

Barriers and enablers to implementation of COVID-19 vaccine programs in a rural and regional Queensland: A provider perspective

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Abstract

Introduction: Vaccines formed the core of Australia's National COVID-19 Plan in combination with other public health measures. Vaccine rates varied geographically, and lower uptake was seen in some regional and remote areas.

Objective: Explore barriers and enablers to implementing COVID-19 vaccine programs and recommendations for improvement from a vaccine provider perspective in rural and regional Queensland (QLD).

Design: Participants included eleven healthcare personnel (HCP) from rural (45%) and regional (55%) settings in the Wide Bay region, QLD, Australia. Semi-structured interviews were conducted to identify barriers and enabling factors HCP experienced implementing COVID-19 programs, in addition to their recommendations to optimise ongoing implementation of vaccine programs. Braun and Clarke's reflexive thematic analysis of interview transcripts was performed, and over-arching themes were identified.

Findings: Four barrier themes were identified: 1. operational barriers, 2. communication issues, 3. financial constraints, and 4. leadership and coordination. Four enabler themes were also identified: 1. adaptability; 2. prior experience and knowledge; 3. collaboration and teamwork; and 4. community engagement. Recommendations for optimising ongoing vaccine rollout included reducing the administrative burden on providers, increasing involvement of primary care and the private sector in planning and decision making, improving communication methods, reviewing financial remuneration for private providers, and decentralising decision-making.

Discussion: There were multiple barriers and enablers to implementation of COVID-19 programs experienced by rural and regional HCP in the Wide Bay region of QLD which were consistent with existing literature.

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Conclusion: A range of actionable recommendations were identified that could optimise the COVID-19 vaccine program and future vaccine programs in rural and regional areas.

KEYWORDS

COVID-19, provider, public health, regional, rural, vaccination

1 | INTRODUCTION

In March 2020, the World Health Organisation declared the SARS-COV-2 a global pandemic and in combination with strict border control and quarantine measures, vaccines against COVID-19 formed the core of Australia's National COVID-19 Plan.^{1,2} COVID-19 vaccines were first available in Queensland (QLD) in February 2021³ and were rolled out in phases with those at highest risk of illness or severity of illness prioritised.^{4,5} The vaccine rollout was slower than initially anticipated, with vaccine rates varying geographically, and lower uptake in some regional and remote areas.⁶

COVID-19 vaccines were offered by a range of providers and funded by both state and federal bodies.⁶ At the state level, QLD Health Hospital and Health Services (HHS) were required to stand-up large mass vaccine clinics in metropolitan and regional areas as well as rural outreach clinics.^{4,7} Distinct from metropolitan and regional vaccine clinics, the state-run rural vaccine clinics were ad hoc and rural areas relied heavily on federal providers for consistent access.⁸ These federal providers included general practitioners (GPs), community pharmacies, Commonwealth Vaccination Clinics, and private companies contracted to vaccinate patients in residential and age care facilities (RACFs) and disability service facilities.⁹ Potential vaccine providers were requested to 'opt in' by submitting an expression of interest to become a provider which included meeting extensive criteria prior to approval.¹⁰ When a second expression of interest was distributed in June 2021, many of these requirements were removed to encourage more providers to opt in to providing vaccines.¹¹

Since the emergence of COVID-19, many studies have focused on the barriers and enablers of vaccine uptake from a patient or consumer perspective.^{12–18} The few studies that have focused on the provider perspective have focused on single providers such as GPs or pharmacists and have predominantly been conducted in cities.^{19–23}

To our knowledge, there has been no other studies focusing on the barriers and enablers experienced by COVID-19 vaccine providers in rural and regional Australia. Knowledge of the barriers and enablers vaccine providers experienced in implementing a COVID-19 vaccine program is

What is already known on this subject?

