BCS, The Chartered Institute for IT

28th April 2020

BCS, the Chartered Institute for IT, response to "How can contact tracing apps be managed to assist Government in answering key questions to address the current crisis and enjoy public support?"

BCS supports the implementation of a contact tracing app as part of a coordinated effort including extensive testing to overcome COVID-19; but we are clear it will only provide the desired uptake and outcomes if underpinned by a robust ethical framework and has an aligned communications strategy as outlined in this note. However, there are also significant challenges that must be met for an ethical framework to be properly implemented, which we also summarise.

BCS Key Recommendations

- Facilitate mass levels of COVID-19 testing to work in tandem with the contact tracing app, "you cannot 'big data' your way out of a 'no data' situation"
- Engage and work strategically with civil society to develop and implement a wide-ranging, inclusive communication programme regarding app installation and use, including guidelines on what is needed for maximum compliance and how the public can appropriately seek recourse
- Ensure minimum interference with people's private 'data' lives and that data isn't sold or shared beyond its intended stated purpose
- Clearly identify and promote Government plans for transparent oversight and governance of the contact tracing app, including the role of key stakeholders such as the National Data Guardian[1] and the NHSX Ethics Advisory Board[2]
- Provide clarity and assurances on the use, ownership, time data will be kept and subsequent disposal of data gathered through the contact tracing app. This will include its plans for the vast amount of data collected through the technology developed during the COVID-19 pandemic
- Implement robust impact assessment of COVID-19 policies with inbuilt flexibility to respond to emerging evidence and tailor mitigations for vulnerable and disproportionately at-risk communities
- Make effective provision for those who do not use or have access to an app-compatible smartphone, this must be routinely reviewed and iterated
- Anticipate and prepare for cross-border issues around tracking contagion as well as data vulnerability once international travel restrictions are relaxed
- Establish effective safeguards to monitor and mitigate any live, persistent and harmful unintended consequences and online harms

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[1] https://www.gov.uk/government/organisations/national-data-guardian
[2] https://www.nhsx.nhs.uk/blogs/digital-contact-tracing-protecting-nhs-and-saving-lives/

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The purpose of the BCS is to promote and advance the education and practice of computing for the benefit of Society as a whole. We bring together industry, academics, practitioners and Government to share knowledge, promote new thinking, inform the design of new curricula, shape public policy and inform the public.

As the professional membership and accreditation body for IT, we serve over 60,000 members including practitioners, businesses, academics and students, in the UK and internationally. We also accredit the computing degree courses in ninety-eight universities around the UK and offer a range of widely recognised professional and end-user qualifications.

The BCS Society Board

BCS' direction and strategy are governed by an elected Trustee Board making decisions aided by an advisory council. Several boards and committees report into our Trustee Board, deciding on the finer details of BCS activities in the evolving world of IT.

The Society Board's role:

- Interpret and communicate our societal role in the context of our royal charter
- Support ethical and inclusive standards across BCS corporate outputs as a critical friend
- Impact-assess significant developments in IT and digital technology using its unique insight across academia, industry, public service and civil society
- Work with governments, media and civil society to champion BCS as a credible and evidence-based voice on critical issues
- Foster inclusion and access to vital services for all our communities by championing the role of IT and digital technology

This paper was compiled with the Society Board and the BCS policy team.

"How can contact tracing apps be managed to assist Government in answering key questions to address the current crisis and enjoy public support? – an ethical impact assessment"

Introduction

BCS supports the implementation of a contact tracing app as part of a coordinated effort including extensive testing to overcome COVID-19 and makes several recommendations for Government and other stakeholders to support the efficacy of the UK's response.

BCS considers the biggest threat to the success of the contact-tracing app is that perceived 'Big Brother' elements of the implementation, for example the use of a centralised database, may have a negative effect on uptake from the public and minimise the chance of reaching the 60% uptake implementation target. BCS considers that a sustained campaign to increase public confidence in IT, supported by assurances of real safeguards, open and ethical data governance and protection by design is fundamental.

