



Does a major change to a COVID-19 vaccine program alter vaccine intention? A qualitative investigation



Samantha J. Carlson^{a,b,*}, Lara McKenzie^b, Leah Roberts^b, Christopher C. Blyth^{a,b,c,d,e}, Katie Attwell^{a,b}

^a Wesfarmers Centre of Vaccines and Infectious Diseases, Telethon Kids Institute, Perth, Western Australia, Australia

^b VaxPolLab, School of Social Sciences, University of Western Australia, Perth, Western Australia, Australia

^c School of Medicine, The University of Western Australia, Perth, Western Australia, Australia

^d Department of Infectious Diseases, Perth Children's Hospital, Perth, Western Australia, Australia

^e Department of Microbiology, PathWest Laboratory Medicine WA, Perth, Western Australia, Australia

ARTICLE INFO

Article history:

Received 15 June 2021

Received in revised form 8 October 2021

Accepted 10 December 2021

Available online 16 December 2021

Keywords:

Covid-19 vaccines

Health Knowledge, Attitudes, Practice

Vaccination

Health policy

Intention

Adult

Australia

ABSTRACT

Background: On 8th April 2021, the Australian Technical Advisory Group on Immunisation (ATAGI) made the Pfizer-BioNtech (Comirnaty) vaccine the “preferred” vaccine for adults in Australia aged < 50 years due to a risk of thrombosis with thrombocytopenia syndrome (TTS) following AstraZeneca vaccination. We sought to understand whether this impacted COVID-19 vaccine intentions.

Method: We undertook qualitative interviews from February – April 2021 before and after the program change with 28 adults in Perth, Western Australia. Using our COVID-19 vaccine intentions model, we assessed changes in participants' COVID-19 vaccine intention before and after the program change. Participants were classified as 1) ‘acceptors’: no concerns about COVID-19 vaccine safety, efficacy, access and would accept whatever vaccine is offered, 2) ‘cautious acceptors’: some concerns and would prefer a particular vaccine brand but would accept whatever is offered, 3) ‘Wait awhile’: for more data, easier access, for another vaccine brand, a greater perceived COVID-19 threat or until mandatory, or 4) ‘refuser’: no intention to vaccinate due to concerns about safety and/or efficacy.

Results: Before the change, 7/18 of those aged < 50 years were ‘acceptors,’ 10/18 were ‘cautious acceptors’ and 1/18 was ‘wait awhile.’ Overall, 14/18 participants had the same COVID-19 vaccine intention after the change; 4/18 became more concerned. For those aged ≥ 50 years and before the change, 5/10 were ‘acceptors’ and 5/10 were ‘cautious acceptors.’ After the change, 8/10 still had the same COVID-19 vaccine intention; 2/10 became more cautious. The major concern before the program change was COVID-19 vaccines having different vaccine efficacy; the concern pivoted to safety.

Conclusion: The majority of participants were ‘cautious acceptors’ who intended on being vaccinated; many had this intention before and after the program change. The Australian government, health care providers and media need to better address COVID-19 vaccine concerns to assist those with COVID-19 vaccine intentions receive a vaccine.

© 2021 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

To control the spread and the associated burden of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), Coronavirus Diseases 2019 (COVID-19) vaccination programs need to be safe and effective. Vaccine programs also need to be accessible and acceptable. In 2020, several Australian studies quantified COVID-19 vaccine intentions before COVID-19 vaccines were available in Australia: overall, there was relatively high intention to vaccinate

in Australia, with approximately 4/5 adults indicating a willingness to be vaccinated [1–3].

Australia commenced vaccinating those deemed at highest risk of COVID-19 with the vaccine by Pfizer-BioNtech (Comirnaty) on the 22nd of February 2021. Three weeks later, doses of the AstraZeneca vaccine were also being distributed and administered, with local production of this vaccine to constitute the cornerstone of Australia's supply. Soon after, on the 18th of March, the European Medicines Agency (EMA) reported that the AstraZeneca “may be associated with very rare cases of blood clots associated with thrombocytopenia” [4]. On the 2nd of April, the Australian Technical Advisory Group of Immunisation (ATAGI) reported the first probable case in Australia [5]. This adverse event following immu-

* Corresponding author at: Wesfarmers Centre of Vaccines and Infectious Diseases, Telethon Kids Institute, Perth, Western Australia, Australia.

E-mail address: samantha.carlson@telethonkids.org.au (S.J. Carlson).

nisation (AEFI) is now called thrombosis with thrombocytopenia syndrome (TTS) which, at the time of writing, is reported in Australia in 3.1 per 100,000 adults aged < 50 years, and 1.8 per 100,000 in those aged \geq 50 years [6].

