

The Optimise Study:

Social networks and mixing patterns

Report 5 | April 2021



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The Optimise Study is a partnership between Burnet Institute and Doherty Institute in collaboration with University of Melbourne, Swinburne University of Technology, Monash University, La Trobe University, Murdoch Children's Research Institute, the Centre for Culture Ethnicity and Health, and the Health Issues Centre.

Optimise is a longitudinal cohort study that will follow up to 1000 participants for a 12-month period. Study participants are not intended to be representative of the broader population but instead have been intentionally recruited from key groups who are considered to be:

- at risk of contracting COVID-19
- at risk of developing severe COVID-19 or,
- at risk of the unintended consequences of the restrictions

Participants are then asked to nominate people who play a key role in their lives, and where permission is given, these people are also invited to participate in the study. Establishing a map of social connections is important because it can be used to examine the influence of the social network on an individual or key groups 1) behaviour including adhering to government directions on COVID-19, 2) attitudes and level of engagement in key COVID-19 interventions such as testing and vaccination, and 3) experience of the unintended consequences of COVID itself, or the government restrictions imposed due to COVID-19. The resulting social map increases our understanding of the interplay between the individual, social and community-level impacts of COVID-19. For more detail on the Optimise study please visit <https://optimisecovid.com.au/>

Social network and mixing patterns

This report focuses on:

- Average overall contacts between October 2020 and March 2021
- Average contacts per setting, over time
- The impact of contacts on mood and the influence of people's social network on attitudes vaccination

433

**SURVEY
PARTICIPANTS**

7

**SEMI-STRUCTURED
INTERVIEWS**

1

**COMMUNITY
ENGAGEMENT GROUP
MEETING**

This report draws on the findings from a number of Optimise research activities. These include responses from 433 participants who completed the Optimise baseline survey, follow up surveys and contact diaries between 14 September 2020 and 1 April 2021. Phone-based semi-structured interviews were conducted with a subset of participants from the study (N=7) in December 2020. These participants included a previous COVID-19 case, health and aged care workers, people who are culturally and linguistically diverse, young people and people living in regional Victoria. On 13 April 2021, a Community Engagement Group meeting was facilitated by the Centre for Health Communication and Participation at La Trobe University and focused on changing social connections over time and into the future. For the first time we have also included findings from Social Network Analyses conducted by Swinburne University of Technology investigating the relationships between social connections and mood and vaccination hesitancy and surety. In the contact diaries, we asked participants to detail every person that they had contact with in the preceding day. **A contact** was defined as someone that participants reported having either a face-to-face conversation with, shared a closed space with (e.g. room, car, bus, lift, train carriage), or had physical contact with (e.g. handshake, hug, kiss, contact sport). This could include people they lived with, people who visited their home, and people they were in contact with when they left their home and could include both intentional or unintentional contacts with people whom they may or may not know.

