literacy of the population, which is around 7%,⁶⁷ remains an obstacle in using apps and technology-based alternative measures (for instance, to apply for social benefits via online platforms).

While 63% of people in South Africa are internet users, only 10.4% have internet access at home, and this figure drops to 1.7% in rural areas.⁶⁸ In addition, prices for mobile data remain high due to a lack of regulation.⁶⁹ Those without access to the internet are hampered by digital illiteracy, making it difficult to navigate online services or use them safely and securely. CovidConnect is a service that provides South Africans with information about Covid-19, healthcare advice and contact tracing processes. It also includes a risk assessment tool that screens users for symptoms and gives advice on whether to self-isolate or seek medical assistance. The platform uses WhatsApp and SMS to notify users of their Covid-19 diagnosis and to inform nominated contacts. However, up to 40% of people in South Africa do not use WhatsApp and

⁶² The News Minute. (March 30, 2020). *Karnataka wants those in home quarantine to send a selfie every hour, starting 7 am.* Available at: <https://www.thenewsminute.com/article/karnataka-wants-those-home-quarantine-send-selfie-every-hour-starting-7-am-121482>.

⁶³ Quarantine Watch. *District Wise Visit & Selfie Report.* Available at: <https://www.covidwar.karnataka.gov.in/Service45/>.

⁶⁴ InternetLAB, (April 2021). *Privacy and Data Protection in the Pandemic: Report on the Use of Apps and Alternative Measures in Brazil.* p. 10. Available at: https://www.internetlab.org.br/wp-content/uploads/2021/04/Privacy-and-Data-Protection-in-the-Pandemic_05.pdf.

⁶⁵ Ibid.

⁶⁶ Ibid, p.26.

⁶⁷ Ibid, p.27.

⁶⁸ Alt Advisory. (March 5, 2021). *Covid-19 Apps: South Africa Project Report.* p. 34. Available at: <https://altadvisory.africa/wp-content/uploads/2021/05/South-Africa-Covid-App-Project-final.pdf>.

⁶⁹ Ibid, pp.34-35.

accessing CovidConnect relies on using data, which is not always affordable.⁷⁰ As a result, those who are less digitally connected, are excluded from accessing important public health services and information.

2. Apps were often disconnected from the broader public health response and affected by low uptake

The fate of contact tracing apps is closely tied to an uncoordinated overall pandemic response. In Brazil, Coronavirus SUS is largely disconnected from the rather sporadic public health strategy, and effective use of its data is not prioritized by the federal government. In addition, a lack of a coordinated campaign to promote and spread awareness of Coronavirus SUS influences the level of the app's uptake.⁷¹ The approach to the pandemic has largely consisted of decisions made at the regional level as opposed to the national level, and this fragmentation may contribute to inconsistent messaging and a low level of awareness among the public around the app and other Covid-19 measures.⁷² In addition, the use of the app is not encouraged by the government and it competes with other apps and platforms developed by public agencies and private actors.

In Colombia, CoronApp also appears as one of many technological measures that do not match public health system needs. In South Africa, digital rights activists comment that the contact tracing app is merely a box-ticking exercise to show the South African government is engaging in tech-based responses to the pandemic.⁷³

A crucial factor determining the effectiveness of contact tracing apps is population uptake.⁵⁷ One paper suggests that around 60% of the population needs to use the app for digital contact tracing to work effectively.⁵⁸ It is notable, however, that none of the countries of focus have reached this level of app adoption. India's Aarogya Setu has the largest number of downloads at over 100 million on Google Play (by July 2021);⁷⁴ in April 2020, it was the fastest growing mobile app in the world garnering over 50 million downloads just 13 days after its launch, beating the previous record-holder Pokémon Go.⁷⁵ However, this only amounts to 9.5% of the population. In Colombia,

⁷⁰ Global Data Justice. (November 5, 2020). *Digital Hegemonies for Covid-19*. Available at: <https://globaldatajustice.org/Covid-19/digital-hegemonies-south-africa>.

⁷¹ InternetLAB, (April 2021). *Privacy and Data Protection in the Pandemic: Report on the Use of Apps and Alternative Measures in Brazil*. p. 9. Available at: https://www.internetlab.org.br/wp-content/uploads/2021/04/Privacy-and-Data-Protection-in-the-Pandemic_05.pdf.

⁷² Ibid, p.15.

⁷³ Alt Advisory. (March 5, 2021). *Covid-19 Apps: South Africa Project Report*. p. 11. Available at: <https://altadvisory.africa/wp-content/uploads/2021/05/South-Africa-Covid-App-Project-final.pdf>.

⁷⁴ Google Play. *Aarogya Setu*. Available at: https://play.google.com/store/apps/details?id=nic.goi.aarogyasetu&hl=en_GB&gl=US.

⁷⁵ Internet Democracy Project. (May 31, 2021). *Virus Detected: A Profile of India's Emergent Ecosystem of Networked Technologies to Tackle Covid-19*. p. 14. Available at: https://cdn.internetdemocracy.in/idp/assets/downloads/reports/covid-app-project-india-country-report/Vijayakumar-and-Ranjit-IDP-Virus-Detected_2021-06-03-103842.pdf.

over 10 million people have downloaded CoronApp from Google Play (by July 2021),⁷⁶ which represents about 20% of the country's population; however, only 17% of the 1.8 million active users have reported their symptoms through the app.⁷⁷ In Brazil, Coronavirus SUS was downloaded 1.99 million times from the Apple App Store (by December 2020)⁷⁸ and around 10 million times from Google Play (by July 2021),⁷⁹ representing only 5% of the population. Ma3an in Lebanon has over 50,000 downloads from Google Play (by July 2021),⁸⁰ which is less than 1% of the country's population. COVID Alert SA in South Africa managed around one million downloads from Google Play (by July 2021),⁸¹ approximately 1.7% of the population. Mask in Iran has accumulated over 200,000 downloads (by July 2021),⁸² which accounts for 0.2% of the population.

3. Multiple and multipurpose apps were deployed

In some countries, contact tracing apps were just one Covid-19 related smartphone app among many. In India, there are over 70 Covid-19 related apps.⁸³ In Brazil, at least eight smartphone apps have been made available by state governments with functionalities beyond contact tracing, such as remote healthcare. In Colombia, CoronApp – the only national contact tracing app – is accompanied by a number of other regional apps, a consequence of limited inter-institutional coordination and a decentralized public health system.⁸⁴ It is possible that the multiplicity of Covid-19 apps in these countries may dilute the overall adoption of official contact tracing apps. However, India mitigates this to a certain extent by investing more in promoting Aarogya Setu, and even makes its use mandatory in certain instances.

⁷⁶ Google Play. *CoronApp – Colombia*. Available at:

https://play.google.com/store/apps/details?id=co.gov.ins.guardianes&hl=en_ GB&gl=US.

⁷⁷ Karisma. (May 5, 2020). *Useless & Dangerous: A critical exploration of Covid apps and their human rights impacts in Colombia*, p. 25. Available at: <https://web.karisma.org.co/useless-and-dangerous-a-critical-exploration-of-covid-applications-and-their-human-rights-impacts-in-colombia/>.

⁷⁸ InternetLAB. (April 2021). *Privacy and Data Protection in the Pandemic: Report on the Use of Apps and Alternative Measures in Brazil*. p. 10. Available at: https://www.internetlab.org.br/wp-content/uploads/2021/04/Privacy-and-Data-Protection-in-the-Pandemic_05.pdf.

⁷⁹ Google Play. *Coronavírus – SUS*. Available at:

https://play.google.com/store/apps/details?id=br.gov.datasus.guardioes&hl=en_ GB&gl=US.

⁸⁰ Google Play. *Ma3an - Together Against Corona*. Available at:

https://play.google.com/store/apps/details?id=com.tedmob.moph.tracer&hl=en_ GB&gl=US.

⁸¹ Google Play. *COVID Alert South Africa*. Available at:

https://play.google.com/store/apps/details?id=za.gov.health.covidconnect&hl=en_ GB&gl=US.

⁸² Android Bazaar Mobile Applications Store. Available at: <https://cafebazaar.ir/app/ir.covidapp.android>.

⁸³ Internet Democracy Project. (May 31, 2021). *Virus Detected: A Profile of India's Emergent Ecosystem of Networked Technologies to Tackle Covid-19*. p. 11. Available at: https://cdn.internetdemocracy.in/idp/assets/downloads/reports/covid-app-project-india-country-report/Vijayakumar-and-Ranjit-IDP-Virus-Detected_2021-06-03-103842.pdf.

⁸⁴ Karisma. (May 5, 2020). *Useless & Dangerous: A critical exploration of Covid apps and their human rights impacts in Colombia*, p. 21. Available at: <https://web.karisma.org.co/useless-and-dangerous-a-critical-exploration-of-covid-applications-and-their-human-rights-impacts-in-colombia/>.

It is also the case in some countries that the purpose of the apps evolved over the course of the pandemic. In India, data collected through Aarogya Setu has been used to create heat maps to track the spread of Covid-19. A similar move was made in Iran, where the data collected by the Mask app has been used to produce infection maps to aid government decision-making and warn the public about the spread of the virus. Thus, the title ‘contact tracing’ apps can be a misnomer and disregard the different functionality and purposes that exists between the apps.

4. Alternative measures often had a greater public health impact than the apps

While contact tracing attracted attention and public debate, alternative measures (notably non-technology-based alternative measures) often have a greater impact from a public health standpoint.. A November 2020 study found that the most effective alternative measures used around the world include “curfews, lockdowns and closing and restricting places where people gather in smaller or larger numbers for an extended period of time.”⁸⁵ Among the least effective measures include “tracing and tracking measures as well as land border and airport health checks and environmental cleaning.”⁸⁶

This general trend is largely reflected in our countries of focus. In the early stages of the pandemic, several months before the launch of COVID Alert SA, South Africa mainly relied on mass screening, targeted testing and lockdown measures to control Covid-19.⁸⁷ This involved mobilizing 28,000 health workers to screen over seven million people in May 2020, helping to keep positive cases at around 3%.⁸⁸ In India, the first national lockdown introduced in March 2020 forced over a billion people to quarantine, compared to the 120 million people who downloaded Aarogya Setu. Based on these numbers and data analyzed by MIT,⁸⁹ it can be argued that lockdowns have done more to suppress the virus than contact tracing apps, a finding backed by the case of Lebanon, where the initial lockdown that lasted until June 2020, involving the closure of schools and airports, was “critical to flattening the curve”.⁹⁰ In contrast, the launch of Ma3an “did not significantly help to mitigate or contain the public health crisis.”⁹¹

⁸⁵ Nature. (November 16, 2020). *Ranking the effectiveness of worldwide Covid-19 government interventions*. Available at: <https://www.nature.com/articles/s41562-020-01009-0>.