On the 8th of April 2021, seven weeks in to Australia's COVID-19 vaccine rollout, ATAGI announced that the Pfizer COVID-19 vaccine was now preferred for adults aged < 50 years [7]. Although it did not ban the use of AstraZeneca for those in this younger age group, access to the “non-preferred” vaccine, AstraZeneca, became extremely difficult. At the time, ATAGI acknowledged that “prefering” vaccines for certain age groups would likely impact confidence in the AstraZeneca vaccine in all age groups [5]. Before the change, Australia had purchased 3.8 million doses of AstraZeneca, and 20 million doses of Pfizer [8] – enough vaccines to fully vaccinate 11.9 million Australians (with no vaccine wastage), in a population of approximately 21 million Australian aged \geq 16 years [9] and thus able to be vaccinated. The strategy was then to rely on local manufacture of AstraZeneca as the mainstay of the rollout [8]. The day after the program change announcement, the Australian Government announced that they had ordered a further 20 million doses of Pfizer vaccines [8]; however Pfizer supply issues would ultimately hinder the early months of the rollout.

Previously, when Australia's childhood vaccine program has been modified following probable AEFI, confidence and subsequent uptake has dropped. After an increase in febrile seizures in children aged 6–59 months who received a particular brand of an influenza vaccine in 2010, the childhood influenza vaccination program was suspended for four months. Annual coverage declined, most notably in Western Australia [10] where the state government had been funding the vaccine for all children aged 6 – 59 months. Coverage dropped due to the suspension of vaccine programs [10], but also because of ensuing hesitancy among both parents and health care workers (HCWs) [11–12]. Coverage has only recently increased following state-based and eventually national influenza vaccine programs and widely reported infant deaths from influenza [13]. There remains, however, a significant gap in knowledge about how Australian *adults* react to vaccine program changes following a safety signal.

In addition to Australia, several other countries suspended their use of AstraZeneca due to TTS. Data show that people in France, Germany, Spain and Italy view that vaccine as less safe since the suspension; however, reports of TTS have had little to no impact on the perception of AstraZeneca safety in Britain and Sweden. Populations in all these countries, however, viewed AstraZeneca as less safe than the Moderna and Pfizer COVID-19 vaccines [14]. We sought to understand whether Australia's COVID-19 vaccine program change immediately impacted confidence in the AstraZeneca vaccine held by adults in Perth metropolitan area, Western Australia.

2. Methods

Through our mixed-methods study called “Coronavax: Preparing Community and Government,” [15] we commenced in-depth qualitative interviews with adults aged \geq 18 years in the Perth metropolitan area, Western Australia, 2 days after Australia's COVID-19 vaccine program commenced. Approximately 2.5 million people live in WA; 1.9 million of these live in the Perth metropolitan area (hereon referred to as Perth). At the time of writing, there had been just over 1,000 confirmed COVID-19 cases in Western Australia since the first case was reported in early 2020 [16].

Recruitment for Coronavax occurred through media releases, word-of-mouth, social networks, and on our website. Participants signed up through a pre-screening survey hosted on REDCap

[17–18] capturing demographic information such as employment, age, gender, comorbidities, household dynamics, highest level of education, religion, country of birth, and language/s spoken at home. Following assessment of whether they fit into our priority groups for interviews, interviews were undertaken by experienced qualitative researchers SJC and LM, and student researcher LR. People prioritised for interview at that time were either HCWs, aged care workers (ACW), aged \geq 65 years, or aged 18–29 years. These particular groups were interviewed first as the Coronavax research team determined in 2020 that they were likely going to be priority groups for vaccination given their high-risk work environments (HCWs and ACWs), susceptibility to severe COVID-19 (those aged \geq 65 years), or role in COVID-19 transmission (those aged 18 – 29 years). Given the unique opportunity to capture any changes in COVID-19 vaccine intention following changes to the vaccination program, we brought the data together from the three groups for this analysis.

Prior to the ATAGI announcement on the 8th April 2021, we had undertaken face-to-face, video, or telephone interviews with 31 people, asking about their thoughts on the different COVID-19 vaccines in use. Following the ATAGI announcement, we re-contacted participants (up to three times each) requesting an email or short phone interview on whether the program change altered anything that they told us, or if they had any new thoughts. Audio files were transcribed verbatim; quotes from the first interview were provided during the second interview for participants to comment on if requested.