- COVID-19 vaccination rates were slower in rural and regional Australia compared to metropolitan areas and therefore understanding barriers and enablers experienced by providers can help to improve the current vaccination program in these areas as well as assist with planning future vaccination or public health interventions that require a multi-sectoral approach.
- Numerous studies have examined the barriers and enablers to COVID-19 vaccination from a consumer perspective.
- The few studies that have focused on the provider perspective have focused on single providers such as general practitioners or pharmacists and have predominantly been conducted in cities.

What this study adds?

- This study is the first to explore the barriers and enablers to COVID-19 vaccination programs from a provider perspective in rural and regional Qld.
- This study identified perceived barriers and enablers by COVID-19 vaccination providers and determined actionable recommendations for improvement including reducing the administrative burden on providers; increasing involvement of primary care and the private sector in planning and decision-making; improving communication methods; reviewing financial remuneration for private providers; and decentralising decision-making.
- These findings can be used to improve the current COVID-19 vaccination program as well as assist with planning and implementing future public health interventions in rural and regional areas that require a multi-sectoral approach.

particularly important in rural and regional areas, where uptake of vaccines lagged behind urban counterparts,²⁴ access to care for COVID-19 is reduced²⁵ and localised provision of vaccines can be dependent on uptake by providers in the area. Such knowledge can inform the processes, personnel, resources, infrastructure, and logistics required to improve implementation of vaccine programs and assist with planning future vaccination or public health interventions in rural and regional areas.

The present study was conducted in the Wide Bay region of QLD, located approximately 250 km north of Brisbane.²⁶ The estimated total population is 310 000 and it includes three regional cities and several rural towns.²⁶ At the time of this study, there had been less than 40 COVID-19 cases with no community transmission.²⁷ Using a qualitative approach with semi-structure interviews, we aimed to identify and explore barriers and enablers to provision of the COVID-19 vaccine among providers in regional and rural areas of the Wide Bay.

2 | METHODS

2.1 | Participants and recruitment

The project invited healthcare personnel (HCP) who were working at a health service that was eligible to provide COVID-19 vaccinations within the Wide Bay region, including GP practices, pharmacies, hospitals, and RACFs. Recruitment occurred between July and November 2021 using the network of the HHS vaccination team and public health unit. Purposive sampling was used to include the maximum diversity of providers. Recruitment emails were sent to GPs, RACFs, pharmacies, and hospital staff members. Utilising a snowball sampling approach, responding participants then referred researchers to others who may be interested in participating. Recruitment ceased once data saturation had been reached with no new themes conceptualised after analysis of transcripts.

2.2 | Data collection: semi-structured interviews

Semi-structured interviews were conducted between August and November 2021, using a female interviewer (Author 1). All participants signed a written consent form before their interview and were offered either a virtual or in-person interview. Interviews lasted approximately 30 min with no repeat interviews, and all interviews were conducted privately between the interviewer and participants and recorded with permission using

Microsoft Teams. A flexible interview guide (Table 1) was used to ask participants about any barriers or challenges, strengths, or enablers and recommendations for improvement for the COVID-19 vaccination rollout from a provider perspective. Recordings were transcribed verbatim and de-identified before data analysis. Transcripts were not returned to participants for comment or correction. The type of HCP (GP, nurse, pharmacist, manager, or RACF), rural or regional location, and gender (male or female) were recorded, and other characteristics are omitted to ensure privacy of participants. Rural and regional locations were classified using the Modified Monash Model²⁸ using the postcode of their primary practicing location, which classifies locations from 1 to 7, increasing with how remote they are.

2.3 | Qualitative analysis of interview transcripts

Interview transcripts were analysed using Reflexive Thematic Analysis outlined by Braun and Clarke²⁹ providing a theoretically flexible framework for robust qualitative analysis. Initial coding of transcripts was completed by an independent female researcher (Author 2) to the interviewer using NVivo 12. Both an inductive and latent approach were used, where coding was directed by the content of the data; however, concepts and assumptions underlying the content were used when reporting the final themes. Decision-making behind codes was diarized, and preliminary themes were identified from each interview. These codes were reviewed by two researchers (Author 1 and 2) who derived lists of subthemes and themes, and any disagreement was

TABLE 1 Semi-structured interview guide used in each participant interview.