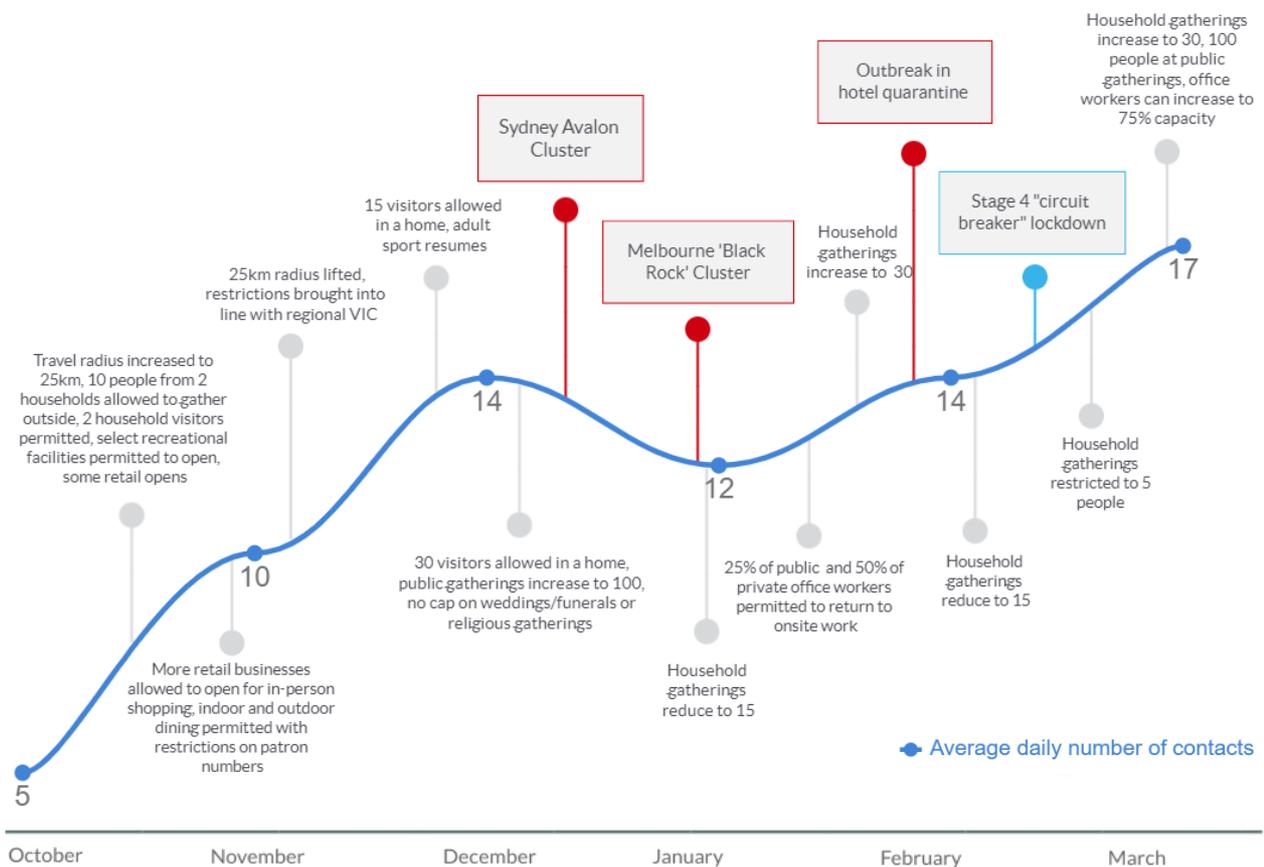
OPTIMISE COHORT

SUMMARY AND IMPLICATIONS

Over time the average daily number of contacts of participants in the Optimise Study has increased. This shows that people are responsive to policy changes and the easing of restrictions in Victoria following the second lockdown. People in our cohort were quick to return to shops and public spaces following the easing of restrictions in November 2020, while there was a more gradual return to cafés, restaurants and bars and social mixing in other people’s homes. Small outbreaks and tightening of restrictions during the January-February period had an impact on reducing social mixing in cafés, restaurants and bars, other people’s homes and recreational sports. The return of office workers to the workplace, increases in indoor recreation and increased visits to public spaces have driven much of increased contacts seen in the months of February and March. People aged 25-35 and 35-44 have been driving recent increases in contacts while older people and people with chronic illness have continued to limit social interaction despite the lifting of restrictions.

