Article

A Retrospective Review of COVID-19 Medicines Information Queries in a Quaternary Hospital with Unique COVID-19 Border Controls

Jeanie Misko *[ID] and Matthew D. M. Rawlins [ID]

Pharmacy Department, Fiona Stanley Hospital, Murdoch 6150, Australia; matthew.rawlins@health.wa.gov.au
* Correspondence: jeanie.misko@health.wa.gov.au; Tel.: +61-8-6152-5024

Abstract: Background: Medicines information (MI) is a specialist area of pharmacy that provides evidence-based answers to often complex medication queries, utilising resources such as textbooks and databases. With the advent of the COVID-19 pandemic, there was a need to change the way COVID-19-related queries were answered due to the rapid evolution of information on vaccination, treatment and prevention. Methods: Medicines information queries were retrospectively reviewed utilising the centre's medicines information database from January 2020 through December 2022 using the COVID-19 keyword to retrieve relevant queries. Information was collected on the enquirer's role, query category, time taken to complete the query, relevant keywords and references accessed. Keywords and references were analysed further to determine the types of queries asked and which references were helpful. Results: The centre received 214 COVID-19-related queries, predominantly in 2022. Most queries were from pharmacy staff (95.8%) and related to vaccination ($n = 95$, 44.4%) or treatment ($n = 87$, 40.7%). Government and specialist organisation websites were used most commonly as reference sources (24.6% and 16.5%, respectively) for their currency with COVID-19-specific resources (such as national guidelines, COVID-19 treatment interaction checkers) and textbooks/databases used less commonly. Conclusions: MI pharmacists have demonstrated their ability to obtain reliable COVID-19-related information, utilising and interpreting information from less traditional sources.

Keywords: COVID-19; medicines information; drug information; pharmacists; pandemic; public health

1. Introduction

Pharmacists are experts in medication management who are well placed to provide evidence-based information on medications, including those used to prevent or treat novel coronavirus disease (COVID-19) [1,2]. Hospital pharmacists have been at the forefront of COVID-19 management since the start of the pandemic in a variety of roles [3–7].

One such role is the medicines information (MI) pharmacist, a specialist pharmacist role providing evidence-based answers to complex medication-related queries asked by clinicians [8–10]. MI centres [2] in Australia are primarily located within hospitals and are staffed by pharmacists experienced in information retrieval and critical review of evidence-based medicine [8,11,12].

Traditionally, answering MI queries commences with review of secondary and tertiary resources (i.e., summarised information of current evidence, such as textbooks and databases) before utilising primary references such as journal articles [9]. With the advent of the pandemic, secondary and tertiary resources were of limited value as they either did not have COVID-19 information or could not keep up to date with the influx of new and changing information.

Information regarding COVID-19 has changed rapidly since the first outbreak in December 2019, including the novel vaccinations and pharmacological means to treat or

prevent COVID-19 [3]. Modifications were needed on how COVID-19-related medicines information queries (MIQ) were researched while still providing accurate information, as up-to-date information was not always available using traditional sources, and information was continually changing. MI pharmacists are ideally placed to analyse information and its sources, such as grey literature, which includes evidence not managed by commercial publishers [13]. There was also a need to rapidly upskill pharmacy staff on both COVID-19 vaccinations and management and where they could access reliable further information.

The medicines information centre (MIC) is situated at a 783-bed quaternary metropolitan hospital in Perth, Western Australia (WA). The government hospital is the major site for multiple organ transplants and operates a large adult and paediatric emergency department. It caters for neonatal through to geriatric services and varies in acuity from intensive care through to rehabilitation medicine. The MIC is staffed by one pharmacist on weekdays and answers approximately 1500 queries per year from staff within the hospital via telephone, email and in person. (No secure online chat facilities were available at the time). The hospital was designated to be a major WA COVID-19 treatment centre for adults and paediatrics during the pandemic. WA had closed state borders from March 2020 to March 2022 to international and interstate visitors [14]. There was no community spread of COVID-19, with all outbreaks originating from travel outside the state and managed by community lockdowns. COVID-19 disease increased dramatically following borders opening in March 2022. The state also had a strict vaccination policy, with 79.7% of adults triple—vaccinated against COVID-19 before borders opened [15].

This paper aims to review the types of medicines information queries received on COVID-19, how these were researched during the COVID-19 pandemic and the types of references that were useful or unhelpful in finding information.