Semi-structured interview guide

1. Introduction and explanation of the role of the interviewer and de-identification process prior to asking any questions.
2. Explanation that this study is independent of interviewer's role with Queensland Health and answers will have no impact on professional relationships.
3. Key questions for every participant
 - a. What has been your involvement in the COVID-19 vaccination program so far?
 - b. What barriers or challenges to implementing the COVID-19 vaccination program?
 - c. What strengths or enablers have helped you to implement the COVID-19 vaccination program?
 - d. Do you have any recommendations for how the COVID-19 vaccination program could be improved?

resolved by discussion between the two researchers. All researchers were working for the HHS and involved in the COVID-19 vaccination program at the time of the study. The analysis and reporting of these data follow the Consolidated Criteria for Reporting Qualitative research (COREQ) standards.³⁰

2.4 | Ethics approval

Ethics approval for this research was obtained from The Prince Charles Hospital Human Research Ethics Committee (TPCHHREC, HREC/2021/QPCH/76625) in July 2021.

3 | RESULTS

3.1 | Vaccine provider characteristics

There were 11 HCP across nine interviews and their demographics are outlined in Table 2. Four were men and seven were women, and five were located in rural (MM5) settings, while the remaining six were located in regional settings. HCP roles included four GPs (two rural and two regional), one rural GP manager, one rural GP nurse, two regional Queensland Health COVID-19 vaccine clinic nurses, two regional senior management RACF employees, and one regional community based pharmacist showing 45% were rural (MM5) and 55% were regional (MM2).

TABLE 2 Participant characteristics of healthcare personnel interviewed.

Participant characteristic	N (%)
Healthcare personnel role	
General practitioner	4 (36)
General practice manager	1 (9)
General practice nurse	1 (9)
Hospital nurse	2 (18)
Residential age care employee	2 (18)
Pharmacist	1 (9)
Sex	
Male	4 (36)
Female	7 (64)
Geographic distribution	
Rural (MM5)	5 (45)
Regional (MM2)	6 (55)

Abbreviations: MM, Modified Monash model; N, Number.

3.2 | Provider barriers to implementation of a COVID-19 vaccine program

Four themes describing barriers to implementing COVID-19 vaccination programs were identified: (1) operational barriers; (2) communication issues; (3) financial barriers; and (4) leadership and coordination. Within each of these themes, various sub-themes were identified with examples of interview transcript provided in Table 3.

3.2.1 | Operational barriers

Increased workload

Most participants described the increased workload created by the vaccination program in addition to the increased workload they had already experienced from other COVID-19-related enquiries and presentations (Table 3, Quote (Q) 1). There was a large administrative burden to register, develop written procedures, train staff, and integrate new systems. For GPs, this also included printing and faxing health summaries for patients seeking vaccination elsewhere, and some clinics hired additional administrative staff to manage the paperwork (Table 3, Q2). GPs also discussed the unanticipated increased workload from vaccine counselling, separate from the administration of vaccinations. In GP clinics, this resulted in scheduling delays for other patients and generated tensions around the delivery of routine programs such as the annual influenza vaccinations. In the pharmacy setting where the daily workload is unpredictable, it was difficult to allow time for vaccination while maintaining core business. Participants in rural areas described that the increased workload was not manageable as they were already understaffed and did not have access to the same surge capacity of regional or metropolitan services and areas (Table 3, Q3). Rural GPs were hesitant to sign up to vaccinate due to this anticipated workload and some reported they would not do it again based on their experience. Additionally, some participants described a reduction in their workforce after vaccination mandates for employees were introduced, putting a further strain on their ability to adjust to the increased workload.