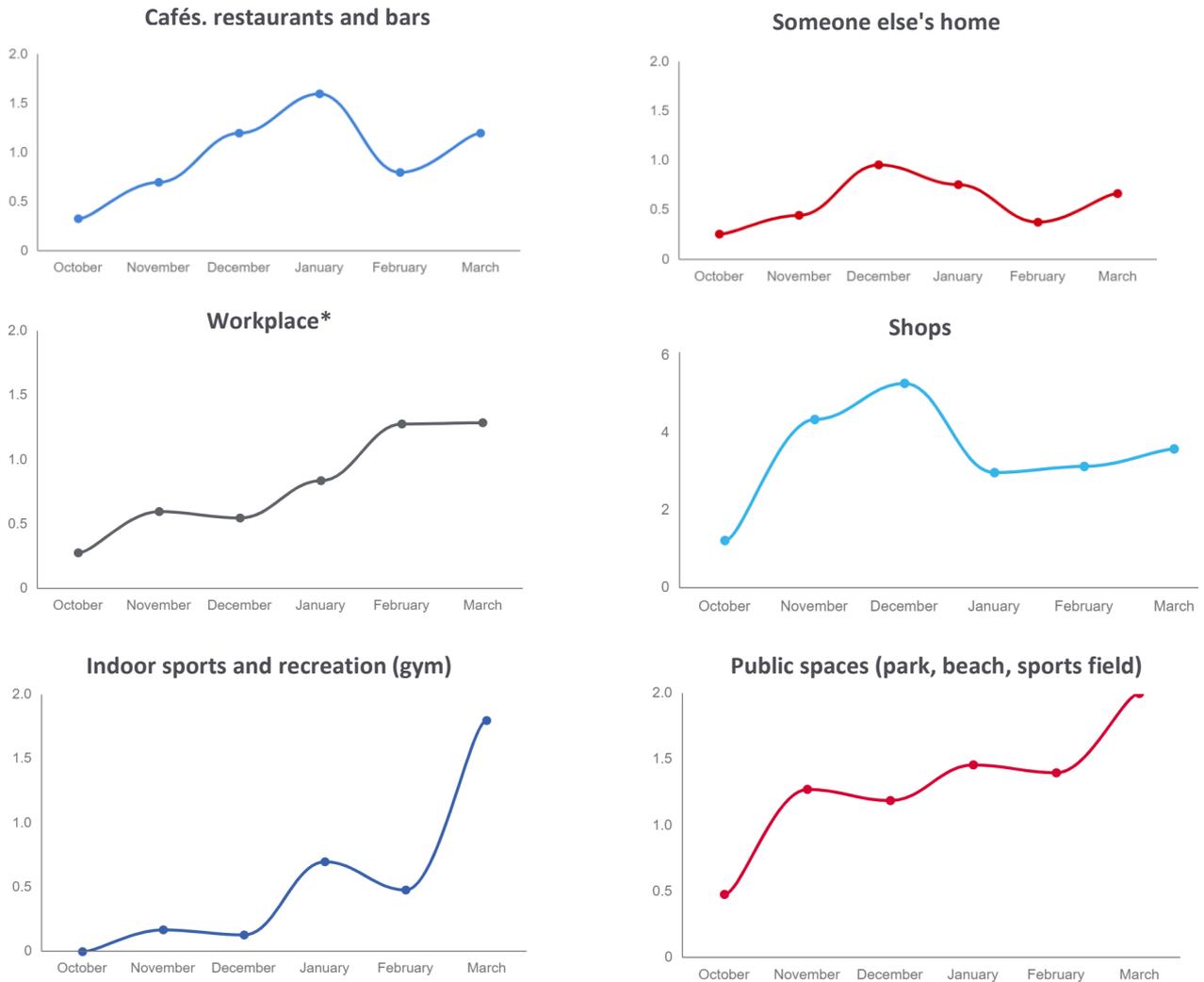
AVERAGE DAILY CONTACTS PER MONTH

As the figure below shows, the average daily number of contacts in the Optimise Study has increased from five contacts per day in October 2020 to 17 in March 2021. This increase has mostly followed the changing restrictions. Contacts dipped slightly in January which may have been due to the restrictions introduced as part of the 'Black Rock' cluster. The five day 'circuit breaker lockdown' between 13 and 17 February appears to have had little impact in reducing *overall* contacts in February.



AVERAGE CONTACTS PER SETTING OVER TIME

Most settings saw a consistent trend with the average number of contacts overall. Contacts at cafés, restaurants and bars as well as in another's home increased with the easing of restrictions. These contacts also decreased in the month of February around the five-day, Stage 4 'circuit breaker' lockdown preventing patrons from dining in at restaurants, visitors gathering in a person's home and playing recreational sports across Victoria. Workplace contacts have steadily increased over time in line with the removal of workplace restrictions, allowing public and private workers to return to the office. Contacts at shops increased substantially between October and November when people were permitted to purchase non-essential retail items in person; this coincided with shopping for the end of year festive season.