2. Results

From January 2020 to December 2022, 214 MIQ were received relating to COVID-19, taking a total of 245 h to complete. Most MIQ were received in 2022 (122 queries), with 9 queries received during 2020 and 83 in 2021. Most were from pharmacy staff (95.8%), with ward-based clinical pharmacists asking 94.2% of these queries. Medical staff made up the rest of the enquirers (predominantly consultants). No MIQ were received from nursing or allied health, potentially due to the clinical speciality team structure where medication-related queries are directed primarily to the pharmacist assigned to the speciality.

Most MIQ related to a specific patient (85.6%). Queries relating to COVID-19 vaccination were most common ($n = 95$, 44.4%), followed by treatment-related queries ($n = 87$, 40.7%). Table 1 summarises queries received by year and query type. Table 1 also demonstrates the change in trends in the types of queries related to the unique experience in Western Australia—few were queries received in 2020, followed by predominantly vaccination queries in 2021 and the management of COVID-19 infection in 2022, when the state borders were reopened to the rest of the world.

For COVID-19 vaccination MIQ, the most common queries were regarding the timing of COVID-19 vaccination and adverse effects and allergy (both $n = 27$, 28.4%). These were about the timing of COVID-19 vaccine administration in relation to other medications (e.g., corticosteroids), monoclonal antibodies (e.g., rituximab), other vaccines (e.g., influenza vaccine) and surgical procedures (e.g., post-splenectomy). Those on vaccine-associated allergy related to the presence of potential excipients in the COVID-19 vaccines, such as polysorbate 80 and macrogol 3350.

COVID-19 vaccine-related adverse effect MIQ ranged from those commonly reported in the media (myocarditis and cerebral venous thrombosis) to lesser-known adverse effects (such as haemophilia). Twenty-one queries (22.1%) related to the administration of COVID-19 vaccine in specific disease states or in patients taking particular medications (e.g., inflammatory bowel disease or natalizumab use), along with adverse effects and the efficacy of vaccines. Fewer questions ($n = 7$, 7.4%) were received about precautions and contraindications to vaccines (e.g., post chemotherapy or while neutropenic). Preparation

and stability of vaccine queries were asked solely in preparation for the vaccine roll out in 2021 (*n* = 6, 6.3%), and included information on temperature, plastic syringe compatibility and preparation. There were a small number of MIQ on which vaccine to administer (mRNA versus adenovirus; *n* = 4, 4.2%), the use of the vaccine in pregnancy or breastfeeding (*n* = 2, 2.1%) and the administration of COVID-19 vaccines (*n* = 1, 1.1%).

Table 1. COVID-19 medicines information queries received January 2020–December 2022 by query type.

Year	2020	2021	2022	Total (%)
Query Type/Subtype				
Management of COVID-19 Infection				
COVID-19 therapy dose modifications	0	3	16	19 (21.8)
Literature review request	0	4	14	18 (20.7)
Choice of COVID-19 therapy	3	0	12	15 (17.2)
Drug interactions	0	1	12	13 (15)
Administration of medication	1	4	6	11 (12.7)
Adverse effects & allergic reactions	0	1	3	4 (4.6)
Patient access to COVID-19 therapies	0	0	4	4 (4.6)
Pregnancy/breastfeeding	0	0	3	3 (3.4)
Total (%)	4 (44.5)	13 (15.7)	70 (57.4)	87
COVID-19 Vaccination				
Adverse effects & allergic reactions	0	21	6	27 (28.4)
Timing of vaccine administration	0	14	13	27 (28.4)
Literature review request	0	21	0	21 (22.1)
Contraindications/precautions	0	3	4	7 (7.4)
Preparation & stability of vaccines	0	6	0	6 (6.3)
Choice of vaccine	0	2	2	4 (4.2)
Pregnancy/breastfeeding	0	1	1	2 (2.1)
Administration of vaccine	0	1	0	1 (1.1)
Total (%)	0	69 (83.1)	26 (21.3)	95
COVID-19 Preventative Medication				
Administration of medication	0	0	7	7 (38.9)
Timing of dose	0	0	5	5 (27.8)
Dose modifications	0	0	3	3 (16.7)
Patient access	0	0	2	2 (11.1)
Adverse effects & allergy	0	0	1	1 (5.5)
Total (%)	0	0	18 (14.7)	18
COVID-19 & concomitant medical conditions				
Adverse effects & allergic reactions	0	0	2	2 (28.7)
Timing of other medications	1	0	1	2 (28.7)
Choice of therapy & interactions	0	0	1	1 (14.2)
Contraindications/precautions	0	0	1	1 (14.2)
Dose modifications of concomitant medications	1	0	0	1 (14.2)
Total (%)	2 (22.2)	0	5 (4.1)	7
Operational				
Smart infusion pump programming	3	0	1	4 (57.1)
Medication supply	0	0	2	2 (28.7)
Workforce planning	0	1	0	1 (14.2)
Total (%)	3 (33.3)	1 (1.2)	3 (2.5)	7