Logistical challenges

Logistical barriers were frequently identified by providers. These included using multiple-dose vials which complicated the management of bookings, forecasting daily numbers, managing cancellations, and providing opportunistic vaccination (Table 3, Q4). Short vaccine expiry dates added to this pressure, especially for single doctor

TABLE 3 Barriers experienced by providers implementing COVID-19 vaccine programs.

Theme and subthemes	Selected quotes
Operational barriers	
Increased workload	(1) "So that's the tricky thing to balance, both doing a routine work plus doing the extra work because the COVID itself has created extra work and a number of patients ring us worried about COVID or want to have test for COVID" (2) "The paperwork made it a lot harder for some people. I had one practice manager go 'I'd do it but I'm not doing the paperwork'" (3) "From a rural general practice perspective, you know we are small practices, and we have a smaller population and smaller staffing level"
Logistical challenges	(4) "The flu shots they come as a single vial vaccine, so we can give it whenever the patient walks in, that's not an issue. Whereas here we've got to tailor it or program it accordingly so that we don't waste the vaccine and do it in a way where we can fit in with the rest of the other workload"
Technological barriers	(5) "The vaccination management solutions app had many problems with it, and it was essentially as if we were building the plane as we were flying it"
Vaccine supply	(6) "We had an incident this week where we didn't get our Pfizer vaccines on time, so we've had to cancel 120 people"
Communication barriers	
Communication with consumers	(7) "I think the biggest barrier that I've experienced is misinformation ... both from a practitioner perspective but also watching how patients have had to tweeze out information themselves from at the time, almost competing bits of information" (8) "We get so focused I think on communicating digitally, that we forget that that leaves some people behind" (9) "Most of the patients who were eligible early on, weren't really going to be the group who was using the eligibility checker and booking online"
Communication with providers	(10) "We found a huge problem with politicians would make decisions and then announce it and we would first find out from them"
Financial barriers	
Financial remuneration	(11) "As for small rural practices, I'm not sure this is financially viable to run this again" (12) "I wasn't expecting it to cost so much. The accreditation itself was \$100 and we had to buy all the chairs, tables, privacy dividers and things like that to make sure that our vaccination area was approved" (13) "The issue with that is you've got a higher funding value for the first vaccine, lower funding value for a second vaccine and if you do both 1st and 2nd, then you get a practice incentive payment. Because we only did the second one, we don't get any of them, so financially we lose out"
Vaccine demand	(14) "I am worried about this extra nurse so when I realised that we had only 10 doses I couldn't very well say to the nurse don't come in, even though we really can't afford to pay her" (15) "In some towns with some great uptake and then in other towns we saw a really poor uptake and I think that's just to do with the mentality of the citizens of those communities and their values and beliefs" (16) "We did not have a single case in our district, so most people know that an most people think we're never going to get it"
Leadership and coordination barriers	
	(17) "How you run a clinic in Bundaberg is not going to be how you can run a clinic out in the rural facilities" (18) "The fact that it felt like someone outside of that sector was making up all the rules for that sector and also were the regulators of that sector and also carried the stick if that sector got it wrong"

or pharmacist clinics. Some participants also noted the negative media coverage of providers who made medication errors or wasted doses, which engendered concerns about their professional reputation. Physical limitations included car parking and physical space for vaccination and monitoring recipients while maintaining physical

distancing and patient privacy. Federal-funded participants reported that these logistical barriers were more prominent with initial expression of interest requirements and created a barrier for small clinics to sign-up, while relaxation of these requirements later in the roll-out reduced this impact.

Technological barriers

Technological barriers were described by all providers as being particularly problematic, especially when vaccine management systems were introduced that differed from their previous vaccination and consultation programs (Table 3, Q5). Participants highlighted that the systems did not link in well with existing systems including the Australian Immunisation Register and when they did, small issues with data entry had large flow-on effects. Faults with booking systems including broken links made it difficult for patients to book their vaccinations and produced a large administrative manual booking burden.