Using the Framework method for qualitative data analysis [19], we examined participants' confidence in the AstraZeneca vaccine, comparing participants' attitudes with each other and with their own attitudes before and after the program change. We modified Leask et al's [20] categorisations of parental positions on routine childhood vaccination to apply specifically to the COVID-19 vaccine intentions of adults. We also considered access in our model, which is distinct from a hesitancy barrier [21] but is a crucial consideration for vaccine uptake, especially during a pandemic vaccine rollout where systems need to reach people who may not be regular participants in vaccination programs. The possible positions are outlined in Fig. 1. SJC undertook the initial assessment of participants' COVID-19 vaccine intentions; all authors reviewed and confirmed them. Tables with full quotes are provided in Supplementary Table 1 for adults aged < 50 years, and Supplementary Table 2 for adults aged \geq 50 years.

This study was approved by the Child and Adolescent Health Services (CAHS) Human Research Ethics Committee (RGS0000004457). Participants gave written consent for the first interview and for project researchers to contact them for follow-up. Pseudonyms have been used.

3. Results

We contacted all 31 participants and obtained data from 28 (90%), within a median response time of eight (5–18) days after the announcement of the program change.

Demographics

Of the 28 respondents, 18 were aged 23–50 years, 17 were female, four had medical conditions that increased the risk of COVID-19 complications, and one was pregnant. The highest level of education was a postgraduate degree ($n = 11$), with a further nine participants having an undergraduate degree. The majority (26/28) spoke English at home, 16 were Australian-born, and 17 reported no religion. The most common industry worked in was health care ($n = 8$), in which six worked in close proximity to patients, and three in aged-care settings.

COVID-19 Vaccine Intention	Reason/s						
Acceptor	No concerns about vaccine safety; and	No concerns about vaccine efficacy; and	No concerns about access; and	Will accept whatever vaccine is offered, when it is offered			
Cautious Acceptor	May have some concerns about vaccine safety; or	May have some concerns about vaccine efficacy; or	May have some concerns about access; or	Would prefer other vaccine, but will accept whatever is offered, when it is offered			
Wait Awhile	For more data on general vaccine safety; or	For more data on general vaccine efficacy; or	For easier access; or	For other vaccine brand perceived as safer; or	For other vaccine brand perceived as having greater efficacy; or	Until they feel at risk of COVID-19; or	Until COVID-19 vaccination is mandatory
Refuser	Concerns about vaccine safety; and	Concerns about efficacy; and	No concerns about access (as no intention to vaccinate)				

Fig. 1. COVID-19 vaccine intentions model.

3.1. COVID-19 vaccine intentions *before* the COVID-19 vaccine program change in Australia

3.1.1. Adults aged < 50 years

In our sample of 18 adults aged < 50 years, 17 were either already vaccinated with their first dose or intending to be vaccinated when a COVID-19 vaccine was offered to them. We classified seven as COVID-19 vaccine acceptors (Fig. 2). For example, Phoebe (female, 28 years) said:

I'm happy to get whatever vaccine I can get, you know, that gives me... a lot more protection again than I had this time last year.

The majority (10/18) of the adults aged < 50 years were classified as 'cautious acceptors'– their most common concern was that AstraZeneca was not as effective as Pfizer, or conversely that Pfizer was a “new” technology. For example, Sterling (male, 25 years) said:

I am much more confident in or comfortable in principle with the AstraZeneca vaccine [than] the Pfizer, only because I know more about the kind of general technology that goes behind the AstraZeneca... I'm not so sure how an mRNA vaccine works. So at the moment I think my preference would be the AstraZeneca but I probably wouldn't refuse the Pfizer.

