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COVID-19 Automated Contact Tracing - Doable or Doomed?

With an enormous focus on containment or elimination of COVID-19, there are as many variances in national Government approaches as there are organisations claiming to have automated contact tracing solutions. But what does it mean, can we do it and what are the constraints and issues to consider?

Debate is broad, claims are many and there are some fundamental things to consider:

- The process – what must happen to effectively contact trace?
- The technology – what are the options and how effective are they?
- The people – will individuals comply, or will they value their privacy more than they value their societal contribution?
- The regulatory environment and the process – is it clear who should do what, do we have the mix right?
- Does it help employers in satisfying their regulatory obligations?
- Ultimately, what is the best way, is there a best way?

Before getting into the details, what is contact tracing? Contact Tracing is not new and has been in place across most countries for some time, but until recently has principally been used for contact tracing for Sexually Transmitted Infections/Diseases (STI/STDs). Now however, it has become a critical component in the defence against COVID-19. There are nuanced definitions by jurisdiction and level of Government but for the purposes of this paper, contact tracing is defined as the '***The identification, listing and follow-up of individuals that may have been infected by a virus so that those individuals receive advice, care and/or treatment and that the spread of the virus is slowed or the virus is eliminated***'. More detail on contact tracing is outlined by the World Health Organisation (WHO) on their website[1] , however this guidance is too broad to be effectively implemented so national Governments then fill in the gaps.

The objective of contact tracing is to contribute to the slowing or elimination of the virus, and to do this as quickly, effectively and efficiently (in terms of effort and cost) as possible.

[1] https://www.who.int/news-room/q-a-detail/contact-tracing

The Process – What must happen to effectively contact trace?

There are several steps required in the contact tracing process for it to be effective and these include:

- **Identification**: In this step of the process, it is all about trying to track down who may have been in contact with the infected person and traditionally this will involve asking the infected person about where they have been, who they have seen and who they contacted. Whilst it is pretty easy during lock-down (with most people going nowhere and seeing no-one apart from those they live with), it becomes more difficult when the individual has been very active or has been asymptomatic. Given the 14 day period of infection, would you be able to recall where you went, at what time and for what duration over the last two weeks? Contacts can be anyone who has been in contact with an infected person: family members, work colleagues, friends, or health care providers as an example.
- **Contact Listing and Notification**: Once identified, everyone considered to have contact with the infected person should be listed as contacts. Efforts should be made to identify every listed contact and to inform them of their contact status, what it means, the actions that will follow, and the importance of receiving early care if they develop symptoms. Contacts should also be provided with information about prevention of the disease. In some cases, quarantine or isolation is required for high risk contacts, either at home, or in hospital.
- **Contact Follow-up and Manage**: Regular follow-up should then be conducted with all contacts to monitor for symptoms and test for signs of infection. This could also include monitoring of those in enforced isolation with alerting and management control, including wellness checks and mental wellbeing assistance.

As with most process-based work, particularly work that requires significant human resource effort, there are significant opportunities to optimise using technology. Time and cost to execute this process manually is enormous but with so many technology options to assist, which add the most demonstrable value and are worth pursuing?

The Technology Options – What are they?

Various technologies have been developed and deployed to support information distribution and contact tracing. Most prolific now is the traditional method of large teams of individuals in contact centres to manually trace individuals via phone calls. In NSW, Director of Contact Tracing, Carolyn Murray said "We've grown to a team of around 150 working day and night to follow up people who have been in contact with people diagnosed with COVID-19. At any one time we can be working virtually across a number of workplaces, with the capability of making up to 1,300 calls to the community a day"[2]. Clearly this comes at an enormous cost and with the

[2] https://www.health.nsw.gov.au/news/Pages/20200416_01.aspx

complexity of the process and effort on each call, at approximately nine calls from each agent each day, scalability is an issue if the pandemic was to spread rapidly.

For the more technology-rich solutions, the most prominent are WhatsApp, TraceTogether[3], COVDSafe (Australia), the upcoming work from the collaboration between Google and Apple[4] (1st iteration due in mid-May), and organisations like Damstra, which has deployed Damstra Solo across enterprises globally. WhatsApp is in use in a number of jurisdictions, TraceTogether is in use across Singapore, COVIDSafe in Australia and solutions are being investigated for use in several other countries including New Zealand. Damstra Solo is in use with large global enterprises needing complex staff communication, protection and performance management solutions.

