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Contact Tracing Apps: Can India Do Better?

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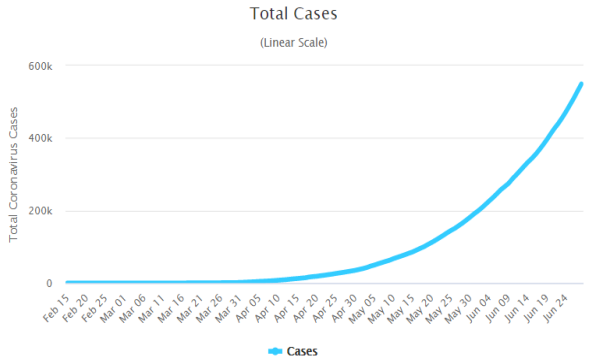
Has India entered the community transmission stage?

As on June 29, 2020, the novel coronavirus causing the highly infectious COVID-19 disease has globally reported over 10 million cases and has claimed around 0.5 million lives[i]. Meanwhile, the number of COVID-19 cases in India currently stand at 559,910 with 16,757 deaths[ii].

With a steady increase in the number of cases, India is currently the fourth worst hit country by the pandemic in the world behind the US, Brazil, and Russia[iii].



Source: https://www.worldometers.info/coronavirus/country/india

The Delhi Health Minister on June 9, 2020, stated that the national capital has 50% cases with undetermined source of the coronavirus infection- a characteristic that the apex medical research body of the country- Indian Council of Medical Research (ICMR) categorises as stage 3 of the COVID-19 spread also known as community transmission. The ICMR, however, has denied any such possibility and continues to stand by the fact that India is still under stage 2 or the local transmission phase[iv] where contact tracing methods can be deployed to control the spread[v].

Executive Summary

Given India's vast population, inability to practice physical distancing norms, limited public health resources and low testing rate, alternate tools such as contact tracing methods need to be deployed effectively to track and curb the spread of the highly transmissible COVID-19 disease before India enters the suspected community transmission or worse the endemic stage. While significant trade-off between privacy and public welfare has been observed across contact tracing apps used globally, the key is to strike a balance between the two and complement the existing manual contact tracing methods with the digital ways.

Recommendations

- ➔ Provide incentives to citizens for using contact tracing apps to improve adoption rate
- ➔ Use a dynamic identifier for local exchange to prevent compromising the security of decentralized data
- ➔ Enable stricter guidelines under the Aarogya Setu Protocol for third party usage of data in absence of a personal data protection law
- ➔ Improve inclusion by making the app and IVRS facility accessible in maximum possible constitutionally recognised languages
- ➔ Deploy manual contact tracing where digital penetration is low to ensure no denial of access
- ➔ Train contact tracers in communication and basic analytical skills
- ➔ Ensure proper legal backing before making the app mandatory

In this policy brief we aim to make policy recommendations for technological deployments of contact tracing apps while ensuring privacy implications for the citizens are preserved via:

a) A comparative study of contact tracing apps deployed globally
b) Understanding the shortcomings in the functioning of *Aarogya Setu*- India's contact tracing app

Contact Tracing Apps Worldwide

Contact tracing is essential to minimise the spread of the virus but manual or physical contact tracing methods like interviews with patients omit out multiple details and are prone to human error. Therefore, designing better policies is the first step towards containing the spread.

Globally, China was the first to design a contact tracing app in early March. The app was used more as a surveillance tool in containing the spread. Different models then followed including crowdsourcing databases (Argentina, South Korea). As the pandemic spread, digital contact tracing, keeping the privacy first design model soon followed with technological companies like Apple and Google coming together to design

Exposure Notification System to aid public health authorities in tracking and guiding the affected and exposed.

This section explains in brief the functioning of contact tracing apps deployed globally.

Australia: *COVIDSafe* launched in mid-April collects personal information and generates a unique reference code. It only uses a bluetooth based smartphone handshake technology for tracking purposes. The data is collected and stored, encrypted with the reference code on a user's phone for a period of 21 days after which it is automatically deleted[vivii]. The data is uploaded to central servers only if the user tests positive or comes in close contact with one and grants permission to do so. The app will be used only as a response to the pandemic and can be deleted anytime by the users with the personal information getting removed from local storage immediately.

South Korea: South Korea has a public database of all affected individuals including their personal information and movements across the country. The database is constantly updated using data collected via Global Positioning System (GPS), Closed Circuit Cameras (CCTV) footage and credit and debit card transactions. *Corona 100m* the app built based on this database is widely popular in the country[viii]. The public has institutional trust and supports full transparency of the system which is backed by a Parliamentary legislation especially since it was successful when the country dealt with the MERS outbreak in 2015[ix].

New Zealand: *NZ COVID Tracer* app launched in May is voluntary and store's location data via a QR code-based visitor registration to track and manage visitors at business places. This is to aid the manual contact tracing methods. Businesses are not mandated to keep QR codes but instead are required to maintain physical contact tracing registers in case of no QR code. No GPS or Bluetooth exchanges happen between phones. The app collects personal information including demographic details such as gender and ethnicity which is then stored in third party servers. The app's privacy policy states data will be used for limited purposes and won't be shared with other ministries unless the user is exposed[x].