Vaccine supply

Rural participants more commonly identified issues with vaccine supply impacting their ability to run a consistent service. This included limited vaccine quantities, late or cancelled deliveries, and lack of access to mRNA vaccines (Table 3, Q6). The few regional participants who discussed vaccine supply expressed that this was not an issue for them, and they were always able to keep up with demand or refer to another provider within the same area.

3.2.2 | Communication barriers

Communication with consumers

Communication barriers were mentioned by all participants who described that information was rapidly changing and often conflicted between federal, state, and local sources. This included information about vaccine eligibility, clinic times, and information about the vaccines themselves (Table 3, Q7). The reliance on social media as a primary method of communication was also pointed out as excluding large groups of the community including elderly and rural residents or those of lower socioeconomic status (Table 3, Q8–9). All participants also identified misinformation spread through a range of platforms as creating barriers to vaccination. Participants emphasised that the lack of official education and health promotion resources regarding COVID-19 vaccinations made it difficult to re-direct patients and those that were available were not targeted to vulnerable demographics. Some participants referred to resources from the US or UK government or unofficial videos from prominent health professionals as helpful and expressed disappointment that the Australian government had not provided the same. The common message from government to “*discuss with your GP if you have any questions*” increased the workload of GPs and some did not feel adequately equipped with information and resources to answer these questions.

Communication between providers

Participants across multiple sectors discussed that the volume and format of communication they received and were expected to keep up with were often overwhelming and did not contain practical information to help with counselling patients or navigating the logistics of the program. The majority of participants also reported that they received communication about changes to vaccine eligibility or provider responsibilities after they were announced in media releases (Table 3, Q10), and this set public expectations that providers were not able to immediately meet. Finally, some participants stated that the local vaccination strategy was not adequately communicated across sectors, and, therefore, individual providers were unaware of what other providers were doing, for example, non-vaccinating clinicians did not know where to refer patients requesting vaccination.

3.2.3 | Financial barriers

Remuneration

Financial barriers were expressed by private providers and predominantly those in rural areas (Table 3, Q11). For service providers, there were large upfront costs to meet the vaccination provider requirements (Table 3, Q12). In addition, the Medicare Benefits Schedule allocated different remunerations for dose 1 and dose 2 of COVID-19 vaccinations, and incentive payments were only available if both doses were given by the same provider. This disproportionately impacted rural providers because state-run rural outreach clinics were ad hoc, and patients often had their first dose opportunistically with the state clinic but booked their second dose at a more convenient time with their rural GP (Table 3, Q13). GPs were also confused about whether they could bill vaccine suitability assessments when counselling patients on vaccination if they were not providing the vaccine and therefore under-claimed for consults.

Vaccine demand

Almost all private providers expressed that unprecedented low demand of vaccinations by consumers impacted on the financial viability of their program. These participants had invested in physical resources or hired additional staff anticipating high demand for the service (Table 3, Q14). Most cited vaccine hesitancy as a significant contributor to low demand and highlighted that they were observing hesitancy in individuals who had never displayed this before, including health professionals. Rural participants stated hesitancy differed between towns and communities depending on the values and beliefs of the population, availability of different vaccine options and the opinions of

influential community members (Table 3, Q15). Low perceived risk of infection was identified by most participants but more pronounced in rural interviews and attributed to the geographically low case numbers in the region at the time of data collection (Table 3, Q16). Finally, some rural private participants discussed that state-run outreach clinics created competition between services and led to reduced demand for local private providers.

3.2.4 | Leadership and coordination barriers

Most participants discussed barriers created by the overall leadership and coordination of the vaccination program from a federal, state and local context. Many described a 'top down' leadership approach where decisions were made at a federal or state level and rolled out with a 'one size fits all' approach making it difficult to tailor programs to the local context (Table 3, Q17). Some GPs mentioned a perceived lack of consultation in the planning stages which underutilised their previous experience with delivering vaccines (Table 3, Q18). Many also discussed that the rapidly changing and often unrealistic expectations expressed by political leaders put additional strain on local providers. Finally, some participants indicated that a lack of role modelling from political leaders and media publications naming (and shaming) unvaccinated leaders made it difficult to build trust with their patients.

