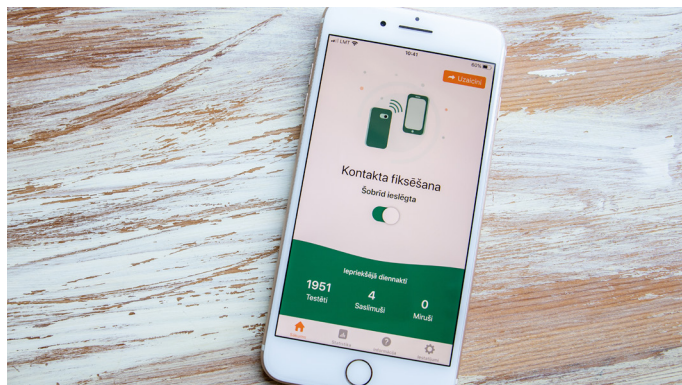


## COVID-19: The Internet of Things and Cybersecurity

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The COVID-19 pandemic has inspired a range of Internet of Things (IoT) innovations to help stop the spread of the virus. This is the eighth edition of COVID-19: IoT and Cybersecurity.

Past editions are found on the [PETRAS website](#).

**The NHS Test and Trace service has launched, however without the support of the NHSX COVID-19 app.**

The [NHS Test and Trace service](#) launched on Thursday 28 May across England. Anyone who tests positive for coronavirus will be contacted by contact tracers and will be asked information about their recent interactions.<sup>1</sup>

The tracing service uses contact tracing staff, online services and local public health experts to identify close recent contacts. The contact tracing efforts are [currently not complemented by an NHS COVID-19 App](#), however this is expected 'in the coming weeks [ed - June]' following a 'successful' trial on the Isle of Wight.<sup>2</sup>

The All-Party Parliamentary Group on the Fourth Industrial Revolution have published a report on the [impact of technology in the fight against COVID-19](#)<sup>3</sup>. The report includes case studies from the group's industry sponsors on the ways technology and AI in particular have been used, as well as insights from academia and local government.

### Overview:

- The NHSX COVID-19 app has not yet been released in the UK outside of the Isle of Wight
- The Joint Committee for Human Rights reiterates calls for extra legislation to protect data collected by the NHS Test and Trace service
- Research and trials into antibody certificates have begun and are continuing alongside work on immunity
- More contact tracing apps have been launched around the world this week
- Concerns about 'mission creep' are strong as the language of contact tracing has appeared in surveillance statements in the US as well as proposals to make a health tracking app in China permanent
- Researchers have set out 16 questions to assess whether a contact-tracing app is ethically justifiable

### Update on the legislation

Previous issues of this briefing have documented the discussion between the Joint Committee on Human Rights and the Secretary of State for Health and Social Care. On 21 May, the Secretary [reiterated his view](#)<sup>4</sup> that new legislation to protect data gathered by contact tracing was not necessary, and that a [draft bill prepared by the Committee](#)<sup>5</sup> would not be adopted.

The Committee also sought to raise this Bill as a Private Members' Bill. The Leader of the House of Commons has [rejected this motion](#) on 28 May, and supports the assessment made by the Secretary of Health and Social Care that extra legislation is not needed.<sup>6</sup>

On 1 June, the Chair of the Committee presented [a new comparative analysis](#) between the protections under the proposed Digital Contact Tracing (Data Protection Bill) and the existing situation under the Data Protection Act. The letter urges that the

Secretary reconsider his decision to reject the Bill.<sup>7</sup>

## Research on antibody certificates is continuing

### United Kingdom

In Issue 7, this briefing introduced a preprint on antibody certificates by the Alan Turing Institute where they have developed a Secure AntiBody Certificate (SecureABC). The [latest version](#)<sup>8</sup> of the working paper of SecureABC published 24 May can be found on GitHub in addition to an [early reference implementation](#).

SecureABC is a decentralised system that allows healthcare providers to issue certificates confirming a person's positive test for antibodies to SARS-Cov-2. The ['decentralised design of SecureABC allows for user privacy by design, and ensures that the healthcare provider \(or government\) does not learn when or where a citizen uses their certificate'](#).<sup>9</sup> SecureABC minimises centrally stored data in order to prevent abuse and for the system to be easily dismantled after it is no longer required. Certificates may also be revoked in 'a privacy preserving-way' if necessary.

The researchers also provide a 'set of security properties with which to evaluate' these systems. They can be found in the [working paper](#). A point to note is that the authors do not believe a single scheme 'can simultaneously satisfy all of these properties as several of them present a trade-off'.<sup>10</sup>

### Estonia

Estonia is testing one of the world's first digital immunity passports. Back to Work is the non-governmental organisation developing the passport. Back to Work believes that ['the team's passport could help once immunity is better understood'](#) and that they will develop their technology simultaneously with scientists.<sup>11</sup> Companies such as Radisson hotels and food producer PRFoods have [already started](#)<sup>12</sup> to test the passport.

## Further updates are being made in the decentralised world

A digital contact tracing app notifies a user when they have been potentially exposed to someone with COVID-19. The DP-3T team have published a [new document](#)<sup>13</sup> on when to show this notification based on estimating exposure through epidemiological parameters and the technological

constraints of the Bluetooth Low Energy technology.

## More and more governments are releasing contact tracing apps

### France

The French coronavirus contact tracing app 'StopCOVID' had been scheduled for release at midday on 2 June, after it was [approved by votes](#)<sup>14</sup> in the *Assemblée Nationale* and the Senate on 27 May. There is a bug bounty scheme running alongside the app to ['encourage the public to help identify any flaws in the software'](#).<sup>15</sup> [YesWeHack](#)<sup>16</sup> runs the vulnerability detection bounty programme for StopCOVID and offers cash rewards to help find critical flaws in the system.