Management of COVID-19 infection MIQ were most commonly about whether a dose modification was required for a COVID-19 medication (*n* = 19, 21.8%). These included dosing in renal impairment (most common), hepatic impairment or with extracorporeal membrane oxygenation. Requests for literature reviews (*n* = 18, 20.7%) were primarily related to dosing in specific diseases or patient groups (including cancer and end-stage renal disease) and the efficacy of various therapies against Omicron COVID-19 variants. Fifteen queries (17.2%) related to the choice of COVID-19 therapy, primarily for antivirals

in different severities of COVID-19, but also to supportive medications (e.g., preferred inhaled corticosteroid or medications for end-of-life care). Drug interaction MIQ (*n* = 13, 15%) were mainly related to nirmatrelvir/ritonavir (*n* = 10, 76.9% of all drug interaction queries), which is known to have multiple interactions. Other interaction questions related to corticosteroids or remdesivir.

Administration MIQ for COVID-19 medications were asked 11 times (12.7%) and included the manipulation of oral COVID-19 therapies (nirmatrelvir/ritonavir and molnupiravir) for administration via enteral feeding tubes, or the duration of infusion (sotrovimab and remdesivir). Patient access to COVID-19 therapies was asked about four times (4.6%). Adverse effects MIQ were also asked four times, with all related to remdesivir (e.g., deranged liver function). Questions related to pregnancy and breastfeeding were asked three times (3.4%) about the use of nirmatrelvir/ritonavir and other COVID-19 supportive care (e.g., dexamethasone). The most common COVID-19 treatment information requested was for remdesivir (30 queries), followed by tixagevimab/cilgavimab and nirmatrelvir/ritonavir (26 and 24 queries, respectively).

COVID-19-preventative medication queries related exclusively to the use of tixagevimab/cilgavimab. Most questions were associated with administration (*n* = 7, 38.9%), both intramuscular and intravenous. All MIQ about the timing of tixagevimab/cilgavimab were on when to administer them post COVID-19 infection (*n* = 5, 27.8%). MIQ regarding changes in dose (*n* = 3, 16.7%) were due to the dose increase from 150 mg/150 mg to 300 mg/300 mg in Australia in late 2022. A single MIQ was received on how patients could access therapy locally via state restrictions.

Fewer MIQ were received on the management of concomitant medical conditions during COVID-19 infection (*n* = 7, 3.3% of all queries). MIQ ranged from managing seizures to end-of-life care, as well as whether to continue or withhold chemotherapy. Operational MIQ (*n* = 7, 3.3%) were primarily related to programming smart infusion pump entries for COVID-19 therapies (including remdesivir and sotrovimab).

The references utilised to investigate COVID-19-related MIQ most commonly were government websites, 152 times out of 618 (Table 2). These included Australian state and federal health departments and organisations (such as the Therapeutic Goods Association and the Australian Technical Advisory Group on Immunisation) and international health department and organisation websites (e.g., Health Canada (https://www.canada.ca/en/health-canada.html (accessed on 13 January 2023)), the UK government (https://www.gov.uk/ (accessed on 13 January 2023)), the Centers for Disease Control (https://www.cdc.gov/index.htm (accessed on 13 January 2023)) and the Food and Drug Administration (https://www.fda.gov/ (accessed on 13 January 2023)). Specialist organisation websites (including the American Society for Health-System Pharmacists (https://www.ashp.org/ (accessed on 13 January 2023)) and the UK Specialist Pharmacy Service (https://www.sps.nhs.uk/ (accessed on 13 January 2023)) were accessed 102 times. In comparison, tertiary resources (i.e., those utilised commonly in general MI enquiries, such as Stockley's Drug Interactions [16] or the Australian Medicines Handbook [17]) were utilised 98 times. COVID-19-specific resources (e.g., the Australian National COVID-19 Clinical Evidence Taskforce [18]) were accessed 34 times.