Of the technology heavy solutions, and in layman's terms, what do they do and how do they work?

- **Mass communications tools** including WhatsApp, are fundamentally a central repository of data, with information managed by Government and with broad distribution. WhatsApp and tools like it allow individuals to gain the info they want from a reliable source. These tools are at low or no cost to the end user, do not collect personal information (unless individuals choose to share) but have no greater utility than providing updated broad and general information. Many governments have taken up the use of WhatsApp as a robust and consistent communications tool, representing a single source of truth for mass communication but that is the extent of the capability to date.

- **Bluetooth close proximity** tools including COVIDSafe, TraceTogether and the Apple/Google Collaboration (due to release the first version of the app in mid-May) rely on the Bluetooth capabilities of the phones to identify other phones within close Bluetooth range (zero to five metres) for a designated time (eg. 15 minutes, because passing someone briskly walking in the opposite direction is too fleeting to register and is considered very low risk). The app on both iOS and Android devices stores the details of the other phones within the app for future reference. If an individual is then confirmed as having COVID-19, they advise the Health Authority (who then contacts the potentially affected individuals by phone in a very traditional way) and/or the individuals are notified on their phones with directions of who to contact. If you use the app and anyone you've encountered later tests positive for coronavirus, your phone may also alert you of that. These solutions come at no cost to the community user but are subsidised by large corporations or Government.

- **Broad-based Enterprise Solutions** – Damstra and other similar organisations produce workforce performance and protection solutions such as Damstra Solo, targeted at enterprises. Solutions are typically not used by consumers directly (although they can be) and rely on simple apps but with complex data collection, analysis and presentation to allow organisations to manage the protection of their staff. Solutions include GPS tracking, geofences, duress alerting, auditable communications, survey and checklist capabilities. These solutions come at a cost and are positioned to satisfy regulatory

[3] https://www.tracetogether.gov.sg/
[4] https://www.apple.com/au/newsroom/2020/04/apple-and-google-partner-on-covid-19-contact-tracing-technology/

obligations around safety and protection of employers but also to deliver a demonstrable return on investment to those organisations

Thinking about each of this technologies it is useful to compare the capabilities of each, which is shown in the following table (WhatsApp has been excluded from this analysis given the limited scope of the solution):

	Traditional Methods (Contact Centre Staff augmented by Police)	Bluetooth enabled tracing (COVIDSafe, TraceTogether and Apple/Google Collaboration)	Enterprise protection and performance solutions (Damstra Solo)
Where have individuals been?	⚠	✗	✓
Who have individuals seen or contacted?	⚠	⚠	⚠
How long have individuals been at a location?	⚠	✗	✓
Can locations/surfaces contacted be identified?	⚠	✗	⚠
Can individuals be informed of status?	✓	⚠	⚠
Can individuals be educated on actions?	✓	⚠	✓
Can individuals be followed up on health status?	✓	✗	✓
Can individuals be managed in isolation?	✓	✗	✓
Can the mental health of individuals be managed?	⚠	✗	⚠
Does the technology provide a duress function?	✓	✗	✓
Does the technology have universal coverage?	⚠	⚠	⚠
Does the solution meet regulatory obligations of employers around staff safety and protection?	✗	✗	✓

Legend:

✓ **= Fully Satisfied**

⚠ **= Partially satisfied, requires additional method to augment**

✗ **= Does not satisfy**

From the above, no single technology solution can completely and efficiently address the challenges of contact tracing across communities, all have shortfalls but in combination they can deliver against the objective.

The People – Will individuals comply, or will they value their privacy more than they value their societal contribution?

There are some significant challenges to the process and the technology but no challenge greater than the change management or driving engagement from the community, there is genuine concern around the use of personal data beyond the purposes of managing the COVID-19 crisis. There is no doubt Singapore is culturally different to Australia and New Zealand and many other countries but even with a very compliant and responsive public, take-up of a free and low impact app (TraceTogether), developed by the Government, Singapore was only able to achieve a take-up of ~20%. COVIDSafe in Australia has had excellent early take-up with 2M downloads in 24 hrs, but then slowing with 1M downloads in the next 2 days. With 3-4M downloads of a 10M target and a slowing take-up rate, at this stage it appears likely that Australia will end up in a similar position to Singapore, unless something changes.