Some critics, however, believe that StopCOVID fails as a privacy preserving design. Nadim Kobeissi, director of a Paris-based applied cryptography consulting office goes so far as to [say](#) that 'the lapses in StopCOVID's design are so serious that for it to be considered for deployment on a national scale may merit an independent scientific ethics review'.<sup>17</sup>

### Italy

Italy launched their decentralised '[Immuni](#)'<sup>18</sup> proximity tracing system on 2 June. Immuni leverages the Apple and Google Exposure Notification framework, and the [documentation](#) is found on GitHub.<sup>19</sup>

### Latvia

The Latvian 'Apturi Covid' contact tracing app was launched on 29 May. Epidemiologists have said that even a take-up as low as 20% will ['already be of great help in identifying risks and limiting the spread of infection going forward'](#).<sup>20</sup> The app uses the software developed by Apple and Google.

### New Zealand

The New Zealand government has gone with a different approach to digital contact tracing in creating 'a digital diary of the places you visit' called [NZ Covid Tracer](#)<sup>21</sup>. The app works on both Apple and Android devices and was launched on 20 May. The user manually points the phone camera at a Ministry of Health COVID-19 QR code poster displayed at the entry to a business and the phone records the QR code. This keeps a record of the

places the user has visited. When an individual is confirmed to have COVID-19, a contact tracer from the health authority will ask the user to read off the locations captured in the digital diary. The locations will then be contacted and asked for its visitor register to identify further individuals to follow up with.

The app has faced difficulties in uptake levels, having followed a [popular private industry app called 'Ripp!'](#) which was launched first and [embraced by businesses](#).

### *Singapore*

Singapore launched one of the first contact tracing apps [TraceTogether](#)<sup>22</sup>. It is based on the centralised [BlueTrace Protocol](#)<sup>23</sup> which was developed by Singapore's Government Technology Agency. The source code is called [OpenTrace](#)<sup>24</sup> and is available on GitHub.

Some migrant worker groups who work or stay in high risk settings are now [required to download](#)<sup>25</sup> the latest version of the TraceTogether mobile app.

### *China*

Nesta has published a [collection of essays](#)<sup>26</sup> on China's approach to public sector innovation with a focus on the applications and ethics of AI. The essays aim to offer policymakers new ideas that may inform their own practice and are written by experts on AI innovation in China.

[Calls have been renewed](#)<sup>27</sup> to speed up the introduction of [data protection laws in China](#)<sup>28</sup> as a response to the information collected on citizens during the pandemic.

### **'Mission creep' has been a common concern in the roll-out of digital contact tracing.**

A version of a health-tracking app used across mainland China [may become permanent](#)<sup>29</sup> as a broader way to monitor people's health. The Hangzhou health commission has proposed integrating more health indicators to develop individual index rankings. This new system would be a 'firewall to enhance people's health and immunity' after the pandemic.

The language used by public health authorities has already been transferred to law enforcement, with the Minnesota Public Safety Commissioner in

the US saying that they've begun [contact tracing arrestees](#)<sup>30</sup> involved in the current riots. The potential repurposing of public health infrastructure to surveillance is a large barrier for uptake and the acceptability of digital contact tracing solutions.

### **How do we access whether a contact tracing app is ethically justifiable?**

On 28 May, researchers from the Oxford Internet Institute, University of Oxford, published a [comment in Nature](#) containing 16 questions to assess whether — and to what extent — a contact tracing app is ethically justifiable.

There is a worry that the ['ethical and social considerations \(could be\) cast aside in the rush to quell the pandemic.'](#) Without paying enough attention to the ethical considerations, trust in government and public health services may subside. In light of this, the researchers believe that these questions could be used by governments and public health authorities to assist in the process of developing ethical apps. They also suggest that they may serve by assisting independent watchdogs in scrutinising these technologies.<sup>31</sup>

**Endnotes**

- 1 <https://www.gov.uk/guidance/nhs-test-and-trace-how-it-works#the-nhs-coronavirus-app>
- 2 <https://www.gov.uk/government/news/government-launches-nhs-test-and-trace-service>
- 3 <http://4irappg.com/covid19>
- 4 <https://committees.parliament.uk/publications/1223/documents/10345/default/>
- 5 <https://publications.parliament.uk/pa/jt5801/jtselect/jtrights/correspondence/Letter-to-Rt-Hon-Matt-Hancock-MP-Secretary-of-State-for-HSC-Draft-Bill.pdf>
- 6 <https://committees.parliament.uk/publications/1283/documents/11444/default/>
- 7 <https://committees.parliament.uk/publications/1284/documents/11453/default/>
- 8 <https://github.com/alan-turing-institute/SecureABC/blob/master/SecureABC.pdf>
- 9 <https://www.turing.ac.uk/blog/turing-researchers-work-ensure-security-and-privacy-covid-19-immunity-passports>
- 10 <https://github.com/alan-turing-institute/SecureABC/blob/master/SecureABC.pdf> [page 9]
- 11 <https://uk.reuters.com/article/health-coronavirus-estonia-digital/estonia-starts-testing-digital-immunity-passport-for-workplaces-idUKKBN22W0GE>
- 12 <https://eandt.theiet.org/content/articles/2020/05/estonia-tests-first-digital-immunity-passports-for-workplaces/>
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- 14 <https://www.connexionfrance.com/French-news/France-StopCovid-app-voted-through-by-France-How-it-works-and-how-to-get-it>
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- 28 <https://technode.com/2019/06/19/china-data-protections-law/>
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- 31 <https://www.nature.com/articles/d41586-020-01578-0>