Iceland: *Rakning C-19* launched in early April uses GPS data to detect the diagnosed. The data is stored in a user's phone and is to be shared with the health authority in case of a probable close contact. The app has clear rules on data retention and purpose limitation. Data will only be stored for 14 days and won't be utilized for any purpose after the pandemic. The app has so far seen approximately 40% adoption rate, however coupled with manual contact tracing, it has been highly successful[xi].

Israel: *Hamagen*, launched in late March requires user consent and collects GPS data that is not uploaded to central servers or shared with a third party[xii]. The historical geographic data of patients from the Ministry of Health is sent to the user's phone and the app cross verifies it in real time against the user's movements in the past 14 days. The app supports five languages[xiii].

Singapore: *TraceTogether* was launched in March, and it supports the existing manual contact tracing methods. The app is voluntary and uses only Bluetooth technology. Location details are traced via physical contact tracers instead of GPS. Dynamic temporary IDs are generated upon close contact and stored locally on the users' phones. The data can and shall be accessed and stored at the central servers if the government requires so. The code for the app was made open source at a later stage. The adoption rate however has been very low (~20%) and they are now moving to smart wearable devices[xiv].

China: The citizens are mandatorily required to use a software under the *Chinese Health Code System* that categorizes them into colour codes. The data is then used for law enforcement purposes such as accessing public transport[xv].

TABLE 1. Technological review of contact tracing apps worldwide by Massachusetts Institute of Technology (MIT)

Country	A	B	C	D	E
Australia	★	★	★	★	
South Korea	NA	NA	NA	NA	NA
New Zealand					
Iceland	★	★	★	★	★
Israel	★	★	★	★	★
Singapore	★	★	★	★	★
China					
India			★		★

A: Voluntary B: Limited C: Data Destruction D:

Minimized E: Transparent NA: Not Available
Data as on 25/06/2020
Source:https://www.technologyreview.com/2020/05/07/1000961/launching-mittr-covid-tracing-tracker/

Aarogya Setu: A Win-Win for the Government and Citizens?

Aarogya Setu, India's contact tracing app developed by the National Informatic Centre (NIC) was launched on April 2, 2020. Arguably the most downloaded government app, it soon crossed 50 million downloads after 13 days and 100 million downloads after 40 days of its launch[xvi].

With the hype surrounding the app for becoming the fastest growing mobile app beating the likes of *Pokemon Go*[xvii], soon questions surrounding the security, privacy and mandate started making the rounds including MIT in a technological review giving it a 2 out of a 5-star rating[xviii] and later downgrading it to 1[xix].

Data Security: The app makes use of Bluetooth and GPS location data of the users. The same location data of users was once exposed to Youtube- a bug that was later fixed on April 26[xx]. Incidentally on May 6, Elliot Anderson, a French cybersecurity expert and hacker claimed that the app had security issues that could again expose sensitive health data of individuals based on the location data being fetched, risking the security of 90 million users[xxi]. The government however, denied any data breach and reinstated that they were working on continuous testing and upgradation of the system.

Data Privacy: The app functions by tracking the location data every 15 minutes. The Bluetooth of the phones collect unique identifiers (*Digital Id* or *DiD*) of users coming in close contact with each other. These identifiers are then stored in a decentralized manner, locally on the phones of the users. The *Privacy Policy* of the app states that data is uploaded to the centralized government servers and encrypted with the *DiD* only if a user tests positive or the self-assessment test is either *Yellow* or *Orange* (indicating a higher risk of catching the infection). CEO of MyGov stated that out of approximately 98 million users, data of only 12,000 users (~0.01%) had been uploaded to the central servers[xxii]. It further also states that if the self-assessment results stay *Green* for 30 days, upon the user's request, the data collected in the past 30 days will be deleted from a user's phone[xxiiixxiv].

Privacy experts however still doubt the choice of Bluetooth technology in ensuring privacy stating that a server can still easily identify COVID-19 users via identification of IP addresses[xxv].

Few have also expressed concerns on using third party services for hosting of COVID related data (Amazon Web Services) and gaining insights (Google Analytics)[xxvi]. Unless Personally Identifiable Data (PII) is completely removed i.e., data is anonymized before uploading or the government has extremely strict guidelines on usage of the data by the third party in absence of a data privacy law, it is very difficult to gain public trust. Past cybersecurity experiences with Aadhar[xxvii] have not been very successful in generating institutional trust.

Credibility: Experts again believe that the Bluetooth technology can lead to False Positive or False Negative cases. Even if users maintain the safe 6 ft distance or are in contact for less than 15 minutes (the two criteria for defining close contact), Bluetooth can capture cases ranging up to approximately 30 ft without measuring the time duration leading to False Positives. On the other hand, if an affected user either does not have the app installed or does not carry his phone with him, the alert function would not trigger leading to cases of False Negatives[xxviii].