Resources prepared by MI were well received (although no formal analysis was undertaken of the usefulness of either queries or resources), with 21 updates of the vaccine spreadsheet produced and medication monograph updates continuing throughout 2022. Staff appreciated the availability of summarised documents. Ad hoc comments received included "information was compiled in a simplified and thorough manner" and "very much appreciated". No information was available on the frequency staff accessed the vaccine and medication updates, as the legacy platform used by the institutional intranet does not record metrics or user activity.

Table 2. Reference types used to answer COVID-19 medication queries.

Reference Type	Examples	Number of Times Used *n* = 618 (%)
Government website	Australian Department of Health, Centers for Disease Control and Prevention	152 (24.6)
Specialist organisation website	Australasian Society of Clinical Immunology and Allergy, American Society of Health-System Pharmacists	102 (16.5)
Tertiary reference	Micromedex, The Australian Injectable Drugs Handbook	98 (15.9)
Journal Open-access COVID-19 themed collections	The New England Journal of Medicine, The Journal of the American Medical Association	57 (9.2)
Database	PubMed, Medline	56 (9.1)
Previous MI query	Dosing of remdesivir in renal impairment; interval between COVID-19 vaccine and tixagevimab/cilgavimab	44 (7.1)
COVID-19-specific reference	National COVID-19 Clinical Evidence Taskforce, University of Liverpool COVID-19 Drug Interactions	34 (5.5)
Product information	Remdesivir, nirmatrelvir/ritonavir	27 (4.3)
Internet	Google search	16 (2.6)
Colleague	Antimicrobial Stewardship Senior Pharmacist, Infectious Diseases physicians	16 (2.6)
Pharmaceutical company	Pfizer, AstraZeneca	15 (2.4)
Study co-ordinator	REMAP-CAP study	1 (0.2)

3. Discussion

This paper offers an insight into the types of COVID-19 queries received by an MIC based in a quaternary hospital, albeit with different challenges compared to many other countries due to closed borders. References used to answer COVID-19-related queries were reviewed, finding unique challenges in how information was retrieved using alternative sources to traditional references.

Data are sparse in the literature regarding the specific role of the MI pharmacist during the COVID-19 pandemic. Articles have focused on pharmacists overall, or ward-based clinical pharmacists [2–5]. MICs have expanded their services to accommodate COVID-19-related MIQ in a variety of ways. Klotz et al. described a specific COVID-19 teleservice by a US Poisons and Drug Information centre which received MIQ not only related to prevention, vaccination and treatments for COVID-19 but also testing and exposures. The teleservice received more queries than the standard poisons and drug service, demonstrating the need for specific COVID-19 information [19].

The MI pharmacist is ideally placed to work during a pandemic, as noted by Khatiwada et al. in their assessment of the role MICs can play in the COVID-19 pandemic [11]. MI pharmacists are skilled in the critical analysis of primary medical literature, with an understanding of statistics and evidence-based medicine, saving time for busy clinicians. MI pharmacists are also experts in summarising information on new medications and retrieving specific information on adverse effects and drug interactions [4,11]. This may take the form of guidelines and evidence-based medication evaluation [6,7], such as the COVID-19 treatment medication monographs and evidence summaries produced at this institution.

Information available on COVID-19 has been overwhelming for both clinicians and the general public, leading to what has been termed an 'infodemic', defined as an overwhelming amount of information, not all of which is true [20,21]. The ease of access to large volumes of information via the Internet and social media allows for rapid dissemination, such as the use of pre-print servers for COVID-19 research and other grey literature. Not all information available has been reliable, with social media spreading false or dubious information rapidly. It can be difficult to determine which information sources can be trusted, and pharmacists are well placed to direct both the public and clinicians to reliable sources of information and dispel misinformation [22]. Given the impromptu positive feedback

received by the MIC, it was seen by our colleagues as a trusted source of information. A limitation of our study was that no formal feedback on COVID-19 MIQ was collected.

The majority of the initial MIQ received related to COVID-19 vaccination during the vaccine rollout in 2021. As supply was severely constrained, there were few questions on which vaccine to have. Extensive training on how to prepare and administer COVID-19 vaccines was also provided by the Australian federal government, which potentially explains why the MIC received so few MIQ on administration. There were a high number of MIQ relating to vaccine efficacy and timing in medical conditions such as in immunocompromised people and in those taking monoclonal antibodies. This reflected the lack of data available on how to treat any patient that was excluded from the original Phase 3 studies (due to conditions such as HIV and cancer). At this time, the most useful information came from specialist medical organisations (including The International Society for Heart and Lung Transplantation and the American College of Rheumatology) producing position statements of the likely efficacy, safety and preferred timing of COVID-19 vaccination. Government committees, such as the Australian Technical Advisory Group on Immunisation, were also useful in summarising what evidence was available (including pre-print scientific articles) to offer guidance. These references were most helpful in providing contemporary data during the introduction of COVID-19 vaccines, treatment and preventative agents. Journal articles reflecting 'real world' conditions started to appear in databases in mid–late 2021, which were also useful references. Standard vaccine references, such as the product information and the Australian Immunisation Handbook [23], did not offer answers to these types of MIQ until long after the initial rollout.