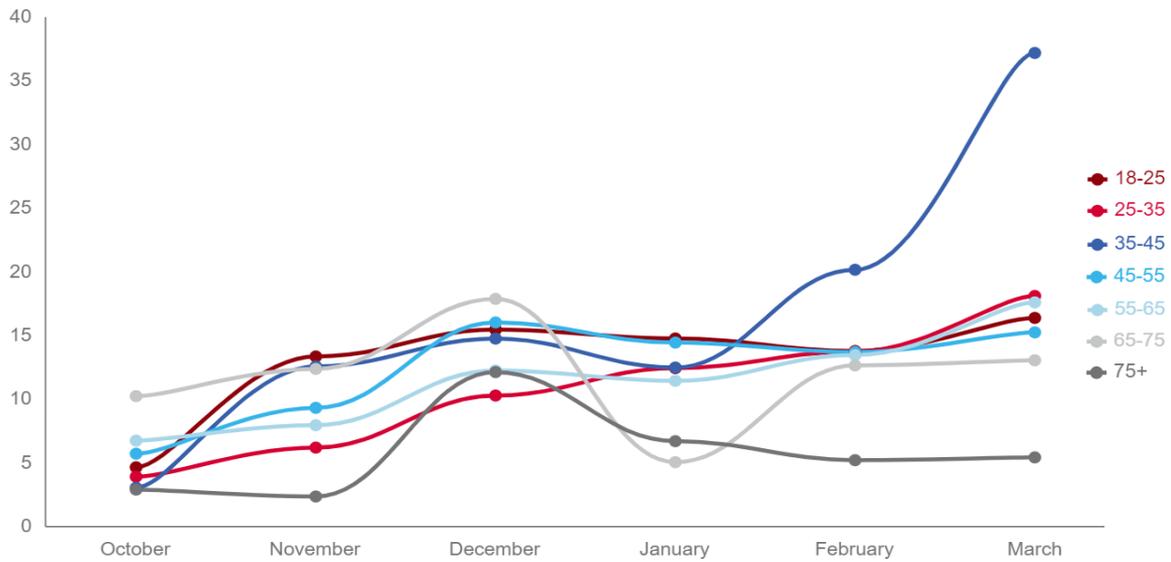


*Workplace refers to offices, factories and other workplaces that are not included in other settings (e.g., childcare, shops etc.).

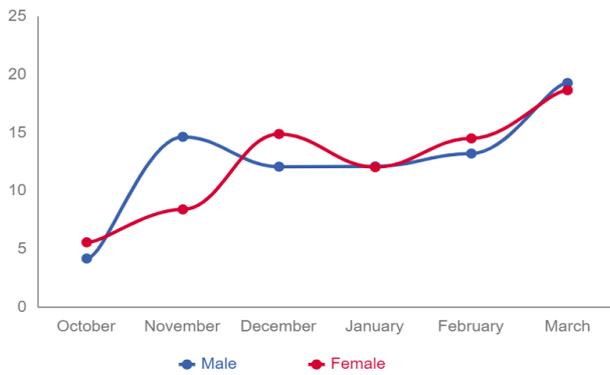
AVERAGE DAILY CONTACTS BY KEY DEMOGRAPHIC CHARACTERISTICS

In recent weeks people aged 35-45 years old have substantially increased their contacts which may be attributed to the return of workers to offices and recreational activities. People aged over 75 have had consistently low contacts with the largest peak in December. Male and female participants have had a relatively similar average daily number of contacts per month. Healthcare workers have consistently had higher numbers of contacts than non-healthcare workers, which may be largely attributed to the contacts they have through their workplace. Similarly, people with chronic disease have had fewer contacts than people without a chronic disease since December. This suggests that while some cohorts are returning to normal patterns of social engagement, others are continuing to limit their social interactions, likely due to the ongoing risk COVID-19 poses.

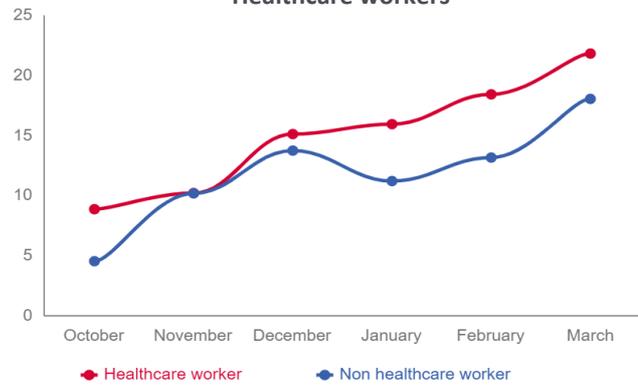
Age group



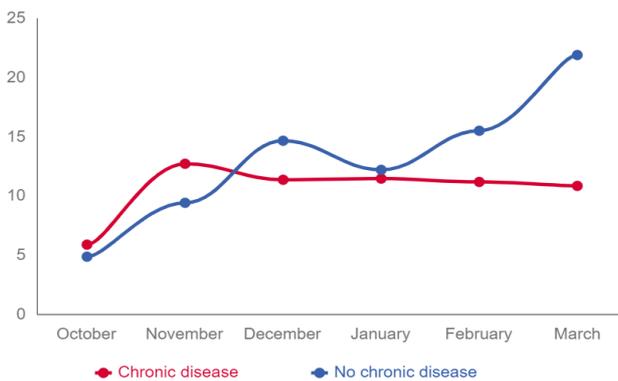
Sex



Healthcare workers



People with and without chronic disease



Language spoken at home



ADAPTING TO CHANGES IN POLICIES AND RESTRICTIONS

The qualitative interviews were conducted in December 2020. Participants interviewed spoke generally about their desire to 'do the right thing' when it came to observing restrictions, whilst also experiencing emotional challenges from the limited ability to see and connect with family and friends during lockdown periods. Many demonstrated adaptability and resilience with the use of innovative solutions to supplement their need for socialisation, such as meeting outdoors for coffee or hosting virtual social events. Some people also spoke about ways they supported others who may have been feeling isolated. For example, an aged care worker described looking out for residents by organising dress up days.