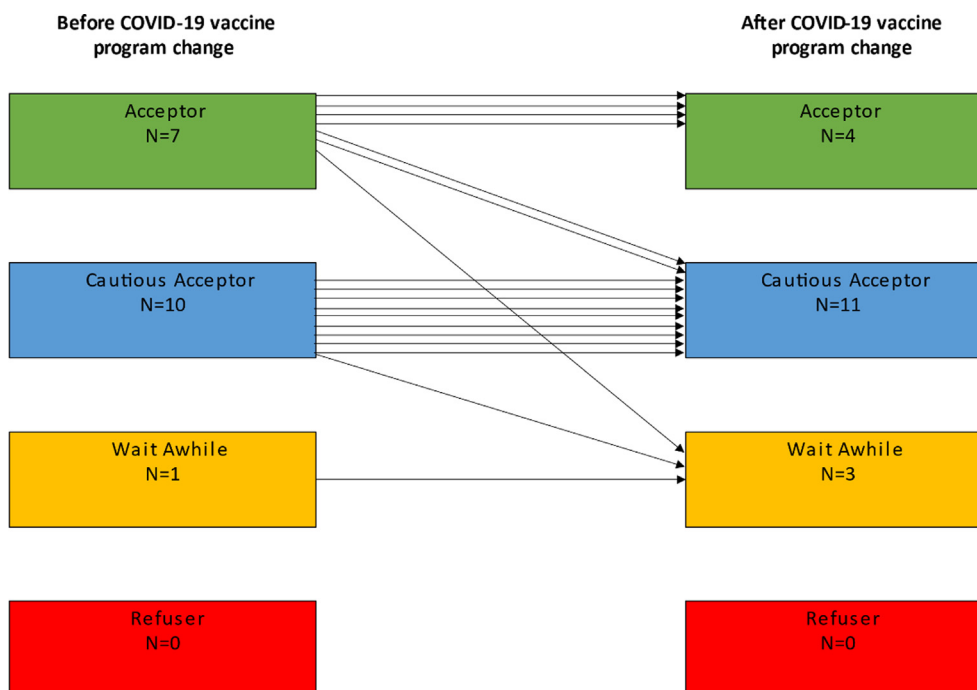


Fig. 2. COVID-19 vaccine intentions held by 18 adults aged < 50 years in Perth, Western Australia.

Only one participant was classified as ‘wait awhile’ at this stage: Margaret (female, 26 years) said:

In the back of my mind [there’s] that worry... around [the COVID19 vaccine] being pumped out really quickly. If there is (sic) any side effects... for me personally... I feel like it would be so late [into the vaccine rollout] that they’d have caught it [by the time I’m eligible].

3.1.2. Adults aged ≥ 50 years

Before the COVID-19 vaccine program change, all 10 of our adults aged ≥ 50 years were either vaccinated or intending on being vaccinated when a COVID-19 vaccine was offered. We classified five as COVID-19 vaccine acceptors before the COVID-19 vaccine program change (Fig. 3). For example, George (male, 69 years) said:

You hear that the Pfizer one is supposed to be better than the other one. But so what? You know ... if you can’t have the Pfizer one, even if it is better, if you can’t have it, then have the second best rather than have nothing at all.

Further, Olivia (female, 56 years) said:

I would take whatever vaccine they offer me... the best vaccine is the one you can actually get your hands on. So, you know, I’m comfortable with what’s happening.

The other five participants were ‘cautious acceptors’, expressing concerns at the speed at which COVID-19 vaccines were developed. Like their younger counterparts, they also discussed the differences in vaccine efficacy across the different vaccines in use. Just one ‘cautious acceptor’ (Beth, female, 82 years) specifically mentioned the emerging data overseas on blood clotting following COVID-19 vaccination, but did not appear to be concerned about it for herself. Beth said:

With the AstraZeneca one, of course I’m reading about the clotting issue... there are so few cases any rate percentage wise, younger

women, and it’s people who have low platelet counts... I’ll take what I can get, which here is AstraZeneca, because I didn’t qualify for the Pfizer.

Like a participant aged < 50 years, a participant in this age group shared thoughts on what they perceived to be a hierarchical approach to COVID-19 vaccination in Australia, whereby politicians and essential workers received the Pfizer vaccine, perceived by many as the “better” vaccine. Eline (female, 69 years) said:

I actually am pro vaccine in general. It’s the AstraZeneca that I’m a bit concerned about as in: is it as effective as it needs to be?... I’d really like to have one as good as the one the Prime Minister got. I think I’m at least as important to my friends and families as he is!

3.2. COVID-19 vaccine intentions after the change to the COVID-19 vaccine program in Australia

3.2.1. Adults aged < 50 years

After the program change, 15/17 adults under 50 who were either vaccinated or intending on being vaccinated when offered planned to stay the course, but some shifted to a more hesitant category. Four remained COVID-19 vaccine ‘acceptors,’ 11 were ‘cautious acceptors,’ but three were now classified as ‘wait awhile’ (Fig. 2). All those who remained acceptors discussed other circumstances they deemed riskier to their health, such as taking the oral contraceptive pill, developing a blood clot from a COVID-19 infection, or influenza vaccination. Annalise (female, 25 years) had said before the program change that she would receive “*whichever one I can get*” and thus was an ‘acceptor.’ However, following the program change, Annalise became a ‘cautious acceptor’ – her doctor advised against AstraZeneca vaccination due to Annalise taking medication against blood clots. She explained:

I still think that had my doctor not advised me against it I would’ve happily received the vaccine since there are health risks in almost everything (e.g. contraception pills which I also had to stop taking