MIQ on the management of COVID-19 infection were minimal until borders opened, making our experience unique. The border opening in 2022 coincided with the availability of oral antivirals to treat COVID-19. How much of an effect the treatment summaries on the intranet had on reducing MIQ is unknown, but there were multiple MIQ regarding remdesivir and nirmatrelvir/ritonavir. Molnupiravir-related MIQ were much less common, possibly indicating the treatment summary was effective in reducing questions for a medication that had no documented drug interactions and straightforward dosing. It is possible that enquirers to the service were wary of the extensive drug interactions with nirmatrelvir/ritonavir and wanted a second check from the MI pharmacist, despite the availability and local promotion of specific COVID-19 drug interaction resources ("COVID-19 Drug Interactions" from the University of Liverpool, as well as WA Health information for clinicians). Remdesivir was the subject of a range of different types of MIQ, from patient access to choice of COVID-19 treatment, not all of which were covered in the medication summary and required additional searching by the MIC.

Similar issues with locating useful references were seen initially with treatment-related COVID-19 MIQ. Data were available initially only from the clinical trials and the product information. In this instance, it was useful that Australia had access to nirmatrelvir/ritonavir later than the USA, which meant that American references such as Micromedex and UpToDate had some useful additional information. Interactions with ritonavir were reviewed initially using HIV resources, such as the Liverpool HIV interactions website and Kucers' The Use of Antibiotics textbook [24]. The National COVID-19 Clinical Evidence Taskforce was a useful reference for choosing a COVID-19 therapy as it was frequently reviewed and updated with the latest evidence. Government websites were also useful for keeping up to date with the changing access requirements for COVID-19 therapies. As expected, standard medication references (e.g., Australian Medicines Handbook [17] and AHFS Drug Information [25]) took more time to be updated and were not used in the first line until later in 2022.

Tixagevimab/cilgavimab was the last COVID-19 therapy to be available in Western Australia in 2022 for prevention. (Due to severe supply shortages and state allocations via Australia's National Medical Stockpile, it was not authorised to be used as COVID-19 treatment). Tixagevimab/cilgavimab was not part of the education sessions due to its

delayed availability, and this may have increased the number of queries received despite a medication summary being available as staff may not have had time to read it.

Due to the late availability of tixagevimab/cilgavimab in Australia, international reference texts once again had useful information to answer MIQ, in addition to international government websites (such as the Food and Drug Administration and Health Canada). Australian state health websites (e.g., the Victorian Department of Health and the New South Wales Department of Health) were also useful, as well as information sought directly from the pharmaceutical sponsor, Astra Zeneca. Australia-based references tended to lag behind in offering information about tixagevimab/cilgavimab.

The low use of COVID-19-specific resources overall in answering MIQ was unexpected (5.5% of all references). These resources were widely promoted to pharmacy staff and within the hospital, so it is likely that enquirers would have checked these references before contacting MI.

MIQ related to the management of concomitant medical conditions such as cancer or schizophrenia during COVID-19 were few. This is likely due to clinicians' familiarity with treating these conditions. Information was generally lacking in reference texts. Literature searches using PubMed were most helpful in obtaining information, followed by specialist organisation websites (for example, the European Society of Medical Oncology).

Operational MIQ were few, perhaps because the MIC is seen as a 'clinical' service rather than an operational one. Most operational MIQ were related to the management of dose error reduction software in smart intravenous infusion pumps, which is overseen by the MIC. The operational MIQ were most frequently answered through liaising with an expert colleague or utilising information from previous MIQ (e.g., intravenous administration).

Searching for reliable information about COVID-19 has challenged the traditional manner in which MIQ are answered as limited up-to-date information regarding COVID-19 was initially available in tertiary resources. Hence, primary and secondary references such as original research and database literature searches were used more commonly, and sometimes as an initial step. Additional sources were often utilised, such as government and specialist medical college websites for guidelines and expert opinion where data were scant or non-existent. Other MICs may find that their experiences differed due to local patterns of COVID-19 disease waves, vaccination timeframes, state/country COVID-19 regulations and the availability of treatments.