It is recommended that contact tracing apps must be founded on 'privacy by design, privacy by default' principles and Government must set a high bar for transparent and ethical data governance as its future legitimacy and trust with public data is at stake. The following paper considers the impacts of a contact tracing app as part of the UK's response to COVID-19 and considers key challenges such as data protection, privacy, public trust and civil liberties. The proposed NHS contact tracing app will alert smartphone users if they are in, or have been in, close contact with someone who has either input recognised symptoms or has tested positive for the COVID-19 virus.

Technology alone will not reduce the number of COVID-19 cases, it must be implemented alongside a significant increase in testing to achieve success. South Korea is using an app to monitor the movements of quarantined citizens[3], and Singapore's Trace Together[4] app has provided an early example of how digital contact tracing can help identify individuals potentially exposed to the virus. In the UK, NHSX has announced it will soon be rolling out its own digital contact tracing app[5] designed to reduce the spread of the virus.

The UK's Centre for Date Ethics and Innovation (CDEI)[6] have recently reprioritised their focus to analyse and address ethical issues bought to the immediate fore by the COVID-19 Pandemic, changes in public behaviour increasingly shifting online, and the development and deployment of any tracing app[7].

BCS welcomes the appointment of BCS Fellow, Professor Luciano Floridi[8] to the NHSX Ethics Advisory Board to provide independent advice and recommendations on the NHS tracing app alongside BCS Fellow Roger Taylor, Chair of the Centre for Data Ethics and Innovation and Chair of the Open Public Services Network[9].

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[3] https://www.technologyreview.com/s/615329/coronavirus-south-korea-smartphone-app-quarantine/
[4] https://www.tracetogether.gov.sg/
[5] https://www.nhsx.nhs.uk/blogs/digital-contact-tracing-protecting-nhs-and-saving-lives/
[6] https://www.gov.uk/government/organisations/centre-for-data-ethics-and-innovation
[7] https://cdei.blog.gov.uk/2020/04/27/how-is-the-cdei-supporting-the-response-to-covid-19/
[8] https://www.oii.ox.ac.uk/people/luciano-floridi
[9] https://www.thersa.org/action-and-research/rsa-projects/public-services-and-communities-folder/open-public-services-network

This paper contributes to this public discussion, is curated by the BCS Society Board and the BCS Policy team and uses IBM's ethical awareness framework (EAF) to consider the wider implications of a contact tracing app. IBM's EAF was written by Mandy Chessell, the current Chair of the CDEI and BCS study on why ethical AI proves challenging in practice[10]. The EAF was created to help people develop ethical policies for their use of analytics and big data, considering the wider implications of their activities.

COVID-19 contact tracing apps – ethical impact assessment using the EAF

- **Context** – For what purpose was the data originally surrendered? For what purpose is the data now being used? How far removed from the original context is its new use? Is this appropriate?

  - Contact tracing will use smartphone data to trace individual proximity to others who have contracted COVID-19 and instruct the person to self-isolate at the beginning of potential viral contagion
  - The data retrieved by the app, will allow users to be immediately notified if they are potentially at risk of contracting COVID-19
  - This is a significant modification from the current use of Bluetooth services and has the potential to enable Government to know app user location and personal data
  - According to NHSX[11], the proposed NHS app will function as part of a wider approach involving 'off-line' contact tracing and testing. Ongoing assessment and review will be critical in ensuring that the app and other digital tools complement contact tracing and testing and that they are not overly relied upon by Government
  - In recognition of the significant upheaval that the COVID-19 pandemic has caused to our daily lives, society and economy, NHSX believes that the NHS app will function to beat COVID-19, and may also be "important in helping the country return to normality". These are important considerations with significant ethical dimensions such as identifying the critical point between economic and societal disadvantage and public health; indeed public health is not and should not be measured solely or over-zealously on COVID-19 contagion and any decisions made must be done transparently, in consultation with independent experts and based in evidence

- **Consent & Choice** – What are the choices given to an affected party? Do they know they are making a choice? Do they really understand what they are agreeing to? Do they really have an opportunity to decline? What alternatives are offered?