Another participant reported that other restrictions such as the requirement to wear masks in all settings acted as a deterrent from some activities. This may explain some of the recent increases in contacts, with the removal of the requirement to wear masks in most settings other than public transport. This was reiterated in the Community Engagement Group meeting (conducted in April) where the loosening of mask wearing restrictions were reported as having increased people's confidence to get back out into their community, something particularly attributed to increasing community engagement amongst older people.

"And then it changed to the fact that you had to wear masks even playing [bowls] and that put a lot of people off..."

"even though he lives quite close by, I couldn't see him...because he basically couldn't really step out of the door much...because he's really high risk...so any cold can make him quite sick."

Participants spoke about how they adapted their social interactions and attempted to reduce their risk of transmitting or contracting COVID-19. Even when permitted, some participants chose to limit their social interactions by not visiting family members for fear of transmitting the virus to those at higher risk of health complications.

Participants of the Community Engagement Group recognised that for some groups life was "back to normal". The representative for younger people stated that people in their network were no longer concerned about the risks of COVID-19 and young people wanted to embrace their freedom. Similarly, the representative for regional centres stated that life had already returned to normal, attributing this to the fact that people in regional centres had not experienced the prolonged lockdown compared to people in Melbourne and a perception that they were less at risk of outbreaks due to their distance from hotel quarantine.

"Life seems to have gone back to normal. People of all generations are out shopping. There is a degree of confidence that's come back into it."

Unsurprisingly, the Community Engagement Group identified older people and those most at risk of serious COVID-19 (such as people with chronic disease) as key groups that are continuing to be more cautious in their mixing patterns. Participants felt this related to an understanding - communicated from the start of the pandemic - that they were most at risk.

"We're pretty aware that our time is limited...so why would we want to cut it short or shorter than what we've got? So I found most of my friends are a lot more hesitant than our children or our grandchildren."

Other groups reported to be less likely to be mixing as much were culturally and linguistically diverse (CALD) groups and those in community housing. One representative who lives in community housing reported that only one third of residents were going out into the community. Hesitation in returning to community activities was related to a lack of trust in government and conflicting information about the pandemic. Participants expressed concern that people who remain isolated are more at-risk of developing problems with their mental health.

"When there's misinformation and conflicting information, it just confirms that they're doing the right thing by not going out and enjoying life."

In terms of looking forward to the future, all participants of the Community Engagement Group reported they were still planning for the short-term, rather than the long term. Overall, participants felt being vaccinated would have the biggest impact on their confidence to socialise and engage in activities in their communities. However, they felt there was a lack of reliable information about the vaccine rollout including information about the risks and benefits of the vaccines. One participant was concerned that people who are socially isolated, are "falling through the cracks" and not receiving reliable information about the vaccine.

"People really need to be informed again to feel comfortable and safe. I think one way of doing that would be to get people from within the different communities that we have to speak to people in their language, on their level...I think we really need to get people vaccinated and talk about that, have a community conversation and be honest about the risks."

SOCIAL NETWORK ANALYSIS

The Optimise study is ground-breaking in capturing and understanding the importance of social connections on the health and wellbeing of people in the state of Victoria as they deal with the impacts of COVID-19. This focus on social connections – or social networks – sets this study apart from others. The Social Network Research Laboratory at the Swinburne University of Technology conducted an analysis of the social networks data collected from the Optimise surveys to investigate the relationships between social connections and mood and vaccination hesitancy and surety.

Social Network Analysis (SNA) is a set of techniques that focus on the “relationships among social entities, and on the patterns and implications of these relationships”.¹ We can use Social Network Analysis techniques to visualise (or map) these social connections as we have done below, as well as to statistically analyse these networks. SNA is not just a method but also gives us theoretical insights by focusing on the interdependent nature of our social world. We become dependent on people through our social connection to them, and these connections can affect important personal issues, such as our mood or our views on vaccination. People are represented as dots in the network, and relations between them are represented as lines.