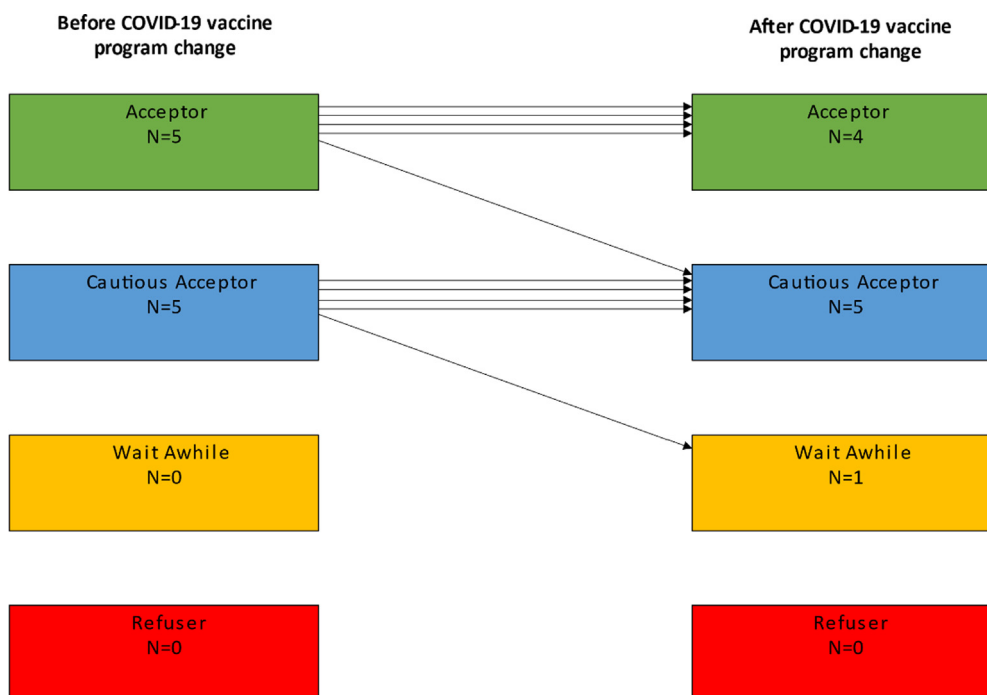


Fig. 3. COVID-19 vaccine intentions held by 10 adults aged ≥ 50 years in Perth, Western Australia.

after surgery, or even the normal flu jab, which has >10 side effects associated with it). So overall if a person doesn't fall under the 'high risk' category it shouldn't change anything

Just one participant (Nancy, female, 27 years) went from being an 'acceptor' to 'wait awhile': she was originally "not too worried" about Australia using different COVID-19 vaccines among the population, but five days after the COVID-19 vaccine program change was hesitant about the AstraZeneca vaccine for people of any age:

I'm very glad the government is taking steps to stop using the AstraZeneca vaccine, because although there's a very low risk of getting blood clots, from what I've read, if you do, the effects are really severe. It makes me worried for my parents who are over 50 and I would prefer that they didn't get that one. Despite the low risk of getting blood clots, because we have no Covid it doesn't make sense for them to take that risk when they don't currently have to.

Though many remained 'cautious acceptors,' the reasoning behind caution changed for some. Many of those who discussed differences in vaccine efficacy turned their attention to the differences in safety, and some discussed how a specific COVID-19 vaccine was now safer. For example, as previously highlighted, Sterling (male, 25 years) originally did not prefer Pfizer due to it being an mRNA vaccine. Thirteen days after the program change, he said:

I feel relieved that I will be in the group that is scheduled to receive the Pfizer vaccine

Those who were classified as 'wait awhile' after the program change had specific concerns about safety due to medical conditions. Margaret said, 16 days after the program change:

I have heard about the blood clots issue, which has concerned me as I have a genetic predisposition to getting Deep Vein Thrombosis (called Factor V Leiden). This has strengthened my position on not being in a huge rush to get vaccinated against COVID-19.

3.2.2. Adults aged ≥ 50 years

After the change, 9/10 of our older cohort who were either vaccinated or intended to be vaccinated when offered expressed no change in their intentions. More specifically, four adults aged ≥ 50 years remained COVID-19 vaccine 'acceptors,' five were 'cautious acceptors' and one was reclassified as 'wait awhile' (Fig. 3). Like some of their younger counterparts, several participants in this group discussed other medical interventions they deemed riskier than receiving an AstraZeneca vaccine. Tori, (female, 69 years) originally said she would be "happy to get AstraZeneca, no problem at all." In her second interview, she said:

I feel a bit bemused by the decision to restrict its use given I have more chance of a blood clot as I take [Hormone Replacement Therapy] than a young one does from the Astra Zeneca vaccine. I will [still] take the AstraZeneca as soon as I can.