⁸⁶ Ibid.

⁸⁷ The Financial Times. May 5, 2020). *South Africa’s mass screening helps stem the coronavirus tide*. Available at: <https://www.ft.com/content/98d0d7c6-9bfb-4a64-bcab-19e0854a3b4d>.

⁸⁸ Ibid.

⁸⁹ Mint. (August 5, 2020). *Are contact-tracing apps helping tame the pandemic?* Available at: <https://www.livemint.com/news/india/are-contact-tracing-apps-helping-tame-the-pandemic-11596611635201.html>.

⁹⁰ SMEX. (May 5, 2021). *Lebanon Country Report: Covid-19 and Social Control*. p.12, Available at: <https://smex.org/wp-content/uploads/2021/05/SMEX-Lebanon-COVID-APPS-Report-1.pdf>.

⁹¹ SMEX. (May 5, 2021). *Lebanon Country Report: Covid-19 and Social Control*. p.15. Available at: <https://smex.org/wp-content/uploads/2021/05/SMEX-Lebanon-COVID-APPS-Report-1.pdf>.

Pillar 2 - Increased Social Control

Many countries amended their legal and regulatory apparatus to allow governments to implement Covid-19 measures. Since the World Health Organization (WHO) designated Covid-19 as a global health emergency in January 2020,⁹² over 100 countries have declared a state of emergency, forming the basis for implementing wide-reaching measures designed to counter the pandemic.⁹³ However, a lack of corresponding regulatory checks and balances, such as data protection frameworks, are seen in some cases. In the countries under review, there is an increase in data sharing between public authorities as well as a rise in public-private partnerships that often lack transparency about their nature and modalities of implementation. This regulatory imbalance and lack of oversight has an impact on the public trust in, and awareness of, contact tracing apps, particularly in certain vulnerable communities. These key insights are detailed below.

1. Legal frameworks: weakening of checks and balances to combat Covid-19

In confronting the pandemic, governments had to rely on their respective legal frameworks in determining whether to declare a state of emergency or rely on existing extraordinary powers. Either path has significant constitutional and societal impacts.

a. Limited recourse to emergency laws which facilitate the securitization of Covid-19 response

During the period of study, not all the countries of focus declared a national emergency in response to Covid-19. Early on in India, Prime Minister Narendra Modi stated on Twitter that there was "no need to panic"⁹⁴ and the Health Ministry Joint Secretary said that Covid-19 is not a health emergency.⁹⁵ No emergency was declared in Iran at that time either. Lebanon initially took a similar route by only declaring a state of mobilization, although this did grant the government some emergency powers.⁹⁶ After the Beirut explosions in August 2020, the Lebanese government announced a state of emergency that empowered the military to enforce restrictions on civil

⁹² World Health Organization. (January 30, 2020). *WHO Director-General's statement on IHR Emergency Committee on Novel Coronavirus (2019-nCoV)*. Available at: [https://www.who.int/director-general/speeches/detail/who-director-general-s-statement-on-ehr-emergency-committee-on-novel-coronavirus-\(2019-ncov\)](https://www.who.int/director-general/speeches/detail/who-director-general-s-statement-on-ehr-emergency-committee-on-novel-coronavirus-(2019-ncov)).

⁹³ Verfassungsblog. (April 19, 2020). *The State of Emergency Virus*. Available at: <https://verfassungsblog.de/the-state-of-emergency-virus/>.

⁹⁴ Twitter. (March 3, 2020). *Had an extensive review... @narendramodi* Available at: <https://twitter.com/narendramodi/status/1234762637361086465>.

⁹⁵ The Print. (March 13, 2020). *Coronavirus cases rise to 81 in India, govt says Covid-19 not a health emergency*. Available at: <https://theprint.in/health/coronavirus-cases-rise-to-81-in-india-govt-says-Covid-19-not-a-health-emergency/380819/>.

⁹⁶ The Daily Star. (March 15, 2020). *Lebanon declares "general mobilization" to face coronavirus*. Available at: <https://www.dailystar.com.lb/News/Lebanon-News/2020/Mar-15/502806-lebanon-declares-general-mobilization-to-face-coronavirus.ashx>.

liberties in the event of a disaster or external war.⁹⁷ South Africa also refrained from declaring an 'emergency' as such, but the president did invoke a 'national state of disaster' (this is different from a state of emergency as it does not permit the derogation of rights).⁹⁸

State of emergency: Typically, what constitutes a state of emergency is identified in a country's constitution which details "both derogations from normal human rights standards and alterations in the distribution of functions and powers among the different organs of the State."⁹⁹ In other words, when a state is confronted with a grave threat to its existence or the lives of its citizens, the constitution sets out a specific legal framework to be followed.

For example, in Colombia, a state of emergency allows the president to issue decrees without approval from the legislature.¹⁰⁰ However, under the Colombian constitution, a state of emergency can only be declared for up to 30 days and the president cannot rule by decree for more than 90 days. Such constraints stem from Articles 212 to 215 of the 1991 Constitution, which "limit the president's power by establishing time constraints for extraordinary powers and automatic judicial review by the Constitutional Court."¹⁰¹

Vulnerable communities often face the brunt of this diminished regulatory oversight. In Colombia, national lockdowns were imposed by decrees issued by the president that were not legally related to the emergency declaration, thus escaping the review of the Constitutional Court. This gave the police expanded powers to enforce lockdown measures, potentially exacerbating already known practices of profiling and discrimination against young people, homeless people, LGBTQ+¹⁰² communities and students.

⁹⁷ Aljazeera. (August 13, 2020). *Lebanon parliament approves sweeping powers for the army*. Available at: <https://www.aljazeera.com/news/2020/8/13/lebanon-parliament-approves-sweeping-powers-for-the-army>

Voice of America. (August 6, 2020). *Lebanon Declares 2-Week State of Emergency after Deadly Blast*. Available at: <https://www.voanews.com/middle-east/lebanon-declares-2-week-state-emergency-after-deadly-blast>.

⁹⁸ Government Gazette. (March 15, 2020). *Declaration of a National State of Disaster*. Available at: https://www.gov.za/sites/default/files/gcis_document/202003/43096gon313.pdf.

⁹⁹ European Commission for Democracy Through Law (Venice Commission), 1995. *Emergency Powers*. Available at: [https://www.venice.coe.int/webforms/documents/default.aspx?pdffile=CDL-STD\(1995\)012-e](https://www.venice.coe.int/webforms/documents/default.aspx?pdffile=CDL-STD(1995)012-e).

¹⁰⁰ Reuters. (May 6, 2020). *Colombian President Duque declares new state of emergency to ease pain of virus lockdown*. Available at: <https://www.reuters.com/article/us-health-coronavirus-colombia-emergency-idUSKBN22I308>.

¹⁰¹ Verfassungsblog. (April 17, 2020). *Pandemic and Executive Powers in Colombia: A Problem and a Modest Proposal*. Available at: <https://verfassungsblog.de/pandemic-and-executive-powers-in-colombia-a-problem-and-a-modest-proposal/>.

¹⁰² The term refers to lesbian, gay, bisexual, transgender, queer (or sometimes questioning), and others. The "plus" represents other sexual identities including pansexual and Two-Spirit.

b. Extended use of extraordinary powers and increased surveillance

For those countries that did not declare a state of emergency, ordinary legislative provisions and extraordinary powers were relied on. This differs from a state of emergency as the basis of such powers lies in pre-existing legislation, typically public health laws, permitting certain measures without necessarily having them tied to a type of emergency.

Extraordinary powers: Usually, the exercise of extraordinary powers “further authorizes governmental restriction, even suspension of rights and liberties beyond what is acceptable in normal times.”¹⁰³ This may not always be in accordance with explicit provisions provided in the constitution or legal framework. Accordingly, there is the possibility of emergency powers being exercised without a comprehensive legal regime governing their exercise. In essence, “[b]y engaging powers under ordinary legislation only, the scrutiny and conditionality that normally attach to the use of emergency powers can be avoided.”¹⁰⁴

For instance, the Disaster Management Act 2002 gives the South Africa government the ability to declare a state of disaster and thus is not derived from the constitution.¹⁰⁵ While a state of disaster is time-limited, and rights can only be limited and not derogated from, “there is no clear oversight role for parliament” since “limitations on freedom of assembly may impact the ability of parliament to convene.”¹⁰⁶ Even so, judicial scrutiny has largely remained intact as some Covid-19 measures have been struck down by the courts.¹⁰⁷ For instance, regulations restricting exercise to certain hours and banning the sale of hot foods failed to meet the test of rationality required under South African law.¹⁰⁸

In other countries though, the situation has been more severe. In India, the central government has made use of the “sweeping powers, with almost no legislative checks upon their exercise or limitations” granted to it under the National Disaster Management Act 2005.¹⁰⁹ Although its provisions make it clear that the legislation is “not intended to deal with public health emergencies or pandemics,” several measures, including the national lockdown, were imposed under this

¹⁰³ “European Commission for Democracy Through Law (Venice Commission), 1995. *Emergency Powers*. Available at: [https://www.venice.coe.int/webforms/documents/default.aspx?pdffile=CDL-STD\(1995\)012-e](https://www.venice.coe.int/webforms/documents/default.aspx?pdffile=CDL-STD(1995)012-e).

¹⁰⁴ European Journal of Law Reform, 2020. *States of Emergency: Analysing Global Use of Emergency Powers in Response to Covid-19*. Available at:

https://www.elevenjournals.com/tijdschrift/ejlr/2020/4/EJLR_1387-2370_2021_022_004_002.

¹⁰⁵ Verfassungsblog. (March 11, 2021). *Covid-19 in South Africa: A Year in Review*. Available at: <https://verfassungsblog.de/Covid-19-in-south-africa-a-year-in-review/>.

¹⁰⁶ Ibid.

¹⁰⁷ Ibid.

¹⁰⁸ News24. (January 28, 2021). *Lockdown: SCA finds Level 4 regulations 'justifiable limitation' of rights - except exercise, hot food*. Available at: <https://www.news24.com/news24/SouthAfrica/News/lockdown-sca-finds-level-4-regulations-justifiable-limitation-of-rights-except-exercise-hot-food-20210128>.