Mandatory or Voluntary: The government had initially launched the app as a voluntary measure. In an announcement on May 1, it then made the app mandatory for all public and private sector employees. The move faced backlash for violating the fundamental right to privacy of individuals. It violated the consent-based agreement that users signed on downloading the app. In the next announcement on May 17, the 'mandatory' aspect was replaced with 'advisable'.

Furthermore, privacy advocates have also been criticising the mandatory use of *Aarogya Setu* for law enforcements such as the *E-pass*. Unless and until the app is made mandatory on a legal basis such as a Parliamentary Act, making the app mandatory is a direct violation of the fundamental right to privacy of individuals[xxix].

Transparency: On 27 May, the government amidst growing concerns over data security, made the code open source for android

developers. Two weeks later it was made open source for iOS as well. The move aimed to promote transparency and collaboration for developing and maintaining a secure and robust system. The app currently being used by over 114 million users[xxx] is being managed by both Team Aarogya Setu and the developer community while being looked over by the NIC.

Accountability: As per the Aarogya Setu Data Access and Knowledge Sharing Protocol, 2020, the NIC will be responsible for maintaining the COVID-19 related information including the third-party entities with whom the data is being shared. The protocol also states that the data retention period will be 180 days. If the user specifically requests, it will be deleted after 30 days[xxxi]. While this to some extent establishes accountability, it still lacks the backing of a strong data protection laws.

Inclusivity: The app was initially launched for smartphone users meaning approximately 500 million users were able to access the app initially which is around 40% of the total population[xxxii]. The government is attempting to include the remaining 60% by tying up with private operators such as Jio to include a compatible version of the app for feature phones adding approximately another 100 million users[xxxiii]. The government also launched the Aarogya Setu Interactive Voice Response System (IVRS)- a toll free service in 11 regional languages for feature phone and landline users[xxxiv].

With the app and the IVRS facility currently supporting only 12 regional languages, the CEO of MyGovIndia claims that the current languages have reached approximately 90% of the population[xxxv]. Other constitutionally recognised languages are still left out even after almost 3 months since the app has been launched.

Furthermore, the numbers neither necessarily reflect whether all smartphone users have installed the app, nor all feature phone users regularly access the IVRS facility. The efficacy of the app is as good as the number of active users.

Economic, gender and age-based disparities in usage of phones raise issues around access deniability.

Accessibility: The Ministry of Social Justice and Empowerment had on April 27 raised an issue with the Ministry of Electronics and Information Technology (MeitY) and NIC regarding the inaccessibility of the app for hearing and visually impaired persons[xxxvi]. However, MeitY is now working on making the app accessible to Persons with Disabilities (PwDs) to ensure inclusion of all.

Policy Recommendations

As India enters the second phase of unlocking the nationwide lockdown *Unlock 2.0* on July 1 and subsequently *Unlock 3.0*, contact tracing will become paramount than ever before.

The unprecedented pandemic has resurfaced the quality of our public healthcare system both physically and digitally and contact tracing is one way to ensure optimum use of our limited capabilities on both fronts.

Our best bet at speedy interventions for COVID-19 cases is *Aarogya Setu*. So far, the application has been successful in detecting more than 650 hotspots and more than 300 emerging hotspots in the country[xxxvii] with an adoption rate of 71%[xxxviii].

Governments across the world have been struggling to choose between public welfare and privacy of their citizens to contain the spread. The Chinese app for example, scored no stars[xxxix] in the MIT technological review. Singapore is facing a very low adoption rate of its app *TraceTogether* resulting in relatively very ineffective insights. Epidemiologists claim that a contact tracing app should have an adoption rate of at least 60% for it to be more effective than manual tracing. This of course needs to be coupled with other measures. Iceland with an adoption rate of 40% has shown incredible results. While Singapore's adoption rate stands at only 26%[xl].

India in such a case has so far shown significant efforts towards continuous improvements in its system. However, public welfare and right to privacy both come at other's expense. The key here is not to completely disregard one or the other but decide a significant trade-off level via proper legal pathways and utilisation of technological prowess. Also, if successful models are to be taken as an example, then, digital contact tracing needs to be used as a tool to complement manual contact tracing methods instead of replacing them.

A few recommendations include:

a) Provide incentives to citizens for using contact tracing apps to improve adoption rate
b) Use a dynamic identifier for local exchange to prevent compromising the security of decentralized data
c) Enable stricter guidelines under the Aarogya Setu Protocol for third party usage of data in absence of a personal data protection law
d) Improve inclusion by making the app and IVRS facility accessible in maximum possible constitutionally recognised languages
e) Deploy alternatives like manual contact tracing in areas where digital penetration is low to ensure complete coverage
f) Train contact tracers in skills such as following up with individuals and basic analytical skills for effective manual contact tracing
g) Ensure proper legal backing before making the app mandatory for any purpose

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