Contacts in general and mood

In addition to asking people about their social contacts, we also asked questions about people’s wellbeing by asking them about their mood. For participants, we measured positive mood and negative mood separately because past studies indicate that positive mood and negative mood tend to be relatively independent from one another². The absence of positive mood does not necessarily indicate high negative mood or the other way around.

When we looked at people’s level of contact with others and their mood, we find some unsurprising results. First, there is a significant positive correlation between number of contacts and positive mood, and a significant and negative correlation between contacts and negative mood. This means that the more contacts a person has, their positive mood is likely to be higher and their negative mood is also likely to be better (positive and negative mood are not the complete opposite of each other).

However, for physical or close contact with others, higher levels of contact are significantly and positively correlated with positive mood, but not inversely correlated with negative mood. This suggests that negative mood is associated with a lack of contact in general – and not lack of close physical contact.

Workplace contacts and mood

A further interesting correlation relates to workplace contacts and mood. Looking at workplace contacts and close physical proximity, we find that increased numbers of workplace contact is negatively and significantly correlated to positive mood. Thus, the more workplace contacts you have, the lower your positive mood is. When we look at workplaces where there is physical contact with other people in the workplace (e.g., health professional), we find even stronger correlations, this time both for positive and also negative mood. That is, higher numbers of physically close contacts at work is significant and negatively related to positive mood, as well as significantly and positively correlated with negative mood. This means that having lots of people in close physical proximity at work during COVID-19 times drops your positive mood and increases your negative mood substantially, suggesting an underlying anxiety about busy workplaces with physical contact that may place people at risk of COVID-19.³

¹ Wasserman, S. and Faust, K. (1994) Social network analysis: Methods and applications. Cambridge University Press., p. 3.

² Diener, E., & Emmons, R. A. (1984). The independence of positive and negative affect. *Journal of Personality and Social Psychology*, 47(5), 1105–1117. <https://doi.org/10.1037/0022-3514.47.5.1105>; Huebner, E.S., & Dew, T. (1996). The interrelationships of positive affect, negative affect, and life satisfaction in an adolescent sample. *Social Indicator Research*, 38, 129–137. <https://doi.org/10.1007/BF00300455>

³ This is aggregated data across the whole Optimise study, and it may be that these effects change over differing timepoints of the study.

Young people

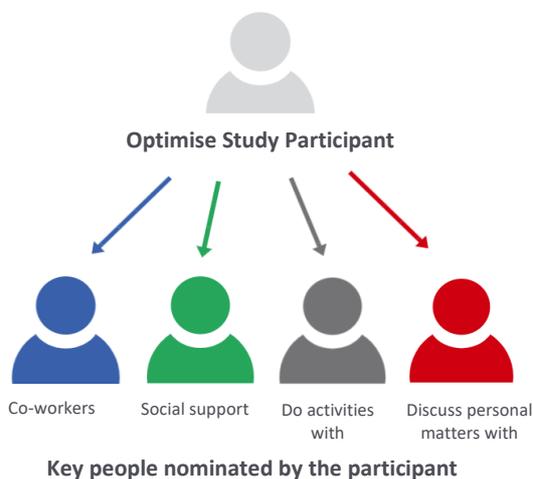
In reviewing participant contact diaries, we found there was a large variation in the number of social contacts. When we divide participants into two groups, putting the top 10% of people with the largest number of contacts in one group and everyone else in the other group, we find that the top 10% are significantly younger. An implication of this is that if younger people become infected with COVID-19 and are asymptomatic, they are likely to come into contact with more people and potentially infect more people.