¹⁰⁹ Verfassungsblog. *An Executive Emergency: India's Response to Covid-19*. Available at:

<https://verfassungsblog.de/an-executive-emergency-indias-response-to-Covid-19/>.

law.¹¹⁰ In Iran, while the legal framework contains some protections and safeguards for individual rights, “vague and overlapping laws after the spread of coronavirus in Iran have led to violation freedom of expression and crackdown of press.”¹¹¹ In addition, the military were empowered to enforce the lockdown and combat the spread of Covid-19 but no time limit exists for this extraordinary power.¹¹² Militarization also took place in Lebanon, where decrees were passed allowing the army and security forces to prevent public gatherings, limit freedom of movement and close borders.¹¹³ However, the laws the executive relied on to justify such interventions fail to specify their scope or include appropriate checks and balances.¹¹⁴

The use of ambiguous legal bases for the broad use of powers is also observed in the Indian government’s use of drones. Such devices are regulated by the Aircraft Rules, 1937 and the Civil Aviation Requirements 2018, which contain rules on the registration process and permits. In May 2020, the government introduced conditional exemptions for central and local authorities allowing the use of drones for Covid-related operations without the normal approval process.¹¹⁵ The Internet Freedom Foundation (IFF), a digital rights group, has argued that these exemptions permit disproportionate surveillance that violates the right to privacy.¹¹⁶ Furthermore, neither the exemptions¹¹⁷ nor the pre-existing drone regulations¹¹⁸ sufficiently address the issue of privacy, and the Unmanned Aircraft System Rules 2021 that have now replaced the Civil Aviation Requirements also grant the central government the power to exempt any person or entity from the rules, wholly or partially.¹¹⁹ Thus, the undermining of privacy evident in the current exemptions may well be continued beyond the Covid-19 pandemic.

¹¹⁰ Ibid.

¹¹¹ Verfassungsblog. (April 24, 2020). *The Iranian Legal Response to Covid-19: A Constitutional Analysis of Coronavirus Lockdown*. Available at: <https://verfassungsblog.de/the-iranian-legal-response-to-Covid-19-a-constitutional-analysis-of-coronavirus-lockdown/>.

¹¹² Ibid.

¹¹³ Verfassungsblog. (March 10, 2021). *Lebanon in Times of Covid-19: A Series of Crises*. Available at: <https://verfassungsblog.de/lebanon-in-times-of-Covid-19-a-series-of-crises/>.

¹¹⁴ Ibid.

¹¹⁵ Ministry of Civil Aviation. (May 5, 2020). *Conditional exemption to Government entities for Covid-19 related Drone/RPAS operations via GARUD portal*. Available at:

<https://pib.gov.in/PressReleasePage.aspx?PRID=1621250>.

¹¹⁶ Internet Freedom Foundation. (June 23, 2020). *The ongoing illegal use of drones for mass surveillance by the Delhi Police needs to be investigated #SaveOurPrivacy*. Available at: <https://internetfreedom.in/the-ongoing-illegal-use-of-drones-by-the-delhi-police-needs-to-be-investigated/>.

¹¹⁷ Internet Democracy Project. (May 31, 2021). *Virus Detected: A Profile of India’s Emergent Ecosystem of Networked Technologies to Tackle Covid-19*. p. 9, Available at:

https://cdn.internetdemocracy.in/idp/assets/downloads/reports/covid-app-project-india-country-report/Vijayakumar-and-Ranjit-IDP-Virus-Detected_2021-06-03-103842.pdf.

¹¹⁸ Observer Research Foundation. (March 5, 2018). *Drones: Guidelines, regulations, and policy gaps in India*. Available at: <https://www.orfonline.org/research/drones-guidelines-regulations-and-policy-gaps-in-india/>.

¹¹⁹ Ministry of Civil Aviation. (March 21, 2021). *Unmanned Aircraft System Rules 2021*. Available at: <https://www.dgca.gov.in/digigov-portal?page=jsp/dgca/InventoryList/RegulationGuidance/Rules/The%20Unmanned%20Aircraft%20System%20Rules/UAS%20Rules,%202021.pdf>.

2. The countries of focus have nascent, sometimes unenforced, data protection regimes

In the countries of focus, comprehensive data protection laws are either not yet in force, are still going through the legislative process, or do not exist. South Africa falls into the first category, with the substantive provisions of the Protection of Personal Information Act of 2013 enforceable beginning July 1, 2021.¹²⁰ The Brazilian General Data Protection Law has been delayed to August 2021¹²¹ and in Lebanon, Law No. 84 of 2018 on Electronic Transactions and Personal Data is yet to be implemented.¹²² In India, a joint parliamentary committee has not yet submitted its report on the 2019 Personal Data Protection Bill.¹²³ There is currently no data protection law in Iran.¹²⁴ Colombia stands out as the only country with an existing law, although the rules have been relaxed during the pandemic to allow public authorities to collect personal information without the usual restrictions.¹²⁵ In general, stronger data protection regimes might have strengthened oversight across the countries in question.

In Lebanon, the IMPACT platform – set up by the Ministry of Interior and Municipalities – allowed citizens to obtain permission to move during the full lockdown. The absence of data protection laws meant that the IMPACT platform suffered from a number of data protection flaws (including data security): it was initially launched without a privacy/data protection policy and the eventual policy was available only in English; the website lacked a Secure Sockets Layer (SSL) certificate, meaning that personal data was inputted into a system that does not encrypt Internet traffic or verify server identity.

a. Increased and non-transparent data sharing between public authorities

The pandemic has prompted states to collect, analyze and share data between different public authorities. Not all countries have been successful in doing so, for example, Brazil, which lacked a coordinated approach between central and local governments resulting in the limited use of

¹²⁰ Hunton Andrews Kurth. (29 June 2020). *South Africa's Protection of Personal Information Act, 2013, Goes into Effect July 1*. Available at: <https://www.huntonprivacyblog.com/2020/06/29/south-africas-protection-of-personal-information-act-2013-goes-into-effect-july-1/>.

¹²¹ DataGuidance. (12 June 2020). *Brazil: President promulgates law postponing LGPD enforcement provisions*. Available at: <https://www.dataguidance.com/news/brazil-president-promulgates-law-postponing-lgpd-enforcement-provisions>.

¹²² SMEX. (May 5, 2021). *Lebanon Country Report: Covid-19 and Social Control*. p. 20. Available at: <https://smex.org/wp-content/uploads/2021/05/SMEX-Lebanon-COVID-APPS-Report-1.pdf>.

¹²³ DataGuidance. (25 March 2021). *India: Committee seeks extension for report on Personal Data Protection Bill*. Available at: <https://www.dataguidance.com/news/india-committee-seeks-extension-report-personal-data-0>.

¹²⁴ DLA Piper Data Protection Laws of the World. Available at: <https://www.dlapiperdataprotection.com/index.html?t=law&c=IR&c2=>.

¹²⁵ Karisma. (May 5, 2020). *Useless & Dangerous: A critical exploration of Covid apps and their human rights impacts in Colombia*. p.31. Available at: <https://web.karisma.org.co/useless-and-dangerous-a-critical-exploration-of-covid-applications-and-their-human-rights-impacts-in-colombia/>.

data. Other countries, however, have invested more in creating and operating various datasets in order to better manage Covid-19. For instance, the National Informatics Centre in India, which is under the Ministry of Electronics and Information Technology, designed a centralized portal enabling individuals to apply for an e-pass to travel within the country. This connects the travel portals of at least 20 states and has processed millions of applications. The sharing of this system helped to expedite the application process for internal travel whilst lockdown measures were in place.

Data sharing between public authorities can have negative impacts. The privacy policy for the Mask app in Iran states that the data it collects, which includes phone numbers, health data, IP addresses and other personal information, may be shared for law enforcement purposes. This can give rise to function creep and extended surveillance, exacerbated by the country's lack of a comprehensive data protection law.

Authorities in Medellín, Colombia built a web platform called Medellín Me Cuida to profile families and assign social benefits, thus collecting data on health, housing, geolocation, profession, and socioeconomic status. The Department of Health in Medellín uses Medellín Me Cuida and SISMUESTRAS (a system that registers the test results of confirmed cases) to search for those with Covid-19 and track their families, communities, work and the places they have visited. These systems have been used in combination to establish who is authorized to move around the city during obligatory isolation periods. This has been achieved by controlling access to the public transportation system by blocking unauthorized citizens' transportation cards. One consequence was that those outside the formal sector of the Colombian economy, in particular street vendors, have had difficulties obtaining travel authorization since they are not typically employed by a registered company that could complete the necessary Medellín Me Cuida registration.

b. Rise of public-private partnerships and lack of transparency

Many countries have deployed technological solutions in collaboration with the private sector. One example is the use of the GAEN API to develop contact tracing apps; around 40 countries have taken this path, including South Africa and Brazil from our countries of focus.¹²⁶ Alternatively, Aarogya Setu in India was developed in a public-private partnership facilitated by the National Informatics Centre.¹²⁷ However, the pandemic gave rise to a range of other types of partnerships.

Some of these partnerships have come in the form of data sharing arrangements. Brazil saw the creation of the São Paulo Intelligent Monitoring Information System (SIMI-SP); this platform, which is used by the São Paulo state government to create heat maps measuring the effectiveness of quarantine measures, consists of geolocation data collected from the telephone

¹²⁶ XDA. (February 25, 2021). *Here are the countries using Google and Apple's Covid-19 Contact Tracing API*. Available at: <https://www.xda-developers.com/google-apple-Covid-19-contact-tracing-exposure-notifications-api-app-list-countries/>

¹²⁷ Ministry of Electronics & IT. (April 2, 2020). *AarogyaSetu: A multi-dimensional bridge*. Available at: <https://pib.gov.in/PressReleasePage.aspx?PRID=1610301>.

companies Vivo, Claro, Oi and TIM.¹²⁸ Soon after the first national lockdown began, the Superintendency of Industry and Commerce in Colombia issued an administrative order permitting mobile network operators and other businesses to share their clients' data with authorities.¹²⁹ In Lebanon, the state owns the telecommunications companies Alfa and Touch, allowing it to easily collect and share metadata with government agencies, including names, telephone numbers and addresses (therefore collecting much more personal information than the Ma3an app).¹³⁰

Other partnerships revolved around private companies helping governments to conduct surveillance operations. The Medellín government in Colombia instructed businesses to connect video surveillance systems with a local security agency as a condition for remaining open during the pandemic.¹³¹ India formed the National Drone Rapid Response Force whereby state officials partnered with drone pilots to enforce the lockdown, make public announcements and disinfect spaces.¹³² Some of these drones were fitted with artificial intelligence and thermal scanners.¹³³

A major drawback of these partnerships is the omission of appropriate regulatory checks.¹³⁴ In Kerala, India, for example, drone footage has been used by law enforcement agencies to arrest over 150 violators of lockdown rules; much of this enabled by a lack of regulatory oversight and

¹²⁸ Forbes. (April 10, 2020). *The Brazil Tech And Innovation Roundup: Largest-Ever Financial Inclusion Scheme Begins, São Paulo Launches Surveillance To Slow Coronavirus Spread, iFood Joins Forces With DeliveryHero*. Available: <https://www.forbes.com/sites/angelicamarideoliveira/2020/04/10/the-brazil-tech-and-innovation-roundup-largest-ever-financial-inclusion-scheme-begins-so-paulo-launches-surveillance-to-slow-coronavirus-spread-ifood-joins-forces-with-deliveryhero/?sh=3e7d81d673bd>.