Interestingly, two of the original acceptors in this age group were either already vaccinated (and thus classified as 'acceptors') or were intending on being vaccinated with their preferred brand ('cautious acceptor'), but nevertheless expressed concern for friends and family members aged < 50 years, and thus were also classified as 'hoping others' wait awhile.' For example, Jackie (female, 65 years) originally said:

I'm all for AstraZeneca or any of the others when they get here... as long as the efficacy has been proven.

But in her second interview, Jackie said:

I don't think I will change anything regarding myself, unless Novavax is available by the time I make the (very slow/delayed) queue. I would opt for that if I was able. However, I am hoping my daughter in the [United Kingdom] gets the Pfizer or Novavax as well as my daughter here in Perth.

Several others in this age group, however, commented that they feel a COVID-19 infection is still riskier than AstraZeneca vaccination for those aged < 50 years. Bill (male, 71 years) said:

Even if I was younger I'm sure I would go ahead [with AstraZeneca vaccination] as the risk from COVID far outweighs the very slight risk of blood clots.

Four of the original 'cautious acceptors' remained disposed to vaccinating, describing how the risk of blood clotting is either higher from a COVID-19 infection (such as Bill), or expressing dismay at the media attention the clotting had received. For example, Francine (female, 53 years) said 6 days after the change to the COVID-19 vaccine program:

No, [the program change doesn't] really [change my thoughts]. But it somehow made me feel that the media... has blown it a little bit out of proportion. Because there were a small amount of people who have had a reaction... they've latched onto it so it's become a huge thing when it's really it's just a couple of people in thousands of people.

Eline (female, 69 years), originally classified as a 'cautious acceptor' described in her second interview how people should have a choice regarding the brand of vaccine they receive. As she would wait to have the Pfizer vaccine, she was classified as 'wait awhile'. Like a younger counterpart, Eline had comorbidities and also a history of reactions to vaccines, and this was likely fuelling her increased hesitancy towards COVID-19 vaccination.

4. Discussion

Our study provides important insight into how major changes to COVID-19 vaccine programs may impact vaccine confidence. At the time of the change, the Australian Technical Advisory Group on Immunisation (ATAGI) recognised it may impact confidence, and media articles focused heavily on the risk of blood clots for weeks afterwards. However, our study shows that for adults in Perth, Western Australia, the majority who intended on vaccinating *before* the change still intended on vaccinating *afterwards*, regardless of age. Although many remained 'cautious acceptors', the focus of their caution pivoted from differences in vaccine efficacy to the risk of blood clotting following AstraZeneca vaccination. Several participants also mentioned that they believed influenza vaccination was riskier than COVID-19 vaccination; we have not yet seen this belief documented in the literature elsewhere in the world.

Our study is not representative of the Australian population, but this is not the purpose of qualitative research. Rather, it captures in-depth data in a new field about a significant period of time in a complex vaccine-rollout process. Our major finding, that the change to the COVID-19 vaccine program changed the reasons behind some people's COVID-19 vaccine intentions rather than the intentions themselves, is reflected in quantitative data. When looking at the COVID-19 vaccination program in Western Australian, with a population of 2.5 million, a slight decline in average vaccinations administered in the days leading up to the ATAGI announcement was documented (5524 doses administered on the 1st April 2021; 3794 doses administered on the 8th April 2021) [22]. However, the average returned to pre-ATAGI announcement figures just three weeks after the announcement. This, however, does not take into account the low levels of access

to vaccination at the time: those that changed their vaccine intentions would likely have been quickly replaced by others seeking appointments.

Recent events in Australia have indicated that changing circumstances in perceived disease risk are likely more influential than changes to a vaccine-program due to a safety incident. In Victoria, Australia, community transmission and further lockdowns generated unprecedented vaccine demand in May 2021. For example, on the first day of a state-wide lockdown in Victoria in May 2021, there was a two-fold increase in the number of COVID-19 doses administered in the state's Commonwealth and state-run clinics, compared with seven days prior when the state was not in lockdown [23]. However, the 'threat' of a COVID-19 outbreak occurring outside of Victoria at the time did not generate unprecedented demand in Western Australia, where there was a more modest 1.2-fold increase in the number of doses administered in Commonwealth and state-run clinics over the same period [23]. During this same period, the utilisation of available COVID-19 doses in Western Australia remained around 80%, but in Victoria went from 75% in the week preceding lockdown, to 93% in the second week of lockdown [23].