THE INFLUENCE OF KEY PEOPLE

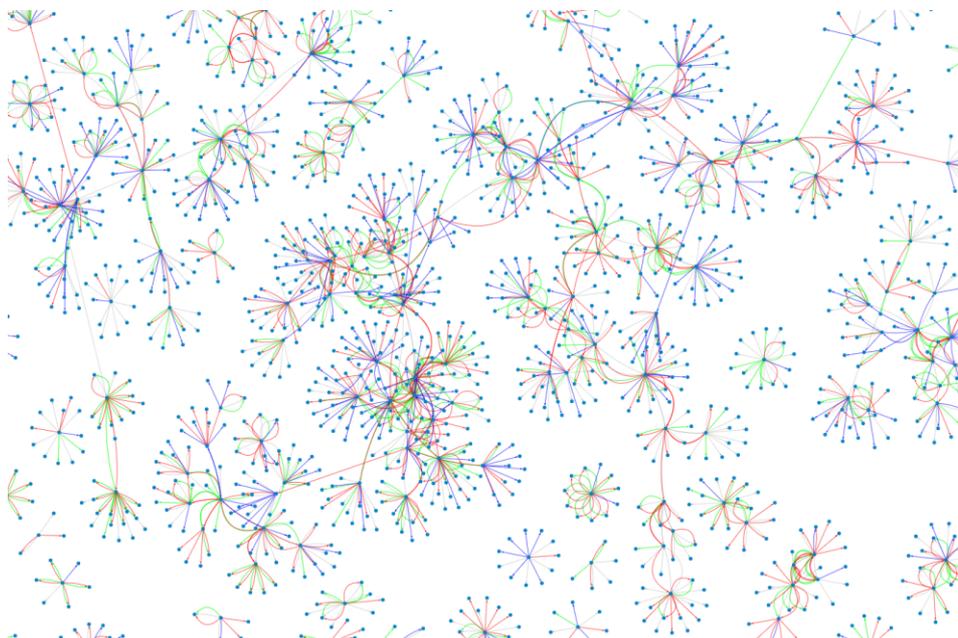
The Optimise study also asks participants to nominate 'key people' in their lives. Key people represent those people who have a key role and make a big difference to our lives. They could be family, friends, neighbours, co-workers or others in people's lives. To identify a range of key people we asked different questions seeking to understand whom participants discuss personal matters with, who provides them with important practical assistance or support, whom they participate in activities and hobbies with, and important co-workers.

From this information we then produced social maps (or visualisations). These social maps show that people have many different sorts of social connections to multiple people. Sometimes these differing relationships overlap, such that people get support and discuss personal matters with the same person, but other times people have relationships with separate individuals for different purposes. This highlights that our social world is very complex. We also see variation in the numbers of people that we are connected to. Some people have many connections, others have relatively few. This may be by choice or by circumstance. Importantly, people's social worlds differ markedly, and using social network analysis to look at these relationships allows us to explore such issues.

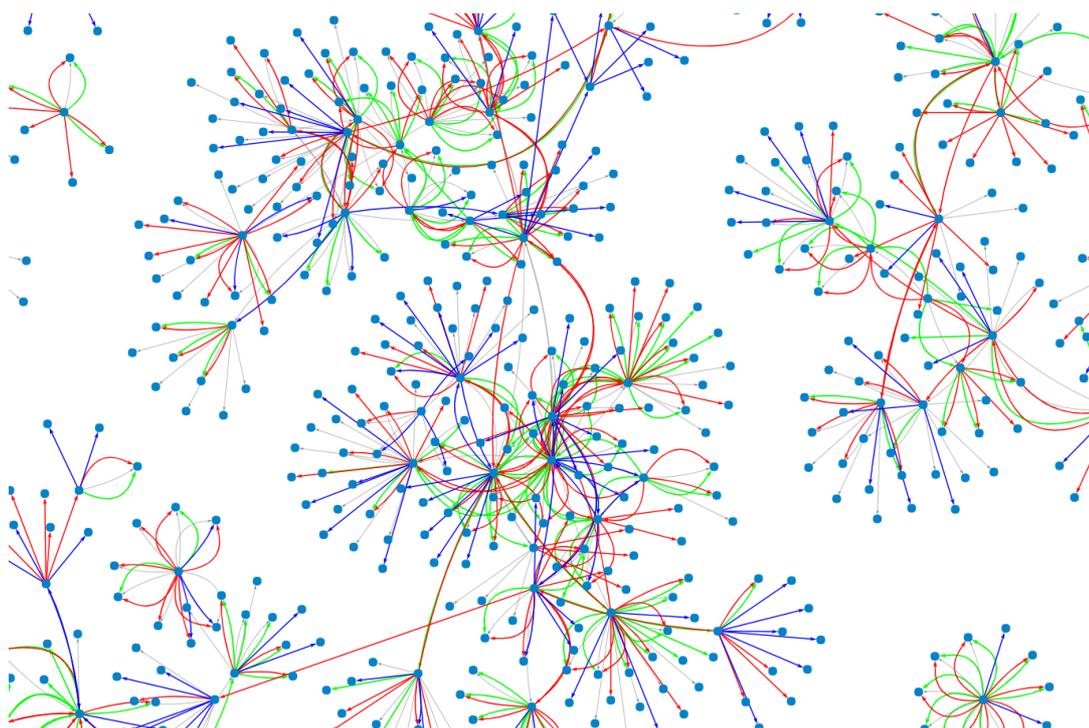
In terms of key people in our study, different coloured lines represent different sub-types of key people. Blue lines are 'co-workers', green lines represent 'social support', grey lines are 'do activities with', and red lines are 'discuss personal matters with'.