¹²⁹ Vanegas Morales. (June 11, 2020). *Circulation of sensitive information between authorities and private entities in times of Covid-19*. Available: <https://vanegasmorales.com/en/circulation-of-sensitive-information-between-authorities-and-private-entities-in-times-of-Covid-19/>.

¹³⁰ Arab News. (May 5, 2020). *Lebanese government to take back mobile networks ahead of new tender*. Available at: <https://www.arabnews.com/node/1669976/business-economy>.

¹³¹ Medellín Herald. (July 1, 2020). *Medellin Metro Area Cracking-Down On Stores Over Covid-19 Biosafety; Pico Y Cedula Restriction To Continue On Tax-Free Day*. Available at: <https://medellinherald.com/ln/item/966-medellin-metro-area-cracking-down-on-stores-over-Covid-19-biosafety-pico-y-cedula-restriction-to-continue-on-tax-free-shopping-day>;

Karisma. (May 5, 2020). *Useless & Dangerous: A critical exploration of Covid apps and their human rights impacts in Colombia*. p. 47. Available at: <https://web.karisma.org.co/useless-and-dangerous-a-critical-exploration-of-covid-applications-and-their-human-rights-impacts-in-colombia/>.

¹³² Outlook. (April 27, 2020). *Drone Support: NDERR formed to fight Covid-19*. Available at: <https://www.outlookindia.com/newsscroll/drone-support-ndrr-formed-to-fight-Covid19/1816070>.

¹³³ Internet Democracy Project. (May 31, 2021). *Virus Detected: A Profile of India's Emergent Ecosystem of Networked Technologies to Tackle Covid-19*. p.13. Available at: https://cdn.internetdemocracy.in/idp/assets/downloads/reports/covid-app-project-india-country-report/Vijayakumar-and-Ranjit-IDP-Virus-Detected_2021-06-03-103842.pdf;

Deccan Herald. (April 3, 2020). *Covid-19: IIT alumni develop drone with infrared camera for thermal screening*. Available at: <https://www.deccanherald.com/national/bharat-biotech-to-release-results-of-covaxin-third-phase-trial-in-july-995710.html>.

¹³⁴ Privacy International. *Public-Private surveillance partnerships*. Available at: <https://privacyinternational.org/learn/public-private-surveillance-partnerships>.

unclear data retention policies, as different states have relied on different protocols.¹³⁵ The SIMI-SP in Brazil remained secret for almost a month until it was put on legislative footing in May 2020, which has fueled concerns about the types of data collected and how they are being used.¹³⁶ This has caused many aggrieved citizens to commence legal actions seeking suspension of the agreement.¹³⁷ Moreover, as outlined above, all of the countries under review lack a comprehensive data protection framework, which further undermines the legitimacy of these public-private partnerships, creating opportunities for function creep and abuse of power.

3. Contact tracing apps suffered from a lack of public trust and awareness

In Colombia, abuse of surveillance powers by law enforcement and intelligence services has a long history.¹³⁸ This context adds to concerns raised during the pandemic around the transparency of the data processing activities of CoronApp, particularly regarding why personal data was being collected via the app.¹³⁹

In South Africa, distrust in the government may have hampered the success of COVID Alert SA. An additional element is the scepticism from a privacy perspective especially “given the lack of an effective data protection framework [and] previous attempts by the government to track and monitor people.”¹⁴⁰ This is coupled with the lack of communication from the government about the app contributing to the low level of understanding of its purpose and how it functions. Judge O'Regan (who was appointed to oversee the initial efforts at contact tracing) pointed out that the lack of focused and targeted communications contributed to public confusion.¹⁴¹ Evidence from media reports and app reviews show public frustration and dissatisfaction with the app partly due to it not appearing to work effectively.¹⁴² For example, exposure notifications have been linked to days when users have not left their homes.

¹³⁵ Medianama. (April 10, 2020). *In Kerala And Telangana, Police Turn To Drones To Enforce Covid-19 Lockdown*. Available at: <https://www.medianama.com/2020/04/223-kerala-telangana-drones-coronavirus/>.

¹³⁶ InternetLAB. (April 2021). *Privacy and Data Protection in the Pandemic: Report on the Use of Apps and Alternative Measures in Brazil*. p. 22 Available at: https://www.internetlab.org.br/wp-content/uploads/2021/04/Privacy-and-Data-Protection-in-the-Pandemic_05.pdf.

¹³⁷ Ibid.

¹³⁸ Karisma. (May 5, 2020). *Useless & Dangerous: A critical exploration of Covid apps and their human rights impacts in Colombia*. p. 31. Available at: <https://web.karisma.org.co/useless-and-dangerous-a-critical-exploration-of-covid-applications-and-their-human-rights-impacts-in-colombia/>.

¹³⁹ Ibid, p. 26.

¹⁴⁰ Alt Advisory. (March 5, 2021). *Covid-19 Apps: South Africa Project Report*. p.11, Available at: <https://altadvisory.africa/wp-content/uploads/2021/05/South-Africa-Covid-App-Project-final.pdf>.

¹⁴¹ Ibid, p.10.

¹⁴² Sunday Times. (January 25, 2021). “The app will give you stress,” says user. But Covid-19 alert app’s effectiveness depends on you, say experts. Available at: <https://www.timeslive.co.za/sunday-times-daily/news/2021-01-25-the-app-will-give-you-stress-says-user-but-Covid-19-alert-apps-effectiveness-depends-on-you-say-experts/>.

From its inception, the Indian government has strongly promoted Aarogya Setu, with Prime Minister Modi hailing the app an “essential tool” in the country’s response to Covid-19. Even so, the app has been subject to scrutiny over privacy concerns,¹⁴³ in particular for its lack of transparency and the volume of data collected.¹⁴⁴ The public has limited avenues for recourse in the event they are misclassified as ‘high risk’ by the algorithm; the government is not liable for “the accuracy of the information provided by the App...as to whether the persons you have come in contact with have in fact been infected by Covid-19.”¹⁴⁵ In addition, algorithms can sometimes encode the already-existing biases of its developers, resulting in potentially discriminatory policies by public authorities.¹⁴⁶

In Iran, the National Headquarters to Fight Coronavirus (NHFC) “has not yet developed a unified approach to implementing contact tracing apps and managing data and privacy concerns, which has exacerbated an already wide trust gap between the ministry, the people and the apps.”¹⁴⁷ While Mask has been advertised and promoted by many government officials, downloads remain low and this is likely due to the distrust generated around the rollout of AC19 and subsequent controversy.¹⁴⁸ The government has also been accused of disseminating misinformation on the spread of the virus,¹⁴⁹ meaning that other information, including around the app, may not be trusted.

In Lebanon, the introduction of the Ma3an contact tracing app in September 2020 “was an insignificant contribution to the country’s ability to prevent the spread of the virus, largely due to poor publicity.”¹⁵⁰ The ineffectiveness of the app has been explained by “a general mistrust in the government, lack of awareness of the app and privacy concerns.”¹⁵¹ Many people were not aware of the app, and sometimes conflicting information was circulated. The app also suffered from a lack of funding,¹⁵² but even so the impact of the economic crisis and the Beirut explosion made it

¹⁴³ Internet Democracy Project. (May 31, 2021). *Virus Detected: A Profile of India’s Emergent Ecosystem of Networked Technologies to Tackle Covid-19*. p. 31. Available at: https://cdn.internetdemocracy.in/idp/assets/downloads/reports/covid-app-project-india-country-report/Vijayakumar-and-Ranjit-IDP-Virus-Detected_2021-06-03-103842.pdf.

¹⁴⁴ Ibid, p.47.

¹⁴⁵ Aarogya Setu Terms and Conditions. Available at: <https://www.aarogyasetu.gov.in/terms-conditions/>.

¹⁴⁶ Internet Democracy Project. (May 31, 2021). *Virus Detected: A Profile of India’s Emergent Ecosystem of Networked Technologies to Tackle Covid-19*. p. 45. Available at: https://cdn.internetdemocracy.in/idp/assets/downloads/reports/covid-app-project-india-country-report/Vijayakumar-and-Ranjit-IDP-Virus-Detected_2021-06-03-103842.pdf;

Blogdroiteeuropéen. (October 15, 2020). *Digital Contact Tracing in India: A Failure of Democratic Science and Technology Policy*. Available at: <https://blogdroiteeuropeen.com/2020/10/15/digital-contact-tracing-in-india-a-failure-of-democratic-science-and-technology-policy/>.

¹⁴⁷ United 4 Iran. (May 5, 2021). *Iran Covid-19 Report*. p. 14, Available at: <https://united4iran.org/wp-content/uploads/FINAL-website-Iran-Covid-Country-Report-.docx.pdf>.

¹⁴⁸ Ibid.

¹⁴⁹ Ibid, p.5.

¹⁵⁰ SMEX. (May 5, 2021). *Lebanon Country Report: Covid-19 and Social Control*. p.12, Available at: Available at: <https://smex.org/wp-content/uploads/2021/05/SMEX-Lebanon-COVID-APPS-Report-1.pdf>.

¹⁵¹ Ibid, p.15.