3.3 | Provider enablers to implementation of the COVID-19 vaccine program

Four overall themes for factors enabling implementation of COVID-19 vaccine programs were identified, including

(1) adaptability; (2) prior experience and knowledge; (3) collaboration and teamwork; and (4) community engagement with examples of interview transcript provided in Table 4.

3.3.1 | Adaptability

Almost all participants discussed the ability of services and teams to adapt as a major enabler to the success of local vaccination programs. This included adapting the central guidance to fit the local context as well as adapting their practice or procedures as new evidence and guidelines emerged (Table 4, Q19).

3.3.2 | Prior experience and knowledge

Primary care and pharmacy participants expressed that their knowledge of delivering vaccines and prior experience from influenza vaccination programs enabled them to plan and coordinate their COVID-19 vaccination clinics more efficiently (Table 4, Q20). They also noted that their knowledge of patients' medical background and existing rapport enabled them to tailor vaccine counselling to their patients. Rural participants also remarked that their knowledge of their community assisted with the logistical planning for vaccination clinics and community members trusted their advice.

3.3.3 | Collaboration and teamwork

Participants discussed the strength of local intersectoral collaboration in both the planning and implementation of their vaccination programs (Table 4, Q21). This included

TABLE 4 Enablers experienced by providers in implementing COVID-19 vaccine programs.

Themes	Selected quotes
Adaptability	(19) "Initially when it was over 70s, they struggled a bit more because we had electronic forms, but we found a solution to that where we got a paper one that we made up ourselves"
Prior experience and knowledge	(20) "A strong enabler was that GPs have been vaccinating for years"
Collaboration and teamwork	(21) "The things that worked well is I thought at least at a local level there was a lot of collaboration and communication" (22) "We were able to learn from what happened at other sites within our organisation because we were sharing that information in the background" (23) "We've been very very lucky that we've had a lot of great leaders and leadership from all different disciplines that have been very proactive in having that common goal"
Community engagement	(24) "They have a disaster management group and I think getting them on board and getting promotion through them and getting promotion through local groups and local radio has been a big bonus"

both formal meetings as well as conversations between informal networks where providers were able to discuss issues they were having, develop solutions and learn from other providers' experiences (Table 4, Q22). Private providers also discussed the availability of hospital doctors for phone advice or referral of complex vaccination cases helped to improve their confidence and facilitated joint decision-making. Teamwork within individual services was also perceived as an enabler of successful programs by many participants. This included strong leadership, clear delegation of responsibilities, and multidisciplinary consultation and input (Table 4, Q23).

3.3.4 | Community engagement

Community engagement was identified as an enabler to successful vaccination, especially by rural participants. Successful strategies included the use of local communication methods such as local radio stations and newspapers, involvement of local disaster management groups, and advocacy undertaken by local clinicians or prominent community members (Table 4, Q24).

3.4 | Provider recommendations

The five key participant recommendation themes are outlined in Table 5, including (1) reduce administrative burden on vaccine providers; (2) increase involvement of primary care and the private sector in planning and decision-making; (3) improve communication methods; (4) review financial remuneration of private providers; and (5) decentralise decision-making.

3.4.1 | Reduce administrative burden

The first recommendation was to reduce the administrative burden on vaccine providers, including the amount of paperwork required to initiate and maintain their vaccination program. Suggestions for this included providing templates for common requirements such as written vaccine procedures and consent forms or utilising external agencies for administrative support (Table 5, Q25).