  - Introducing a tracing app causes concern over the legal use of personal data, General Data Protection Regulation (GDPR) can be navigated as "exceptional legislation is possible only if it introduces necessary, appropriate and proportionate measures limited to the duration of the emergency". The on-going use of the app and the data collection/storage would need to be reviewed at the end of the pandemic crisis

[10] https://www.bcs.org/content-hub/cdei-and-bcs-study-into-ethical-maturity-of-ai-practice/
[11] https://www.nhsx.nhs.uk/blogs/digital-contact-tracing-protecting-nhs-and-saving-lives/

- An NHS contact tracing app is dependent on individual downloads and operates via an 'opt in' system. It would be significantly beneficial to public trust if data were not sent out from the application unless the individual concerned is considered infected
- The Government must develop a comprehensive communications plan regarding app installation and use, how an app will benefit the individual and how it may slow the spread of COVID-19 and how it will manage, securely store and dispose of public data; this includes transparency and co-ordination with app developers to curate and nurture public trust
- The Government's National Data Guardian[12] for health and adult social care, Dame Fiona Caldicott[13] has already commented publicly about how health and care information will be vital in our response to COVID-19[14]. It is vital that the now statutory role of the National Data Guardian, plays an active role in both building public trust and encouraging the Government to navigate the ethical questions posed by the NHS contact tracing app and its future iterations. It is felt this would be of benefit if carried out in collaboration with Elizabeth Denham CBE, the UK Information Commissioner
- As part of the Government's response, provision will need to be made for those who do not use or have access to an app-compatible smartphone. NHSX has provided assurances that the app will complement "more traditional measures that, working together, can protect vulnerable groups and those who cannot or do not want to access digital tools[15]". This is welcome and will need to be assessed routinely to make sure it is functioning effectively for these affected groups
- It should be noted that the availability of Global Positioning System (GPS) on smartphones, may be wider than Bluetooth, and including GPS data may help with inclusion
- A critical factor in the Government's success will be to create mass levels of COVID-19 testing to work in tandem with the app, as the NHS contact tracing app will be ineffective on its own as " you cannot 'big data' your way out of a 'no data' situation"[16]

- **Reasonable** – Is the depth and breadth of the data used and the relationships derived reasonable for the application it is used for?

- Due to the scale and impact of COVID-19 on all aspects of public life, and that the UK does not have enough data to predict, contain and eliminate COVID-19, it is reasonable for the Government to ask and encourage people to provide information about our behaviours to help reduce the spread of COVID-19
- Conversely it is vital for individual privacy and public trust that the Government provide assurances on the use, ownership and disposal of data gathered through the app
- It is not technically necessary for location and proximity data to leave an undiagnosed patients' phone. A decentralised model, that does not collect data from undiagnosed patients, is being adopted in Germany, and some other jurisdictions. This approach should be preferred, and data only provided to a central point once a person is diagnosed
- Government should set the bar high for ethical data governance and must be transparent to increase and sustain public trust for any tracing app to be effective

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[12] https://www.gov.uk/government/organisations/national-data-guardian
[13] https://www.gov.uk/government/people/fiona-caldicott
[14] https://www.gov.uk/government/speeches/data-sharing-during-this-public-health-emergency
[15] https://www.nhsx.nhs.uk/blogs/digital-contact-tracing-protecting-nhs-and-saving-lives/
[16] https://www.buzzfeed.com/albertonardelli/nhs-coronavirus-tracing-app-hancock?ref=hpsplash

- Government should engage strategically with civil society as part of a wide-ranging communication programme, inviting and responding to concerns from our diverse communities as well as listening to, and acting on, the advice of experts in the field. This will have far reaching benefits beyond the current crisis as part of a wider exercise in building a digitally literate nation that benefits all
- For trust to be established and Government to achieve the desired outcome, developers should keep access to people's private 'data' lives at a minimum whilst protecting public health, and ensure data isn't sold or shared beyond its intended purpose
- It is clearly reasonable and in the public interest to use data from an NHS contact tracing app to identify hotspot areas of COVID-19, in order to determine more accurate service provision, where more hospital beds are required for patients, which hospitals, care homes, GP practices need more PPE based on the acuity of the patients and where basic supplies like food are in demand
- It would also be reasonable and ethically incumbent on Government to incorporate aggregated data from both the app and other 'off-line' methods to impact assess, and tailor mitigations for communities that are already being shown to be disproportionately vulnerable. The Centre for Disease Control and Prevention's report on 'COVID-19 in Racial and Ethnic Minority Groups'[17] comments that the "effects of COVID-19 on the health of racial and ethnic minority groups is still emerging; however, current data suggest a disproportionate burden of illness and death among racial and ethnic minority groups"
- The COVID-19 crisis presents us with an unprecedented opportunity to demonstrate the power of data to mitigate significant healthcare inequalities and Government would be able to build robust, data-led equality impact assessment from the start

- **Substantiated** – Are the sources of data used appropriate, authoritative, complete and timely for the application?