The dilemma with this is that for automated contact tracing to be effective, the majority of individuals need to have access to, and use, the technology. COVIDSafe and TraceTogether have a tremendous solution now (not without issues, but on balance the solution is solid and method effective in most cases) and as stated by both, the solutions become effective when there is >40% penetration. To achieve 40% penetration relies on several key factors including the solution is at no cost to the individual, it is universally available, and it does not compromise the privacy of the individual. Both COVIDSafe and TraceTogether achieve all these objectives yet still haven't been able to get there... The Australian Prime Minister initially floated the use of a COVID-19 tracing app could be mandatory, but this was quickly retracted to advise the solution will be 'opt-in' after significant political and societal feedback.

Fundamentally, despite the enormous impact on lives with over 230,000 deaths globally and more than 3.2M cases globally (those countries hardest hit being US, Italy, Spain, France and the UK), there is still a strong resistance to change and a lack of trust. This will perhaps be the greatest hurdle to adoption of an effective technology (or combination of technologies) to deliver the desired outcome. Whilst reasons for take-up vary by individual (some believing the crisis is overstated, others not trusting of technology companies or Government, others believing it won't happen to them), it appears that privacy is valued more than community.

So, what has been done in understanding and articulating the reason for these changes and how good has the job been so far? Governments, particularly those in Australia and New Zealand took early and decisive action, including education of the community with terms now forming part of the local vernacular – 'social distancing', 'essential travel', 'flatten the curve' and 'mandatory isolation' to name a few. More people also now know the impact of not taking these actions on the health system and the potential inability to cope. As one specific example, with approximately 2,000 ventilators available in Australia, even assuming they are all available for COVID-19 treatment (and that there are sufficient health professionals to manage them), with an expected 5% of COVID-19 cases becoming critical and requiring ventilation[5], this means all

[5] https://www.abc.net.au/news/2020-03-27/do-we-have-enough-ventilators-to-fight-coronavirus/12092432

ventilators would be in use when there are 40,000 cases or more in Australia. At that point, Doctors, Nurses, Health Executives, Administration and Government would be presented with a deeply troubling moral question of whether to leave existing cases on the ventilator (leaving the new cases without), or, take the ventilator off one person to treat another. Fortunately, in Australia and New Zealand, these decisions have not been required to date but if there was a spike in cases (as there was early on), with >15% daily growth in cases, from a base of 6,700 cases in Australia, it would exceed 40,000 in less than two weeks!

So, education has been effective, as have very strict lockdown conditions but the Government is walking a fine line, trying to balance the COVID-19 crisis against the economy and there is increasing pressure to relax some restrictions - a more effective contact tracing mechanism will be required prior to relation of restrictions.

The Government, regulation and responsibilities?

Given the above, the Government needs to take the leadership position in this as the commercial drivers for private entities, despite positive intent, may not result in the best outcomes for the communities they serve. It could also be contested that the Government, as the setter of Policies and Standards related to Privacy (in particular) is in the best position to assess, keep and manage what will be very sensitive personal data relating to health status and records of individuals.

There is a role for private companies in the management of this crisis, but under central Government guidance in terms of regulatory frameworks and policies, process, technology, education and data. There are an abundance of great technology companies bringing great solutions to bear against this pandemic but they need to be tightly coordinated and the approach to date appears piecemeal, clutching at a restricted number of options without addressing the fundamentals of coverage, depth and veracity of the full solution, but there is a way forward.

What about employers and their obligations?