3.4.2 | Increase involvement of primary care and the private sector in planning and decision making

The second recommendation was to increase the involvement of primary care and the private sector in planning and decision-making by utilising their existing knowledge and experience and to ensure programs are appropriate for all settings. Some participants went further to suggest that the vaccinations should have been allocated solely to either federal or state services to reduce competition between providers, improve communication, and allow for a more efficient allocation of resources (Table 5, Q26).

3.4.3 | Improve communication methods

This recommendation included improving communication between federal and state services to ensure the public received clear and consistent messaging and enabling local services to tailor messaging to their local context and population needs. Providing multi-modal education resources that are tailored to specific population groups

TABLE 5 Provider recommendations for improve implementation of the COVID-19 vaccine program.

Themes	Selected quotes
Reduce the administrative burden on vaccine providers	(25) "Why didn't we have the practice support people just go out and spend an hour with the practice manager and help them out with the paperwork"
Increase involvement of primary care and the private sector in planning and decision making	(26) "One, I think is just give it to private sector and let them do it properly, which I think they will again and if we had to employ more people to do it we would. The other one is to just do it away from the private sector"
Improve communication methods	(27) "Probably the communication, like just a little brochure that's relevant and specific to that age group"
Review financial remuneration for private providers	(28) "I think those are the things the Commonwealth has to take into account, whether the practices are being adequately remunerated"
Decentralise decision making	(29) "Give us all the policies and say look it's all done for you, you've just gotta implement it your own sneaky little way that works for you"

could also reduce the burden on GPs and other healthcare professionals to provide vaccine education on top of their high workload (Table 5, Q27).

3.4.4 | Review financial remuneration of private providers

The fourth recommendation from private providers, including GPs and pharmacists, was a review of the financial remuneration to account for additional costs and increased workload associated with the vaccines (Table 5, Q28). This included consistent remuneration for all vaccine doses to allow for different services to collaborate when one service could not provide all doses.

3.4.5 | Decentralise decision-making

The final recommendation was the decentralisation of decision-making to remove the 'top-down' approach, allowing regional and rural communities to take control of their vaccine programs to enable community engagement and tailoring of programs to the local context (Table 5, Q29).

4 | DISCUSSION

This study reports barriers and enablers to implementation of COVID-19 vaccine programs experienced by 11 vaccine providers in the Wide Bay region of QLD and provides novel and valuable information in an under-researched area of the provider perspective to implementation to vaccine programs in regional and rural settings.

The findings of this study were consistent with the existing international and inter-state literature on this topic. The theme of operational barriers identified is mirrored in multiple other studies.^{20–22,31} Turcu-Stiolică et al.,²² a cross-sectional study of 636 community pharmacies, identified operational barriers to vaccination including access to training and physical space for vaccinating clients and storing vaccinations. Gerges et al.,²¹ a qualitative study of the experiences of pharmacists in Canada 2021, reported challenges with increased workload from vaccination and other COVID-19-related tasks, mismatch of supply and demand for vaccinations, and inadequate financial compensation for their services. Wright et al.,²⁰ a qualitative study examining the experiences of GP owners and practice managers in Greater Sydney, identified similar issues of large financial impact from capital costs and increased need for administrative support as well as a mismatch of supply and demand for different vaccinations.

Communication barriers were experienced by all participants in our study and have been described throughout the literature. This included limited communication to providers about vaccine eligibility and changing guidelines where providers heard about changes from the media at the same time as consumers.^{20,21} Wright et al.²⁰ stated that lack of communication 'compromised the efficiency of the vaccine rollout' and suggested that this stemmed from a lack of understanding of general practice workflow and their experience delivering vaccinations. Copp et al.¹⁹ surveyed 295 GPs in Australia in 2021 who expressed that they wanted more resources to assist with communicating about the COVID-19 vaccinations with patients. Kauffman et al.¹² suggested that websites and videos to refer patients to would be helpful. Carlson et al.³¹ interviewed HCWs working in private practice in Perth, Western Australia and suggested that the inclusion of more information on vaccine safety, efficacy, development process and normalising common side effects in public campaigns could 'counteract sensationalist media' and increase vaccine acceptance.