¹⁵² Ibid.

harder to convince people to download the app as many were dealing with displacement and an increasing distrust in the government.¹⁵³

4. Impact on vulnerable communities

a. Discrimination against marginalized groups

During the pandemic, there have been “various reported cases of ostracizing and targeting along the lines of caste, class, religion, and gender.”¹⁵⁴ The Punjab’s Cova app’s feature that allows users to report mass gatherings and inter-state travelers in their area effectively permitted citizens to carry out surveillance on behalf of the state. However, this duty has been delegated without the commitments to equality that states must usually follow. Accordingly, this feature of the Cova app has become a “mechanism to keep existing divisions and power relations intact”¹⁵⁵ by giving citizens the opportunity to unfairly penalize certain individuals or even whole groups.

b. Suppression of Protests

Protests broke out across Colombia in reaction to the insufficient aid provided by national and local governments to mitigate the problems generated by lockdowns and other Covid-related measures. In Bogotá, “people decided to break the mandatory lockdown to demand assistance from the Mayor’s Office and to emphasize that the people facing difficulties were mostly children, sick people and older people.”¹⁵⁶ Despite the peaceful nature of the protests, public authorities deployed excessive force against the demonstrators.¹⁵⁷ Similar events took place in Medellín, with protests in June 2020.¹⁵⁸ Journalists covering the event reported the use of disproportionate force against demonstrators by the police.¹⁵⁹

Protests in Lebanon originally began in October 2019 causing the ousting of Prime Minister Rafic Hariri and the installation of a new government. However, after a curfew was implemented in

¹⁵³ Ibid, p.16.

¹⁵⁴ Internet Democracy Project. (May 31, 2021). *Virus Detected: A Profile of India’s Emergent Ecosystem of Networked Technologies to Tackle Covid-19*. p. 115. Available at: https://cdn.internetdemocracy.in/idp/assets/downloads/reports/covid-app-project-india-country-report/Vijayakumar-and-Ranjit-IDP-Virus-Detected_2021-06-03-103842.pdf.

¹⁵⁵ Ibid, p.115.

¹⁵⁶ Karisma. (May 5, 2020). *Useless & Dangerous: A critical exploration of Covid apps and their human rights impacts in Colombia*. p.57. Available at: <https://web.karisma.org.co/useless-and-dangerous-a-critical-exploration-of-covid-applications-and-their-human-rights-impacts-in-colombia/>.

¹⁵⁷ Karisma. (May 5, 2020). *Useless & Dangerous: A critical exploration of Covid apps and their human rights impacts in Colombia*. p.58. Available at: <https://web.karisma.org.co/useless-and-dangerous-a-critical-exploration-of-covid-applications-and-their-human-rights-impacts-in-colombia/>.

¹⁵⁸ Ibid.

¹⁵⁹ Twitter. (June 16, 2020). *Más y más agresiones a jóvenes en Medellín... @AquinoTicias1*. Available at: <https://twitter.com/AquinoTicias1/status/1272682948211458049>;

Twitter. (June 15, 2020). *Capturas ilegales, agresiones a manifestantes... ” @AquinoTicias1*. Available at: <https://twitter.com/AquinoTicias1/status/1272614496067092481>.

March 2020 in response to Covid-19, “the police and security forces forcefully removed protestors’ tents in Martyrs’ Square, which had been one of the centers of the protests.”¹⁶⁰ In late April and early May 2020, protests escalated again in response to the government’s mishandling of the economic crisis during the pandemic, with the country defaulting on its sovereign debt and experiencing a rapid rise in inflation.¹⁶¹ Protestors also criticized the government’s economic rescue plan talks with the International Monetary Fund (IMF).¹⁶² This public anger was reignited when a lockdown was instituted in January 2021 “without providing adequate economic relief”, for basic necessities, such as food.¹⁶³ This resulted in numerous casualties after clashes between security forces and demonstrators.¹⁶⁴

¹⁶⁰ SMEX. (May 5, 2021). *Lebanon Country Report: Covid-19 and Social Control*. p. 18. Available at: Available at: <https://smex.org/wp-content/uploads/2021/05/SMEX-Lebanon-COVID-APPS-Report-1.pdf>.

¹⁶¹ France24. (May 1, 2020). *Lebanese protest against rescue plan as government seeks IMF help*. Available at: <https://www.france24.com/en/20200501-lebanese-protest-against-rescue-plan-as-government-seeks-imf-help>.

¹⁶² Ibid.

¹⁶³ SMEX. (May 5, 2021). *Lebanon Country Report: Covid-19 and Social Control*. p. 18. Available at: <https://smex.org/wp-content/uploads/2021/05/SMEX-Lebanon-COVID-APPS-Report-1.pdf>.

¹⁶⁴ Ibid.

Pillar 3 - Equal Access to Society

While Covid-19 and the various measures introduced to combat it have had a severe impact on large swathes of society, certain vulnerable communities have been particularly acutely affected. While some of these issues are touched on in Pillar 2, the research also highlights insights on equal access for certain groups, including those less digitally connected, migrants, refugees and those living in informal settlements.

1. The tech-based Covid-19 response enhanced the digital divide and inequalities

As described in Pillar 1, contact tracing apps were deployed despite disparities in internet access and the adoption of mobile technology. The importance of this problem cannot be overstated, since unequal access to smartphone technology can “exacerbate existing inequities and raise ethical concerns.”¹⁶⁵ Furthermore, by making social security services available predominantly through online platforms, vulnerable communities who lack internet access and mobile devices may be deprived of assistance.

An example can be found in Colombia, where citizens in Medellín were required to register onto the Medellín Me Cuida to obtain social benefits. The personal data recorded is used to evaluate the profiles of users and allocate cash transfers to selected beneficiaries. However, in setting up this system, the Mayor’s Office had incorrectly assumed that these vulnerable citizens were equipped with sufficient internet access and the required level of digital literacy to navigate Medellín Me Cuida. As a result, the aid provided was insufficient to mitigate the hunger experienced by vulnerable communities, making it more difficult to cope with the lockdown measures and fueling the protests.

In addition, online platforms may also sometimes lack locally relevant content which can have negative implications beyond vulnerable communities. For instance, South Africa has 11 official languages but COVID Alert SA is only available in English; this is the sixth most commonly spoken language inside the home and the second most used outside.¹⁶⁶ A similar problem was evident in Lebanon, where the privacy policy for the IMPACT platform, which citizens use to obtain permission to travel within the country, was originally only available in English even though Arabic is the official language.¹⁶⁷ Such design decisions have the potential to exclude large sections of society from access to vital services.

¹⁶⁵ Nature. (January 21, 2021). *Tracking and promoting the usage of a Covid-19 contact tracing app*. Available at: <https://www.nature.com/articles/s41562-020-01044-x>.

¹⁶⁶ Statistics South Africa. (May 28, 2019). *General Household Survey 2018*. Available at: <http://www.statssa.gov.za/publications/P0318/P03182018.pdf>.

¹⁶⁷ SMEX. (May 5, 2021). *Lebanon Country Report: Covid-19 and Social Control*. p. 20. Available at: <https://smex.org/wp-content/uploads/2021/05/SMEX-Lebanon-COVID-APPS-Report-1.pdf>.

2. Acute impact on vulnerable communities

The project highlighted that the use of contact tracing apps as well as alternative measures (whether technological or not) also disproportionately affected vulnerable and marginalized populations.

a. Migrants and refugees

Across the world, national lockdowns and more stringent border controls that led to warnings from the United Nations High Commissioner for Refugees (UNHCR) and others that “the stateless and migrants are at heightened risk.”¹⁶⁸ In public health crises, “migrants and refugees are disproportionately vulnerable to exclusion, stigma and discrimination, particularly when undocumented.”¹⁶⁹ It was recommended that such vulnerable groups are “ensured equal access to health services and are effectively included in national responses to Covid-19.”¹⁷⁰ Nevertheless, certainly among the countries of focus, this was not always achieved.

In Iran, Covid-19 has a significant impact on Afghan nationals, who are the majority of refugees and migrants.¹⁷¹ The pandemic aggravates the pre-existing inequalities suffered by refugees and migrants, including “their access to some economic, social and cultural resources”.¹⁷² For instance, when businesses started to only accept electronic payments, many Afghan migrants were excluded due to not having a bank account.¹⁷³

When lockdown was declared in India, most migrant workers were deprived of their livelihoods and access to basic necessities, including food and housing. This includes around 140 million individuals, many of whom have no access to social security services and who mostly work in the informal sector.¹⁷⁴ The lockdown made access to public transport more difficult, resulting in many people having to travel home on foot, sometimes for hundreds of kilometers.¹⁷⁵ These problems were further exacerbated by the online portals for travel; the application process required users to have a smartphone and an internet connection, which migrants do not always possess. These

¹⁶⁸ The World Health Organization. (March 31, 2020). OHCHR, IOM, UNHCR and WHO joint press release: the rights and health of refugees, migrants and stateless must be protected in Covid-19 response. Available at: <https://www.who.int/news-room/detail/31-03-2020-ohchr-iom-unhcr-and-who-joint-press-release-the-rights-and-health-of-refugees-migrants-and-stateless-must-be-protected-in-Covid-19-response>.

¹⁶⁹ Ibid.

¹⁷⁰ Ibid.

¹⁷¹ United 4 Iran. (May 5, 2021). *Iran Covid-19 Report*. p. 30, Available at: <https://united4iran.org/wp-content/uploads/FINAL-website-Iran-Covid-Country-Report-.docx.pdf>.

¹⁷² Ibid.

¹⁷³ Ibid.

¹⁷⁴ Internet Democracy Project. (May 31, 2021). *Virus Detected: A Profile of India’s Emergent Ecosystem of Networked Technologies to Tackle Covid-19*. p. 62, Available at: https://cdn.internetdemocracy.in/idp/assets/downloads/reports/covid-app-project-india-country-report/Vijayakumar-and-Ranjit-IDP-Virus-Detected_2021-06-03-103842.pdf.

¹⁷⁵ Ibid.

problems were as pronounced for internal migrants as they were for international migrants.¹⁷⁶ The combination of the lockdown and online travel applications contributed to a humanitarian crisis that disproportionately affected migrants.