  - The Organisation for *Economic Co-operation and Development (OECD) defines contact tracing as; 'aiming to identify, list and closely watch people who have been in contact with an infected person, even if they do not display symptoms. This helps the traced persons to get care and treatment early and prevents further transmission of the virus[18]'*
  - There are concerns around the quality of data that will be collated from the public using the NHS contact tracing app. When a member of the public who has the app installed becomes unwell displaying symptoms of COVID-19 they can choose to allow the app to notify the NHS triggering alerts to other app users who have been in significant contact range over the previous few days. The efficacy of the data is therefore dependent on several extenuating factors such as whether people infected with COVID-19 abide by Government guidelines, the time taken for individuals to become infectious, and the public confidence in using the app
  - The current scientific and medical advice suggests that self-isolation is most effective in controlling COVID-19 if started as soon as possible after the onset of clinical symptoms
  - Use of the NHS contact tracing app will only be beneficial if the alert and resulting advice provided by the app is sent to the individual immediately and is adhered to by the individual. Adherence to the advice is likely to be more successful if supported by mass daily testing

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[17] https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/racial-ethnic-minorities.html
[18] https://www.who.int/features/qa/contact-tracing/en/

- It is vital for the Government to implement robust impact assessment of its COVID-19 policies with inbuilt flexibility to respond to the evidence and tailor communications accordingly

- **Owned** – Who owns the resulting insight? What are their responsibilities towards it in terms of its protection and the obligation to act? Fair – How equitable are the results of the application to all parties?   Is everyone properly compensated?

- Robust governance and custodianship processes must be identified and implemented with periodic review to ensure security and ethical data governance regardless of the legal basis of ownership
- The Government, in collaborative consultation with civil society will work to identify ethical approaches to managing the ownership and/or custodianship of public data
- The public should be informed about how to seek recourse if they feel their data has been used inappropriately
- Public concerns over the use of personal data will be mitigated by the use of clear, up to date and relevant communications throughout the implementation and use of the NHS app, helped by the creation and dissemination of clear and transparent signposting around data custodianship and ownership by the Government

- **Considered** – What are the consequences of the data collection and analysis?

- To be effective, any contact tracing app will trigger a requirement for a significant increase in testing, both polymerise chain reaction (PCR) and serologic tests creating further data for analysis, research and resource planning
- The NHS contact tracing app's success is in large-part dependent on a critical-mass of users across the country and UK regions, and the threshold is needed for this to be met has been suggested to be 60% of the population but this requires clarification
- Concerns around Bluetooth-based contact tracing apps have led to a significant joint project between Google and Apple to enable contact-tracing apps to function while in theory still preserving the privacy of those who use it[19]. The two companies plan to release an application programming interface (API) that apps from public health organizations can use. Crucially, Google and Apple say the system will not involve tracking user locations or even collecting any identifying data that would be stored on a server.   Currently the UK Government appear to have rejected this approach in favour of a centralised system[20]
- There are practical concerns about the drain on battery life that results from an app that always requires Bluetooth to remain on; specifically, that devices are more likely to run out of battery faster. Users may also be less consistent with their Bluetooth use once they are aware that a contact tracing app is competing for battery life with other apps that may be more important to individuals' personal requirements
- The API will let those apps use a phone's Bluetooth radios, with a range of about 30 feet, to keep track of whether a smartphone's owner has come into contact with someone who later turns out to have been infected with Covid-19. Once alerted, that user will be provided with advice, dependent on the evolving context and approach, including self-isolating and/or testing. However, it is important to note this will only apply if both relevant devices that are

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[19] https://www.wired.com/story/apple-google-bluetooth-contact-tracing-covid-19/
[20] https://www.bbc.co.uk/news/technology-52441428

in proximity have the application installed and Bluetooth enabled so the efficacy will be the square of the adoption percentage in the case of Bluetooth