The management of MIQ in future pandemics should include an early review by the MI pharmacist to identify useful resources and communicate these to relevant stakeholders within the institution. Likely topics for MIQ should also be pre-emptively discussed where possible with appropriate clinicians. An assessment of necessary additional resources, including time commitments, should also be performed.

4. Materials and Methods

A retrospective review of COVID-19 queries received by the MIC was conducted from January 2020 to December 2022. All MIQ queries received at our institution are recorded by the receiving MI pharmacist using MiDatabank software version 3.2 (MiDatabank, CoAcS Ltd., Bath, UK). The data collection for each MIQ includes enquirer details, query details, keyword assignation specific to the MIQ, a category (e.g., administration/dosage, interactions, adverse effects), references used to answer the MIQ and statistics on time taken to complete the MIQ. Relevant MIQ for COVID-19 were retrieved from the Institutional MIC software (MiDatabank) using the fixed keyword term, 'COVID-19', followed by a free text search for 'COVID' to retrieve any queries that had not been keyworded using the fixed term.

Each MIQ was then reviewed individually to determine if it was related to COVID-19. Any MIQ that was not related to COVID-19 was excluded. Keywords assigned to the individual MIQ at the time of the query response were collated to further characterise the COVID-19-related query. The queries were separated into prevention, vaccination, treatment, management of other diseases or operational. The keywords were then further

analysed using category subtypes to determine any trends based on frequency of keywords (e.g., for example, more queries related to a particular medication, or category such as drug interactions). For example, a MIQ on remdesivir administration would be assigned to the treatment category, while the management of cancer in a patient with COVID-19 would be assigned to the management of other diseases category. The remdesivir query would then be allocated the query subtype administration of medication, as well as the medication name. References utilised were also collated by name using the title of the reference (e.g., Australian Department of Health) and type (e.g., government website). This information was compiled in Microsoft Excel (Microsoft Corporation, Richmond, WA, USA).

To familiarise staff with COVID-19 treatments in anticipation of the state border opening in early 2022, a series of treatment summaries was compiled in medication monograph format for each of the available therapies at that time—remdesivir, regdanvimab, casirivimab/imdevimab, sotrovimab, nirmatrelvir/ritonavir, molnupiravir and tixagevimab/cilgavimab. Information was compiled using data from previous MIQ and references such as product information and original trial data. Each monograph included brief summaries on the key trials, limitations of the evidence and unanswered questions, such as safety in pregnancy or the optimal dose in obesity. This information was published on the hospital intranet for pharmacy staff and given to medical staff working in COVID-19 areas to upskill their knowledge. While formal quality assessment was not conducted, informal review was undertaken by clinical pharmacists, medical consultants and junior medical officers.

The dissemination of important information regarding COVID-19 vaccination and treatments was provided to pharmacy staff through various methods, such as emails, newly created guidelines and medication monographs available on the hospital's intranet and education sessions (mostly virtual). In March 2021, a document with information on COVID-19 vaccination safety, efficacy in specific disease states, adverse effects, key trials and resources was compiled by MI to address common questions and provide a resource to pharmacy staff where standard references were lacking. Information was collated from trials, government websites and specialist organisations. It was accessible to institutional pharmacy staff through the hospital intranet, with medical and nursing staff and clinical staff from other hospitals accessing the information on request. This was updated regularly over the next 6 months and provided a source of information to multiple pharmacists across Australia. This resource was also not assessed for quality in a formal manner. However, it was reviewed by other pharmacists who also provided content.

Additionally, a summary document was prepared on the safety of COVID-19 treatments and supportive medications in pregnancy and breastfeeding for medical and pharmacy staff and reviewed by other pharmacy staff. It utilised data from standard references (for supportive, established treatments) in addition to product information and specialist organisation information (for the new COVID-19 treatments). In preparation for the border opening, continuing education (live and on demand) was provided to local area pharmacy staff on COVID-19 treatment and supportive care, organised by the Antimicrobial Stewardship team and MI. These interventions were aimed at upskilling staff knowledge as well as offering written information for quick access within the hospital.

5. Conclusions

The COVID-19 pandemic has offered an opportunity for MI pharmacists to demonstrate their expertise in information retrieval and critical analysis of evidence-based medicine alongside the role of other pharmacists. In this MIC, the COVID-19 pandemic necessitated changes to traditional information searches through the use of primary resources and expert-driven guidelines for fast, reliable information in this rapidly evolving pandemic.

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