Similar effects were seen in Lebanon, where lockdown measures were unevenly applied to Syrian refugees and worsened by the economic downturn. The Ma3an contact tracing app has not been widely adopted by refugees, especially since it is not mandatory. Conversely, the IMPACT platform for requesting permission to move during the lockdown excluded Syrian refugees, as only 22% of them have legal residency, meaning that most lack the requisite documentation or ID numbers to register.¹⁷⁷ This was particularly detrimental as refugees' movement is more heavily restricted, including out of camps, and enforced by the military. Those refugees who were able to travel had limited options and pay higher prices for services, even to get to hospitals.¹⁷⁸

In Brazil, in June 2020, federal measures were introduced to prohibit the entry of foreigners according to routes rather than countries of origin (as had been the case with measures introduced in March 2020 in relation to Venezuela).¹⁷⁹ Such measures had an unequal impact on Latin American immigrants, particularly Venezuelans.¹⁸⁰ While Brazil has previously been lauded for its response to the exodus of Venezuelans fleeing economic collapse in their country,¹⁸¹ the UNHCR had to suspend its relocation programs "which were moving poor Venezuelans away from isolated border areas to interior locations where there was a better chance for housing and jobs."¹⁸² Moreover, previous hostilities between Brazil and Venezuela allegedly led to the former imposing targeted border controls against its northern neighbour in March 2020,¹⁸³ even though such measures were arguably disproportionate.¹⁸⁴

¹⁷⁶ Chatham House. (July 13, 2020). *Covid-19: The Hidden Majority in India's Migration Crisis*. Available at: <https://www.chathamhouse.org/2020/07/Covid-19-hidden-majority-indias-migration-crisis>.

¹⁷⁷ SMEX. (May 5, 2021). Lebanon Country Report: Covid-19 and Social Control. p. 22. Available at: <https://smex.org/wp-content/uploads/2021/05/SMEX-Lebanon-COVID-APPS-Report-1.pdf>.

¹⁷⁸ Ibid, p.21.

¹⁷⁹ InternetLAB. (April 2021). *Privacy and Data Protection in the Pandemic: Report on the Use of Apps and Alternative Measures in Brazil*. p.24. Available at: https://www.internetlab.org.br/wp-content/uploads/2021/04/Privacy-and-Data-Protection-in-the-Pandemic_05.pdf.

¹⁸⁰ Ibid, p.15.

¹⁸¹ UN News. (August 19, 2019). *UN refugee chief impressed with Brazil's 'exemplary' response to plight of fleeing Venezuelans*. Available at: <https://news.un.org/en/story/2019/08/1044431>.

¹⁸² Latin American Program Working Paper. (December 2020). *Venezuelan Migrants Under Covid-19: Managing South America's Pandemic Amid a Migration Crises*. Available at: https://reliefweb.int/sites/reliefweb.int/files/resources/Venezuelan%20Migrants%20Under%20COVID19_Managing%20South%20America's%20Pandemic%20Amid%20a%20Migration%20Crisis.pdf.

¹⁸³ Borders in Globalization Review. (December 15, 2020). *Brazilian Border Closures in Pandemic Times: A Comparative Approach to Four Regions*. Available at: <https://journals.uvic.ca/index.php/bigreview/article/view/19962>.

¹⁸⁴ openDemocracy. (June 18, 2020). *Covid-19 at the Brazil-Venezuela borders: the good, the bad and the ugly*. Available at: <https://www.opendemocracy.net/en/pandemic-border/Covid-19-brazil-venezuela-borders-good-bad-and-ugly/>.

b. Informal settlements

Covid-19 has intensified the challenges facing those in rural areas and those in informal sectors of the economy.¹⁸⁵ This was particularly true in South Africa where, apart from the threat of the virus itself, insufficient water supplies and constrained spaces have been “but a few of the many challenges faced by many indigent people in South Africa.”¹⁸⁶ This is in addition to the contentious use of quarantine camps, where more than 100 residents were kept in isolation for 14 days without being tested for Covid-19 and denied the opportunity to self-isolate at home. In May 2020, AfriForum (a civil rights organization) succeeded in its legal challenge against the South African government regarding the use of these camps, declaring that they should be closed immediately.¹⁸⁷

¹⁸⁵ Mail & Guardian. (April 12, 2020). *Covid-19 and the call for solidarity: Challenges for informal settlements.* Available at: <https://mg.co.za/article/2020-04-12-Covid-19-and-the-call-for-solidarity-challenges-for-informal-settlements/>.

¹⁸⁶ Alt Advisory. (March 5, 2021). *Covid-19 Apps: South Africa Project Report.* p. 36. Available at: <https://altadvisory.africa/wp-content/uploads/2021/05/South-Africa-Covid-App-Project-final.pdf>.

¹⁸⁷ AfriForum. (May 6, 2020). *Afriforum Wins Case Regarding Covid-19 Quarantine Camp.* Available at: <https://afriforum.co.za/en/afriforum-welcomes-judgement-on-Covid-19-quarantine-camp/>.

Recommendations per Country

This section presents country-based recommendations which aim to improve practices in the context of the pandemic response.

Brazil

1. Systematic Oversight

We recommend establishing active transparency practices, systematic monitoring and oversight of the government's measures in the context of the pandemic, especially when they affect rights.

2. Prior Impact and Proportionality Assessment

It is recommended that public authorities and private entities that collaborate with the government to process personal data in the pandemic prepare and publish impact reports as a good practice of active transparency and accountability.

3. Data Protection Adjustments

There is some tension between the General Data Protection Law, which came into force in September 2020, and infra-legal rules that organize data processing in public administration. These regulations, such as the Ministry of Health's National Health Information and Informatics Policy and Decrees 10.046/2019 and 10.047/2019, pay little attention to data protection norms and standards. The General Data Protection Law must be respected by the infra-legal rules that organize day-to-day activities in public administration.

A review and harmonization agenda is therefore recommended.

4. Precautionary Principle

As a risk management mechanism, the precautionary principle imposes the adoption of control measures in the face of potential risk to the environment and life and of uncertainties regarding the impact of activities. Although its initial conception is related to environmental policy, in practice the precautionary principle has been incorporated into several areas, such as public health and consumer law.

Therefore, the adoption of technologies to tackle the pandemic, such as contact tracing and anonymized data heat maps, should consider risk management, based on the precautionary

principle. It is up to the public authorities to evaluate the scientific controversies surrounding these technologies; take into account risks such as the re-identification of anonymized data, data leakage, etc.; assess their weaknesses concerning the ability to safely process such data; and maintain a wide-ranging debate with civil society about the impacts and possible benefits of using these technologies in the pandemic context.

5. Transparency

Government measures, data on the pandemic and the terms of cooperation with the private sector must be actively made available.

6. Transitional mechanisms

Exceptional rules were introduced, emergency regulations were created, and new markets and new economic actors have emerged during the pandemic.

In a process analogous to that designed to address serious human rights violations, it may be advisable to consider transitional mechanisms that assess the legacy of these practices and norms, and that promote accountability and reconfiguration so that exceptionality is not perpetuated.

Colombia

1. Policy Recommendations for Apps

- The public sector should design applications and data systems to tackle the pandemic that take into account the technical capacities and structure of the public health information systems.
- The health authorities should lead the development of technology to deal with a public health crisis. The idea is to avoid a sense of urgency and excessive trust in technological solutions. In other words, the health authorities should define the problems based on the capacities of the health system.
- The designers of multiple apps at the national and local level should ensure that they are interoperable and based on coordinated responses. The data collected by local applications must reach the national level to be analysed and consolidated and national data should made available to local authorities.
- The process of supporting communities to ensure compliance with biosafety measures and guidelines should be led by authorities and organizations aligned with public health missions. Communities that have historically been victims of police brutality should not be disciplined by force, especially when the crisis at hand is related to health and not to public order.
- The government's decision to use applications to support the implementation of biosafety measures should not be based solely on the efficacy of the applications in other contexts. The government's use of these alternatives should be supported by an impact analysis that takes into account the possible consequences the apps could have in the Colombian context and on vulnerable groups.
- The government's strategies to deploy applications or web apps to support the implementation of biosafety measures should consider, in their planning and design, the availability of technologies and the socio-economic conditions of vulnerable and impoverished communities.
- The development of online forms to authorize economic reactivation and movement around cities should take into account both the formal and informal economic sectors and include specific reactivation requirements that correspond to their characteristics, possibilities and operations.
- The designers of these apps should avoid introducing other actors who are not familiar with the public health system.

2. Legal Recommendations for Apps

- The design of apps for public services by private parties must be accompanied by follow-up measures and clear responsibilities that prioritize the public interest.
- The process of designing the apps must be transparent about the purposes of the data collected. Likewise, the collection of data should be guided by the principle of necessity and proportionality in keeping with the main public health objective.
- Future lockdowns must be imposed by appropriate legal instruments such as laws and decrees that can only be issued by the president based on a legitimate declaration of an emergency. The Constitutional Court must review the orders and their time limits must be clearer.
- Orders issued to protect public health must be coherent from the start. Thus, national and local governments must avoid using public order as the basic justification for measures to prevent contagion, whether for Covid-19 or any other pandemic.
- National and local authorities must limit the use of data and systems acquired or created as part of the public health strategy. Strict limitations related to public health must be transparent and public. Other uses must be avoided.
- The Data Protection Authority must review Circular 001 and formally declare that the exception is not in force. There should be accountability measures to ensure that personal data under Circular 001 are used according to data protection principles and law.
- Data given or taken by authorities should not be used for surveillance and punishment. Authorities must question the use of data to punish people, choose action at a distance and focus on public health for communities as a whole.
-

India

1. Technical Recommendations for Apps

- Make all existing Covid-related apps open source on all platforms, and ensure that any new ones are open source from the outset. By regularly updating GitHub (a provider of Internet hosting for software development and version control using Git) and making the server-side codes publicly accessible and auditable, people can collaborate, check the codes for vulnerabilities and start a system of peer-review.
- Make all Covid-related apps purely voluntary across all sectors, and ensure that no individual is penalized, or denied access to any service, public or private, because of their non-use.
- Switch from the use of static IDs to dynamic pseudo IDs, which are generated in the phone itself, and not the central server.
- Offer a clear and easy-to-access option to delete an account and information from the app, as well as from the server.
- Establish a practice of communicating to users the addition of any new functionalities, as well as updates to the app and/or any of its governing documents in a simple and accessible manner, before the changes are applied.
- Minimize the amount of data collected to what is strictly necessary, particularly personal or identifiable data; this includes doing away with the need for GPS location.
- Separate contact tracing from the additional features on the app. If necessary, design and launch an app exclusively for the former, which does not collect personal details.
- Switch the contact tracing app's protocol to decentralized privacy-preserving proximity tracing (DP-3T). This is an open-source Bluetooth-based tracking protocol, so that users' contact tracing logs are only stored locally, the details of which no central authority is able to access.

2. Policy and Legal Recommendations for Apps

- Ensure that all apps have critical legal documents such as the Terms of Service and Privacy Policy, and that these are in the public domain.
- Draft these documents in language that gives individuals greater clarity, autonomy and control over their data, and the use thereof – such as, and not limited to, explicit consent requirements, the right to withdraw consent, and the right to object.