Visualisation of key people relationships



Close up view of key people relationships



Vaccination hesitancy and surety

We can also use social maps to look at the influence key people may have on an individual's attitudes and intentions. We wanted to explore the attitudes of people's social network towards vaccines, in attempt to better understand how vaccine hesitancy may be understood and addressed. Vaccination hesitancy is when people are not certain or quite sure that they will personally agree to be vaccinated, and also includes people who report they will definitely not get vaccinated. From our survey data we find that vaccination hesitancy is socially influenced by key people – that is, attitudes towards vaccination are influenced by people we are connected to. This means that if participants are connected to other people who have vaccination hesitancy, they are significantly more likely to have vaccination hesitancy too. What this shows is that our important social relationships can influence our own personal views on key issues like vaccination.

In addition, when we examine people's vaccination surety (i.e., those who say they probably will get vaccinated) we also find social influence processes. Our preliminary longitudinal analyses suggest that over time vaccination surety is increasing, such that overall, more people are being socially influenced by key people they are connected to that vaccination is a good idea. The main finding here is that whether it is vaccination hesitancy or vaccination surety, our social connections to others are extremely important and can influence our own attitudes and behaviours.

Importantly, vaccination hesitancy is socially influenced when one is connected to key people who provide support, or whom you discuss personal matters with, or do activities with - but there is no such influence on hesitancy when key people are co-workers. This would suggest that any workplace interventions around vaccination would likely be broadly ineffective at a population-level because workplace social connections are unrelated to views on vaccination.

A further network effect for vaccination hesitancy is that people with greater online/virtual interactions are less likely to be vaccine hesitant. That is, the more people you interact with online, the more likely you are to say you will get vaccinated. We will need further investigation into this finding to see if there are other driving forces underneath this insight, but it does raise interesting questions about the value and impact of online communication. These findings will be investigated further and presented in future reports.

RECOMMENDATIONS

1

Provide credible information about the vaccine rollout to support vaccine uptake.

There was widespread agreement amongst the Community Engagement Group that reliable sources of information are needed to communicate about the vaccine rollout, as well as the risks and benefits of the vaccines. Norman Swan was mentioned by several participants as reliable, calm, and impartial, while Daniel Andrews' style of communicating every day, and answering every question, was also seen as trustworthy.

2

Provide regular, credible updates about COVID-19 (including current restrictions and their rationale) to encourage people to connect with their social network while ensuring safe social mixing in the community.

As with vaccines, a "go-to" source of credible, reliable, and up to date information about COVID-19, and any current restrictions was sought by several in the Community Engagement Group. Participants sought information providing clarity as to what restrictions were still in place, and a rationale for why they were required (i.e. masks still required on public transport but not in workplaces or large sporting gatherings). Participants expressed dissatisfaction that the daily press conferences, and the ABC daily COVID-19 update, were no longer occurring and were now unsure where to go for reliable COVID-19 related information.

3

Vaccination education strategies should utilise the influence of social networks, particularly social connections and online communities to promote vaccine messages and support uptake.

Given the influence of key people (excluding co-workers) on people's views about getting vaccinated, vaccination education strategies should focus on everyday social connections between people and using online communication channels to change attitudes, rather than workplace social connections.

4

Maintain messaging about the importance of risk mitigation strategies, especially for younger age groups.

Risk mitigation strategies will continue to be vital in Victoria and Australia especially as people transition back to workplaces, recreational activities and other settings and as restrictions on gathering limits reduce. This is particularly the case whilst COVID-19 vaccine coverage is low across the country but will also be required as vaccine coverage increases.

Messaging must continue about the importance of staying home if unwell, testing at the early signs of symptoms, hand washing and physical distancing. Such messaging should particularly focus on younger age groups. It is important to recognise that young people are driving much of the contacts and the majority are unlikely to be vaccinated for some time yet. Hence, if a new cluster of COVID-19 were to occur in the community there is a risk that it will not be detected for some time if young people do not undertake timely testing when symptomatic. Because young people are also mixing the most and are the further down the priority list for the vaccine roll-out, delayed detection may result in widespread transmission before cases are detected. As has been discussed in previous Optimise Reports (Report 3), it is vitally important to have messaging that engages young people about COVID-19 risk and reduce barriers to timely testing. There is also a need to continue to reduce stigma associated with COVID-19 infection to encourage young people to be tested.

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