It is important for both the Australian government, Australian health authorities, and health care providers to communicate in such a way that addresses people's concerns, and leaves little opportunity for other concerns to sprout and grow. For those undertaking public risk communication, Leask et al recommend frequent communication about process and outcomes; and making values explicit. For clinicians, Leask et al recommend supporting valid consent; and helping people to weigh risk and benefit [24]. With regard to what our participants discussed, this would mean communicating in a way that helps people understand their individual risk of an adverse event following vaccination with AstraZeneca. It would also mean providing information on COVID-19 vaccine brands perceived as having lower vaccine efficacy, comparing risks from COVID-19 vaccination and infection, regardless of age. In addition to clarifying concerns, making COVID-19 vaccination more accessible for those who are 'waiting awhile' for easier access should also see an increase in uptake. This has recently occurred in Western Australia. On the 8th June 2021, people aged 30–50 years in Western Australia and who otherwise did not fit into any other priority group were for the first time able to make a booking for COVID-19 vaccination: over 65,000 people in Western Australia booked in within 48 h of the announcement [25].

A major strength of our study was its flexible data collection method; this enabled us to contact participants within a short time frame to ascertain whether or not the change to the COVID-19 vaccine program altered people's intentions regarding vaccination. The main limitation of our study, however, was that the majority of our participants were well-educated (due to our prioritisation of HCWs for interviews at that time), spoke English at home, and did not have any medical conditions that would increase their vulnerability to a severe COVID-19 infection. Given how well-educated our cohort was, they were arguably more in-tune with program changes than the general public. Further research should explore the COVID-19 vaccine intentions of other groups, such as those who are Culturally and Linguistically Diverse, adults with comorbidities, and those who live in regional and remote areas. Indeed, Coronavax will be interviewing such groups [15].

5. Conclusion

We have found that there is still high willingness to vaccinate against COVID-19 in Western Australia following a major change to the vaccine program. For those who already had concerns about COVID-19 vaccination, the reason/s for their concern mostly chan-

ged from vaccine efficacy differences to vaccine safety differences. The government, health care providers and media spokespeople need to be aware of potential reasons for concern, and to address such concerns to assist those with COVID-19 vaccine intentions.

Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: [SJC, LM, and LR have no conflicts of interest to declare. CCB is co-chair of the Australian Technical Advisory Group on Immunisation (ATAGI), co-chair of the ATAGI COVID-19 working group and is a recipient of an NHMRC Investigator Award (APP1173163). KA is a member of the ATAGI COVID-19 working group, and a specialist advisor to the Therapeutic Goods Administration. She is a current recipient of a Discovery Early Career Researcher Award funded by the Australian Research Council of the Australian Government (DE19000158)].

Acknowledgements

We are grateful for the time and insight our participants shared with us. We would also like to thank our Coronavax Research Coordinator and Project Manager, Dr Sian Tomkinson, and the Coronavax consumer representative, Ms Catherine Hughes, for their support.

Funding

Coronavax is funded through a Wesfarmers Centre of Vaccines and Infectious Diseases Catalyst grant, a Future Health Research & Innovation Fund COVID-19 Focus Grant, and by the Western Australian Department of Health.

Appendix A. Supplementary material

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.vaccine.2021.12.021>.

References

- [1] Seale H, Heywood AE, Leask J, et al. Examining Australian public perceptions and behaviors towards a future COVID-19 vaccine. *BMC Infect Dis* 2021;21(1):1–9.
- [2] Alley SJ, Stanton R, Browne M, et al. As the pandemic progresses, how does willingness to vaccinate against COVID-19 evolve? *Int J Environ Res Public Health* 2021;18(2):797.
- [3] Dodd RH, Cvejic E, Bonner C, et al. Willingness to vaccinate against COVID-19 in Australia. *Lancet Infect Dis* 2021;21(3):318–9.
- [4] European Medicines Agency. COVID-19 Vaccine AstraZeneca: benefits still outweigh the risks despite possible link to rare blood clots with low blood platelets [online]. Amsterdam2021 [cited 2021 Apr]. Available from: <https://www.ema.europa.eu/en/news/covid-19-vaccine-astrazeneca-benefits-still-outweigh-risks-despite-possible-link-rare-blood-clots>.
- [5] Australian Technical Advisory Group on Immunisation (ATAGI). ATAGI statement on COVID-19 vaccination and a reported case of thrombosis [online]. Canberra: Australian Government Department of Health; 2021 [cited 2021 Apr]. Available from: <https://www.health.gov.au/news/atagi-statement-covid-19-vaccination-reported-case-of-thrombosis>.
- [6] Australian Technical Advisory Group on Immunisation (ATAGI). ATAGI update following weekly COVID-19 meeting – 9 June 2021 [online]. Canberra: Australian Government Department of Health; 2021 [cited 2021 Apr]. Available from: <https://www.health.gov.au/news/atagi-update-following-weekly-covid-19-meeting-9-june-2021>.
- [7] Australian Technical Advisory Group on Immunisation (ATAGI). ATAGI statement on AstraZeneca vaccine in response to new vaccine safety concerns [online]. Canberra: Australian Government Department of Health; 2021 [cited 2021 Apr]. Available from: <https://www.health.gov.au/news/atagi-statement-on-astrazeneca-vaccine-in-response-to-new-vaccine-safety-concerns>.
- [8] Department of Health. Australia's vaccine agreements: Australian Government; 2021 [cited 2021 Sept]. Available from: <https://www>.