Under pre-existing regulatory requirements and frameworks, all employers have obligations to protect their staff (these existed pre-COVID-19) and under return to work processes (within COVID-19 restriction level adjustments), there are heightened expectations. So what should an employer do, particularly when flooded with 'free' apps or services purporting to support them in the process of returning to work? Questions should be asked prior to making decisions on the veracity of the offers and/or solutions:

- Will the Government provided solution satisfy my obligations to support my staff in return to work? Short answer is ***no***, due to a number of reasons including, but not restricted to:
    - Employers will <u>not have access to the data</u> on the status or otherwise of their employees

    - Employers will not know how many employees have downloaded the app and therefore will not know how many of their staff are able to be effectively contact-traced or be advised if they have come into contact with a case
    - Unlike personal protective equipment (PPE), it is not obvious as to whether the app is being used and employers will not be able to mandate the use of the app or monitor compliance

  Risk therefore on the employer is that if a single case is identified on a site (through the community-based contact tracing app or normal processes) that the entire site may be shut-down, at enormous cost to the business. As an example, all National Australia Bank (NAB) staff were sent home[6] from their Melbourne Head Office in March, on the back of a single case on the ground floor of their Head Office. With location-based information, including no-touch entry/exit to site and using an app or bluetooth beacons for visitors entering sites, it is possible to isolate affected areas and only shut-down contaminated areas, which may be 10% or less of the site area
- Can I satisfy my obligations with a single application? Reason to ask this question is that when more apps are required, the higher the complexity, which will result in lower take-up and therefore lower coverage
- Is the solution available now and how quickly can it be deployed at scale? Many solutions require new hardware and/or new software that is either not available or will entail significant logistical challenges
- Does the solution provide ongoing utility value to my organisation? Whilst there are immediate benefits for implementing a solution to satisfy the COVID-19 requirements, given the investment in change management you should be able to derive ongoing benefits

It is incumbent on employers to look after the safety and wellbeing of their employees (both regulatory and moral obligations) but unfortunately, community-based apps (such as TraceTogether and COVIDSafe) do not satisfy those obligations so to rely on them exclusively will be to the detriment of the employer and the employee.

Ultimately, what is the solution?

There is a solution and it ***is*** possible, but it requires strong leadership and a considered approach across both the public and private sector, in some respects going back to the basics of good analysis and presentation of viable, costed options with a solid understanding of the net benefits, risks and issues of each solution.

Automated contact tracing effectiveness can be significantly enhanced, at a net lower cost, by using a considered combination of capabilities and Government centralised control/decisions around the data. At a macro level, this involves optimising the existing contact tracing processes employed by Governments now, but strongly augmented through digital methods to lift the volume and effectiveness of the resources performing that function. The solution must include:

[6] https://www.thechronicle.com.au/news/nab-hq-evacuated-over-virus-fear/3974523/

- No-cost (to consumer) Bluetooth-based solutions to detect close contact, accepting that this is only as good as the take-up of app
- Governments strengthening the regulatory environment and guidance around employers and their management of the protection of their staff. As is contemplated in NZ, that employers must maintain tighter control and visibility of staff and contractors entering and exiting workplaces and improve methods of communication
- Collection of data from enterprises employing workforce performance management solutions, particularly focused on location information, which can be a real determinant of likelihood of contracting COVID-19 for identified cases. Concatenation of that location-based data with other sources of known cases in the community or workplaces is critically important
- Presentation of de-identified (personal information removed) COVID-19 confirmed case locations or clusters to technology vendors and employers to allow them to use those locations as geofence zones to alert staff on entry and/or identify their staff that may have have been exposed
- Implement technology solutions to manage the mental health, wellbeing and resilience of staff, ideally through a 'single-pane-of-glass' to aid in take-up and simplicity for the end user, thereby lifting compliance
- Employers must continue to satisfy their legal and regulatory obligations (strengthened through this period) to protect their staff, community tracing apps are insufficient to meet these obligations, so alternates must be implemented

Damstra, as an organisation providing rapid and globally deployable workforce performance and protection solutions, can deliver an important and significant proportion of the solution set using Damstra Solo. As above though, neither Damstra nor any other single technology solution provider can deliver the full capability. Chasing one option to the exclusion of all others will shift the needle from doable to doomed…

About the Author and Damstra

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Damstra, with our large team across our multinational locations remains fully committed to assisting our customers, the Government and the broader global community with our globally deployable solutions. For more information about how Damstra may be able to assist in this endeavour, including close contact tracing solutions for employers, please contact David Rose (david.rose@vaultintel.com) or Damstra via our website at

https://damstratechnology.com/products/solo

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