Community engagement was identified as an important enabler to COVID-19 vaccination programs which mirrored other international studies.^{32–36} Tjilos et al.,³⁴ a qualitative study of community-engaged conversations about COVID-19 vaccinations in New England, USA, found that community leaders suggested utilising existing social networks and trusted community leaders to disseminate credible information. This is particularly important in rural areas where such engagement plays an important role in public health responses²³ and can be utilised to ensure that programs are targeted to specific community needs rather than using a 'one size fits all' approach that often excludes marginalised groups.^{32,36}

4.1 | Strengths and limitations

The strengths of this study included its novel focus on the rural and regional provider perspective which has previously not been explored to date, despite the importance of provider uptake in vaccine delivery. Focusing on rural and regional providers provides insight into the unique experiences of vaccine provision in these areas that are comparatively under-resourced compared to urban counterparts and experience poorer health outcomes.²⁵ Given the majority of leadership and policy development around COVID-19 vaccine delivery occurred in metropolitan areas, identifying gaps and weaknesses in the application of these policies in rural and regional areas is important and should be addressed in future vaccine rollouts. The geographical and role diversity among participants enabled a nuanced view of the barriers and enablers within the region and

their function within a cross-jurisdictional, multi-sectorial, multi-disciplinary health delivery team.

Limitations of this study include the single region focus, where there may be specific barriers or enablers experienced by HCP that may not apply in other regional and rural areas of Australia. Furthermore, even within the Wide Bay region, there may be other site-specific enablers and barriers experienced by vaccine providers at sites not included in this study. Selection bias may be present whereby HCP willing to participate in the interviews may differ from those who declined. This may be due to capacity and time factors, or their experience with implementing the vaccine, which may alter the willingness to participate in interviews. HCP who elected not to opt in to provide the COVID-19 vaccine are not captured in this study, who may have valuable additional information about barriers to opting into this process. Researchers were all health professional and involved in the COVID-19 vaccination roll-out in Wide Bay and therefore had existing assumptions about the importance of vaccination. The study sample size of 11 people is comparable to similar qualitative studies in this area^{21,22}; however, including a larger and more diverse range of participants may also reveal additional barriers and enables to vaccine provision, and warrants further research.

4.2 | Implications and recommendations

This study identified actionable recommendations for future improvement including reducing the administrative burden on providers, increasing involvement of primary care, restructuring government allocation of resources and responsibility; reviewing financial remuneration arrangements; increasing local community engagement to improve risk communication and decentralisation of decision-making to give communities control of their vaccination programs. This research can be used to inform the current and future COVID-19 vaccination plans as well as the planning of future public health interventions in rural and regional areas.

5 | CONCLUSION

This study highlights the unique barriers and enablers experienced by rural and regional COVID-19 vaccination providers. The participants identified barriers to COVID 19 vaccination including: operational barriers relating to workload, logistics and technology; communication issues to the public and providers; financial barriers from remuneration and vaccine demand; and issues with leadership and coordination. Enablers included: adaptability

of providers; prior experience and knowledge of vaccination programs; collaboration and teamwork and community engagement. Actionable recommendations were identified which could improve COVID-19 vaccination programs and help to inform planning future vaccination and other public health interventions in rural and regional areas.

AUTHOR CONTRIBUTIONS

Shannen Oversby: Conceptualization; methodology; data curation; formal analysis; project administration; writing – original draft; writing – review and editing; investigation. **Elizabeth M. Hamilton:** Conceptualization; methodology; data curation; formal analysis; writing – review and editing. **Angela Ratsch:** Conceptualization; methodology; supervision; writing – review and editing. **Scott Kitchener:** Conceptualization; methodology; supervision; writing – review and editing.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interests.

ETHICS STATEMENT

The Prince Charles Hospital Human Research Ethics Committee (TPCHHREC, HREC/2021/QPCH/76625).

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