- It is incumbent on both Government and organisations like the BCS and wider civil society to make sure this is done properly and in line with the Nolan Principles[21]
- For the Government to achieve transparency with the public, individuals should have access to what personal data the NHS tracing app has and how it will be used
- Any contact tracing app must ensure suitable safeguards to protect the data of vulnerable people both during COVID-19 and beyond, for example those at risk of domestic abuse, targeted hate or discrimination and fraudulent activity. It is therefore vital that the Government conduct iterative impact assessments that consider diverse and vulnerable groups
- There are numerous cross-border issues around tracking contagion as well as data vulnerability once national and international travel restrictions are relaxed, and this will need to be addressed by Government
- Human behaviour presents complex practical challenges to the proposed contact-tracing technology as outlined by Professor Ross Anderson[22] (Professor of Security Engineering, University of Cambridge) Consequently, there could be several reasons why data collected from a contact tracing app may be inaccurate and Government will need to build this into testing and review
- It is important that Government works closely with stakeholders across industry, academia, the public sector and civil society to maximise the benefits of data-driven technologies, that those benefits are fairly distributed across society, and to create the conditions for ethical innovation to thrive

- **Access** – What access to data is given to the data subject?

- A contact-tracing app has wide ranging implications and is counter-cultural, to make sure it is proportionate and fit for purpose, it is recommended that Government undertake and publish a robust equality impact assessment to understand access needs and any implications for diverse communities, particularly those traditionally distrusting of authority or the government. Without participation across all our communities, any contact-tracing app's efficacy will be limited
- By publishing its plans for the vast amount of data collected and technology developed during the COVID-19 pandemic , the Government will be able to show how it plans to balance the need for ethical oversight and proportionate use with providing maximum societal benefit thereby enhancing public trust
- It is considered critical that safeguards are developed and implemented to mitigate online harms such as trolling or abusive partners intending to use location data against them and other cyber-crime

- **Accountable** – How are mistakes and unintended consequences detected and repaired? Can the interested parties check the results that affect them?

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[21] https://www.gov.uk/government/publications/the-7-principles-of-public-life
[22] https://www.lightbluetouchpaper.org/2020/04/12/contact-tracing-in-the-real-world/

- Robust governance and regulation to monitor and mitigate any live, persistent and harmful unintended consequences and online harms are essential
- The CDEI's role in the Governments response to COVID-19 is welcome, including advising them on how to deploy technology with appropriate safeguards and appointing an Ethics Advisory Board to provide independent advice and recommendations to the app oversight board[23]
- Contact tracing apps should be founded on the principle of 'privacy by design, privacy by default'[24]
- Government has a responsibility to continually inform and disclose information to the general public and intended users, about the intentions of how our data will be used and processed, with assurances of transparency and anonymity
- Making the application source code open source before launch or using existing open source frameworks in development and planned for use in other jurisdictions (MIT Safe Paths[25], DP3T[26]), will ensure maximum accountability and allow for scrutiny by security and privacy experts
- It is important the public are informed about how to seek recourse if they feel their data has been used inappropriately

Conclusion

BCS supports the implementation of a contact tracing app as part of a coordinated effort including extensive testing to overcome the effects of COVID-19 on the health and economy of the nation. The biggest threat to success is that perceived 'Big Brother' elements of the implementation, for example the use of a centralised database, may have a chilling effect on uptake by the public and make the 60% uptake target difficult to achieve. A sustained campaign to increase public confidence in IT, supported by assurances of real safeguards, open and ethical data governance and protection by design is fundamental to success. Contact tracing apps must be founded on 'privacy by design, privacy by default' and it is recommended that Government set a high bar for transparent and ethical data governance as its future legitimacy and trust with the use of public data is at stake.

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[23] https://cdei.blog.gov.uk/2020/04/27/how-is-the-cdei-supporting-the-response-to-covid-19/
[24] https://edpb.europa.eu/sites/edpb/files/files/file1/edpbletterecadvisecodiv-appguidance_final.pdf
[25] https://covidsafepaths.org/
[26] https://github.com/DP-3T/documents