- Release into the public domain the terms of the partnership for all apps that have been developed in public-private partnership.
- Expedite the process of bringing into effect a Personal Data Protection Law with the necessary provisions to cover all Covid-related apps and IT-enabled tools.
- Hold the government liable in the event of inaccurate information about a person's health or risk status being provided by the app, or if there is any unauthorized access to users' information.
- Resolve the contradictions and ambiguities in the apps' existing legal documents.
- Institute a clear sunset clause for all primary and secondary data collected by the apps, and delete the data within a reasonable time period, or as soon as they are no longer necessary, whichever comes first. Do not repurpose the data for uses that were not made explicitly clear to the user from the start.
- Invite independent security auditors and testers to review the app's security and privacy measures, and provide reports on their findings.
- Release into the public domain the details of the algorithm used by the apps to do risk assessment and contact tracing.
- Provide clear information regarding the type of data collected and for what purpose, where and for how long data will be stored, with whom the data will be shared and for what purposes, and the security protocols for all of these functions.
- Hold regular transparent, democratic, and scientific processes of consultation with civil society members.

Iran

1. Develop a unified government response to the Covid-19 pandemic, taking into account both national and local-level government bodies

The government, especially at the national level, should find ways to coordinate the national response more effectively between governing bodies. The national government should also trust local and situated knowledge, allowing and empowering local and regional governments to take action on behalf of their constituencies.

2. The government and public health officials must work to develop and implement a unified and consensual approach to contact tracing

The government's early efforts in this regard, which were implemented through the ill-conceived AC19 app, were ethically questionable and lacking in transparency regarding what data would be collected, how it would be used, and how it would be stored. The failure of the AC19 app generated a massive trust gap between governing bodies and the public.

Should the government seek to implement app-based contact tracing methods in the future, the above questions should be answered as clearly as possible in order to ensure user privacy, safety, and well-being.

3. Consistently implement laws that allow prison furloughs or full pardons for all prisoners – including political prisoners

The Iranian government should not use anti-Covid policies to intimidate and crack down on political dissidents, nor should policies be used to punish imprisoned dissidents. The Iranian government should ensure that its laws are consistently and equitably applied in order to reduce prisoner numbers, limit the spread of the virus, and treat all prisoners equally under the nation's laws.

4. Respect the freedom of the press surrounding Covid-19 reporting

Open, accurate, and transparent communication surrounding the virus will improve the public response to the pandemic and help prevent excessive infections, deaths, and long-term illness.

5. Maintain and improve access to vital services for vulnerable populations – particularly Afghan refugees and migrant workers

Services for migrants and refugees – including access to healthcare, economic assistance, and education – must be maintained in order to ensure vulnerable populations survive the ongoing difficulties associated with the pandemic.

Lebanon

1. The Public Health Response

Develop a clear national strategy to better prevent and mitigate Covid-19

After the country reopened in July 2020, the government implemented ad hoc initiatives to respond to the virus, which have clearly failed. The government's decisions to lock down the country have been taken haphazardly, and it has failed to establish consistent policies for incoming travelers and lockdown enforcement. Going forward, there needs to be a clear plan and better coordination between different sectors and committees working on the pandemic response.

Improve data-sharing practices between different government entities while respecting the right to privacy

From testing data to the data used to provide economic aid, there are a number of demonstrated deficiencies. The government needs to ensure that accurate data is collected and shared with relevant entities, including the Epidemiological Surveillance Unit, while respecting people's right to privacy. The IMPACT platform presents a potential step in the right direction, but their inability to account for privacy in their design is of concern.

Provide more aid to people in need in a more efficient manner and limit the role of the army

Given that Lebanon is facing an economic crisis, the funds it receives from international donors, including the World Bank, should be used to provide aid to families in need, especially while during harsh lockdown measures. Moreover, the aid must be distributed more quickly and efficiently, which was a clear problem when the government provided aid in the pandemic's early stages. Finally, the participation of the Lebanese Armed Forces to distribute aid may contributes to the securitization of the public health response.

Strengthen cooperation and coordination between the public and private sector concerning the preparedness of hospitals

There need to be stronger coordination efforts between the public and private sector. Specifically, the government should designate special hospitals in different governorates to treat Covid-19 patients in order to better manage resources and preserve other services.

Improve support for healthcare workers

The government and donors should strengthen the human resources of the healthcare system and give financial incentives to healthcare workers to work under these conditions. Additionally, they should support healthcare workers with proper PPE. This includes better management of donated resources. For example, a large number of oxygen respirators were stored in inadequate conditions.

Reduce the cost of Covid-19 tests

In most cases, tests cost LBP100 thousand (USD67 at the official exchange rate, USD12 at the black market rate), which is particularly expensive given the country's poor economic situation. The government should make a concerted effort to reduce the cost of these tests.

Bolster the capacity of the Epidemiological Surveillance Unit

International donors should assist the MiPH to train more staff in the Epidemiological Surveillance Unit, as MoPH is understaffed. The WHO also advised the MoPH to increase the number of staff.

Improve communication with the media

Media play an important role in the response to the pandemic. However, the Lebanese media has sometimes played both a positive and negative role during the management of Covid-19. Content should be scientific and professional to increase awareness and education among the public and consequently improve the response to measures and restrictions.

2. Applications and technology to fight the pandemic

Approach application development using a privacy by design framework

The Ministry of Public Health, and its affiliated applications, should use a privacy by design framework when developing applications. While the developers behind Ma3an, the contact tracing application, did consider privacy during the design process, the application still had privacy flaws. Moreover, there are several faults in the new platforms developed to allow people to move and administer the vaccine.

Remove requests for location data from any contact tracing applications

The developers behind Ma3an enabled the application to request location data to accommodate older Android models. While the developers claimed the application does not store data, the app's third party features could access that data, thereby jeopardizing people's personal data.

Publish more detailed policies in Arabic and English and explicitly name any third parties that have access to data

Producing privacy policies is a good first step, but the policies should be as clear as possible and directly list any third-party applications that have access to the data, and what they might be able to do with it. Given the weak legal framework for privacy in Lebanon, a strong, transparent privacy policy is especially critical.

Consult academics and civil society while developing these applications

While Ma3an does a better job developing a multi-stakeholder model, with academics heavily involved in the development process, and the subsequent applications launched by IMPACT were responsive to criticisms about privacy, they did not include a range of stakeholders ahead of the app's deployment.

3. The potential for social exclusion

Develop alternative, non-digital means for movement requests and vaccination registration

Although launching online platforms can streamline the process in some cases, it also makes it difficult for elderly people, as well as those who share mobile devices (particularly common among refugees).

Enforce the lockdowns evenly across Lebanon

Vulnerable populations, including refugees, who already face restrictions on their freedom of movement, should not face disproportionate restrictions during the lockdown.

South Africa

1. Recognition of the impact of Covid-19 responses on various rights

The government needs to recognize the various impact Covid-19 responses have on the rights of people in South Africa. The government should conduct short-, medium- and long-term evaluations in which they reflect on success, challenges, and mistakes. An important component relates to the type of legal framework that has guided the government's approach. In future crises, human rights impact assessments should inform the legal framework, including reflections on states of emergency and states of disaster, and what would be necessary and justifiable.

2. Privacy is key

The government, and its private partners must ensure rights-based and transparent regulatory and policy frameworks, with a particular emphasis on privacy rights. Government, and its partners, must urgently re-assess the use of WhatsApp as part of its Covid-19 response. Activists, academics, and members of the technical community should conduct further research on this point and support the government in finding safer and more appropriate options and solutions.

3. Access

The government must take urgent steps to enable the establishment and use of Universal Service and Access Funds and Digital Inclusion Initiatives and Funds to ensure that people in South Africa can access relevant response resources and services. Further efforts to establish zero-rate information portals are encouraged.

4. Digital literacy

Digital materials must be developed and made accessible. These materials must be clear and appropriate, accompanied by training and tools that address how to use the relevant app as well as highlighting key data privacy issues. Digital literacy training should be provided to government staff, community health workers, and app users.

5. Communication

Focused and targeted communication efforts should continue. Everyone in South Africa should be provided with access to accurate and timely information about Covid-19, COVID Alert SA, COVIDConnect, and any other measure that requires the collection and processing of any personal information. The media must comply with applicable codes of conduct, the South African Constitution, and international human rights standards to ensure that information

disseminated is true, accurate and fair. The media is encouraged to engage with other sectors, specifically academia, the technical community, and civil society to inform people of relevant Covid-19 developments.

6. Consultation

The government must, as much as reasonably practical, quickly and without delay ensure public consultation on key developments and measures.

7. Oversight and review mechanisms

The Information Regulator must be involved in discussions regarding contact tracing and the government should facilitate meaningful engagements with key stakeholders. In line with Judge O'Regan's recommendations, the government should undertake independent security audits of the systems it has authorized.

Annex: Contact Tracing Apps - Key Technical Features

Contained in this Annex are tables providing details on key technical features of each Covid-related app covered in our research.

Coronavirus SUS (Brazil)	
Description	Coronavirus SUS is contact-tracing app developed by the Brazilian government. The app is implemented using web-based technologies and is available for both iOS and Android. The app also provides health information and guidelines about Covid-19, shows maps of nearby health centers, and contains a newsfeed featuring official news and relevant data about the pandemic in Brazil.
Developer(s)	DATASUS (Ministry of Health) (public entity)
Model	Decentralized (uses GAEN API)
Privacy Policy	https://validacovid.saude.gov.br/politica-privacidade
Terms of Use	NA
Transparency	Code is open-source and is publicly available on Github (https://github.com/spbgovbr/aplicativo-coronavirus-sus)
Downloads (as of July 2021)	Over 10 million (Google Play)
Data Collected	<ul style="list-style-type: none"> • Location data • Android ID
Notable Data Sharing	<p>App Permissions:</p> <p>By complying with the GAEN API, the app does not request access to geolocation, hardware IDs or unique user identifiers. However, the app does request permission to the Bluetooth functionality of the device.</p> <p>3rd Party SDKs:</p> <ul style="list-style-type: none"> • Google Mobile Services • Google Firebase Library, which includes services like Google Analytics and Google Crashlytics • Adobe Phonegap Push <p>3rd Party Data Access:</p> <ul style="list-style-type: none"> • Google Mobile Services (required to integrate Google's Exposure Notification API) • Google Firebase (typically used for tracking purposes, e.g., installation monitoring, however this is unconfirmed)
Use of Location Data	NA
Other Info	Not all network connections are encrypted using the transport layer security (TLS) protocol.