- health.gov.au/initiatives-and-programs/covid-19-vaccines/about-rollout/vaccine-agreements.
- [9] Australian Bureau of Statistics. National, state and territory population: Australian Government; 2021 [updated 2021 Sept; cited 2021 Sept]. Available from: <https://www.abs.gov.au/statistics/people/population/national-state-and-territory-population/mar-2021>.
- [10] Carlson SJ, Blyth CC, Beard FH, et al. Influenza disease and vaccination in children in Australia. *Med J Aust* 2021;215(2):65–67.e61.
- [11] King C, Leask J. The impact of a vaccine scare on parental views, trust and information needs: A qualitative study in Sydney, Australia. *BMC Public Health* 2017;17:106.
- [12] Blyth CC, Richmond PC, Jacoby P, et al. The impact of pandemic A(H1N1) pdm09 influenza and vaccine-associated adverse events on parental attitudes and influenza vaccine uptake in young children. *Vaccine* 2014;32(32):4075–81.
- [13] Carlson SJ, Blyth CC, Beard F, et al. Influenza disease and vaccination in children in Australia. *Med J Aust*. 2021. <https://doi.org/10.5694/mja2.51100>.
- [14] Smith M. Europeans now see AstraZeneca vaccine as unsafe, following blood clots scare [online]. London: YouGov; 2021 [cited 2021 Apr]. Available from: <https://yougov.co.uk/topics/international/articles-reports/2021/03/22/europeans-now-see-astrazeneca-vaccine-unsafe-follo>.
- [15] Attwell K, Carlson SJ, Tchilingirian J, et al. Coronavax: Preparing Community and Government for COVID-19 Vaccination: a Research Protocol for a mixed-methods social research project. *BMJ Open* 2021;11:e049356.
- [16] Australian Government Department of Health. Coronavirus (COVID-19) current situation and case numbers [online]. Perth, WA: Australian Government; 2021 [cited 2021 June]. Available from: <https://www.health.gov.au/news/health-alerts/novel-coronavirus-2019-ncov-health-alert/coronavirus-covid-19-current-situation-and-case-numbers>.
- [17] Harris PA, Taylor R, Thielke R, et al. Research electronic data capture (REDCap)—a metadata-driven methodology and workflow process for providing translational research informatics support. *J Biomed Inform.* 2009;42(2):377–81.
- [18] Harris PA, Taylor R, Minor BL, et al. The REDCap consortium: Building an international community of software platform partners. *J Biomed Inform.* 2019;95:103208.
- [19] Gale NK, Heath G, Cameron E, et al. Using the framework method for the analysis of qualitative data in multi-disciplinary health research. *BMC Med Res Methodol.* 2013;13(1):1–8.
- [20] Leask J, Kinnersley P, Jackson C, et al. Communicating with parents about vaccination: a framework for health professionals. *BMC Pediatr.* 2012;12(1):154.
- [21] Bedford H, Attwell K, Danchin M, et al. Vaccine hesitancy, refusal and access barriers: The need for clarity in terminology. *Vaccine* 2018;36(44):6556–8.
- [22] Government of Western Australia. COVID-19 Coronavirus: Vaccination dashboard [online]. Perth, Australia: Government of Western Australia; 2021 [cited 2021 June]. Available from: <https://www.wa.gov.au/organisation/covid-communications/covid-19-coronavirus-vaccination-dashboard>.
- [23] Australian Government Department of Health. COVID-19 vaccine rollout updates [online]. Canberra: Australian Government Department of Health; 2021 [cited 2021 June]. Available from: <https://www.health.gov.au/resources/collections/covid-19-vaccine-rollout-updates>.
- [24] Leask J, Carlson SJ, Attwell K, et al. Communicating with patients and the public about COVID-19 vaccine safety: recommendations from the Collaboration on Social Science in Immunisation. *Med J Aust.* 2021;215(1):9–12.e11.
- [25] Premier of Western Australia Mark McGowan. The response to the expansion of eligibility for COVID-19 vaccinations in WA. Facebook 2021 [cited 2021 June]. Available from: <https://www.facebook.com/photo?fbid=341275540694631&set=a.263657845123068>.