CoronaApp (Colombia)	
Description	CoronaApp is a contact-tracing app developed by the Colombian government in collaboration with the national health service (a) and is available on iOS and Android. The purpose of the app is to control and monitor the spread of Covid-19 by allowing users to perform self-diagnosis, receive online medical assistance and access Covid information in real-time.
Developer(s)	Colombian National Institute of Health (public entity) and the National Digital Agency (public entity)
Model	Centralized (uses Bluetrace, an open-source application protocol for digital contact tracing developed by Singapore Government Digital Services)
Privacy Policy	https://www.ins.gov.co/Normatividad/PoliticasInstitucionales/politica-de-tratamiento-de-informacion-coronapp-colombia.pdf
Terms of Use	NA
Transparency	Code is not open-source and is obfuscated
Downloads (as of July 2021)	Over 10 million (Google Play)
Data Collected	<ul style="list-style-type: none"> • Names • National ID Numbers • Phone Numbers
Notable Data Sharing	App Permissions: <ul style="list-style-type: none"> • Requests access to Bluetooth functionality of the device • Location is requested as soon as the application is launched • Access to the phone-call functionality of the device is requested to contact the Covid-19 hotline set up by the Colombian health authorities
	3 rd Party SDKs: <ul style="list-style-type: none"> • Google Mobile Services • Google Firebase Library, which includes services like Google Analytics and Google Crashlytics
	3 rd Party Data Access: <ul style="list-style-type: none"> • Google Firebase (typically used for tracking purposes, e.g., installation monitoring) • Amazon (server host provider)
Use of Location Data	Collects and stores the users' location as soon as app is launched, and in particular checks whether the user has given the app permission to access geolocation data. These data are used to show the users' location on a map and to show symptom activity on a map.
Other Info	All network connections are encrypted using the transport layer security (TLS) protocol.

Aarogya Setu (India)	
Description	The Aarogya Setu app is a contact tracing app released by the Central Government of India. Features include contact tracing, self-diagnosis features, risk status, information and updates on best practices related to Covid-19, telemetry and real-time statistics about the spread of the virus, ePass integration, information on labs with Covid-19 testing facilities and an open API service to query information about employees' health status
Developer(s)	A team of 70+ 'Volunteers', including government officials from the National Informatics Centre (NIC), and individuals from private companies, public universities, and civil society groups (public-private partnership)
Model	Centralized (custom-built)
Privacy Policy	https://web.swaraksha.gov.in/ncv19/privacy/ , https://static.swaraksha.gov.in/tnc/
Terms of Use	NA
Transparency	The source code is available on GitHub (https://github.com/nic-delhi/AarogyaSetu_Android), but the application code is obfuscated
Downloads (as of July 2021)	Over 100 million (Google Play)
Data Collected	<ul style="list-style-type: none"> ● Name ● Gender ● Age ● Profession ● Countries visited in a 30-day period ● Willingness to volunteer in times of need ● OS version ● Manufacturer (of the device) ● Model ● Device type ● Version of the app ● Bluetooth unique address (MAC) ● Location data
Notable Data Sharing	<p>App Permissions:</p> <ul style="list-style-type: none"> ● Requests access to Bluetooth functionality of the device ● Requests the geolocation of the device ● Requests access to the camera <p>3rd Party SDKs:</p> <ul style="list-style-type: none"> ● Google Firebase Library (used for installation analytics) ● Google Mobile Services <p>3rd Party Data Access:</p> <ul style="list-style-type: none"> ● Google ● Amazon (server host provider)
Use of Location Data	The location data of the device is collected and stored in the server. This activity takes place at the point of registration and also when completing the self-assessment form. According to the privacy policy, the app 'continuously collects location data and stores securely on a user's mobile device, a record of all the places the user has been at 15 minute intervals.'
Other Info	All network connections are encrypted using the transport layer security (TLS) protocol.

Cova (India)	
Description	The Cova app assists citizens with preventive care information and provides advisories in the Punjab region. Its features include a real-time dashboard for Punjab, India and global stats, a symptoms checker and self-assessment functionality, Corona Awareness, travelling instructions, prevention products, information on hospitals in Punjab, a FAQs section and call support.
Developer(s)	Government of Punjab (public entity)
Model	It is unclear whether this is a contact tracing app; documentation from Google Play indicates that it is not, whereas the Punjab Government contends that the app does contact tracing of positive cases. In any case, it uses a custom-built centralized approach as information is sent to and from a government-owned central server.
Privacy Policy	https://msewa.punjab.gov.in/m-sewa/privacyPolicy.html
Terms of Use	NA
Transparency	The source code is not publicly available, and the app code is obfuscated
Downloads (as of July 2021)	Over 1 million (Google Play)
Data Collected	<ul style="list-style-type: none"> • Mobile number • Name • Address • Photograph • userID (from the app) • Geolocation data
Notable Data Sharing	App Permissions: <ul style="list-style-type: none"> • Requests access to Bluetooth functionality of the device • Requests access to location data • Requests access to the camera to be used for taking photographs for the self-assessment functionality and scan QR codes
	3 rd Party SDKs: <ul style="list-style-type: none"> • Google Mobile Services (provides location services, maps and Google sign-in) • Google Firebase Library • YouTube Player (to embed videos in the app)
	3 rd Party Data Access: <ul style="list-style-type: none"> • Azure • Google
Use of Location Data	The location data of the device is used to maintain the parameter distance when a user is in quarantine (i.e., generate a geofence) and check the distance with others using the app to ensure appropriate social distancing.
Other Info	Network communications made from the app are not encrypted, including when sensitive data like geolocation and telephone numbers are sent in outgoing communications to servers.

Mask (Iran)	
Description	Mask is the official app in Iran providing citizens with information, notification and movement-tracing services related to the Covid-19 pandemic. Its key features include an infection-risk map, official Covid-19 information, and a self-assessment and proximity-based risk notification service.
Developer(s)	A team of volunteers from Sharif, Amirkabir and Shahid Beheshti Universities (private entity)
Model	Centralized (custom-built)
Privacy Policy	https://www.mask.ir/privacy.html
Terms of Use	NA
Transparency	The source code is not publicly available, and the app code is obfuscated
Downloads (as of July 2021)	Over 200,000 (Android Bazaar Mobile Applications Store)
Data Collected	<ul style="list-style-type: none"> ● Phone number ● Health-related information ● Location ● IP address ● User agent ● Android ID ● Service provider name ● Device model ● Android version ● Contacts
Notable Data Sharing	App Permissions: <ul style="list-style-type: none"> ● Requests access to the camera to be used for scanning QR codes ● Requests access to location data ● Requests permission to 'read' and 'write' external storage
	3 rd Party SDKs: <ul style="list-style-type: none"> ● Google Mobile Services ● Google Firebase Library (for analytics and tracking) ● Sentry (for analytics and tracking) ● Pushe.co (for analytics and tracking)
	3 rd Party Data Access: <ul style="list-style-type: none"> ● Google ● Amazon (server host provider)
Use of Location Data	According to the privacy policy, older versions of the app make use of the location of the device and newer versions do not use such data. However, the code for requesting access to location data can still be detected.
Other Info	According to the privacy policy, data collected by the app can be used for law enforcement purposes.

Ma3an (Lebanon)	
Description	Ma3an is the official contact tracing and exposure notification app for Lebanon. The app allows users to broadcast their presence anonymously to other mobile devices.
Developer(s)	Ministry of Public Health, the American University of Beirut, TedMob (public and private entities)
Model	Centralized (uses Bluetrace, an open-source application protocol for digital contact tracing developed by Singapore Government Digital Services)
Privacy Policy	https://mophtracer.tedmob.com/privacy-policy
Terms of Use	NA
Transparency	The source code is available on GitHub and is not obfuscated
Downloads (as of July 2021)	Over 50,000 (Google Play)
Data Collected	<ul style="list-style-type: none"> ● Phone number ● Operating system ● Model of the device ● Network carrier ● Language ● Time zone ● Location
Notable Data Sharing	<p>App Permissions:</p> <p>The app requests permission for geolocation data and the Bluetooth functionality of the device.</p> <p>3rd Party SDKs:</p> <ul style="list-style-type: none"> ● Google Firebase Library (used for installation analytics, secure data storage and two-factor authentication) ● Google Mobile Services ● OneSignal (typically used for push notification services) <p>3rd Party Data Access:</p> <ul style="list-style-type: none"> ● Amazon (server host provider) ● OneSignal ● Google Firebase
Use of Location Data	The OneSignal API retrieves the geolocation of the device, and this process is triggered whenever the device is registered to OneSignal servers. The privacy policy states that the app requires location permission to be granted for the app to access Bluetooth features, but the sharing of this data with OneSignal is not mentioned in the policy.
Other Info	The app makes use of multiple push notification services, including Google's Cloud Messaging, OneSignal and Huawei's push notifications. It is unclear why multiple services are used for the same purpose.

COVID Alert SA (South Africa)	
Description	COVID Alert SA is a contact-tracing app from the National Department of Health in South Africa. As well as contact-tracing, the app also provides a 24-hour Covid-19 hotline for users.
Developer(s)	South African National Department of Health (NDOH) (public entity)
Model	Decentralized (uses GAEN API)
Privacy Policy	https://sacoronavirus.co.za/covidalert/privacy-policy
Terms of Use	NA
Transparency	The code is not open-source and is obfuscated
Downloads (as of July 2021)	Over 1 million (Google Play)
Data Collected	<ul style="list-style-type: none"> ● Names ● Cell number ● Date of birth
Notable Data Sharing	<p>App Permissions:</p> <p>By complying with the GAEN API, the app does not request access to geolocation, hardware IDs or unique user identifiers. However, the app does request permission to the Bluetooth functionality of the device.</p> <p>3rd Party SDKs:</p> <ul style="list-style-type: none"> ● Babylon Health ● Google Mobile Services ● Google Firebase Library, which includes services like Google Analytics and Google Crashlytics. <p>3rd Party Data Access:</p> <ul style="list-style-type: none"> ● Google Firebase (typically used for tracking purposes, e.g., installation monitoring, however this is unconfirmed). ● WhatsApp (to notify users of their Covid-19 tests).
Use of Location Data	NA
Other Info	<ul style="list-style-type: none"> ● All network connections are encrypted using the transport layer security (TLS) protocol. ● The use of WhatsApp to notify users of their Covid-19 test results contradicts points 3.1.2.c and 7.2.7 of the privacy policy (which essentially state that users will remain anonymous).