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Original Research

What is the landscape of community pharmacy technology? Critiquing contemporary digital innovation in the Australian context

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Abstract

Background: Rapid introduction of technology in community pharmacy practice has created a wealth of research opportunities relating to its design, implementation and sustainability of use. Digital technologies such as electronic prescriptions, real-time prescription monitoring and electronic health systems have the capacity to improve timely access to medicines for patients and facilitate clinical decision making by community pharmacists. However, these systems were not implemented with the support of an evaluation framework tailored to pharmacy practice. Considering the unique technological needs of pharmacists, the Technology Evaluation Key could be utilized to evaluate the implementation of pharmacy-related technology in practice. **Objective:** This narrative review aims to describe and critique the implementation of three Australian pharmacy-related technologies using the Technology Evaluation Key. **Methods:** A database search of EMBASE, Medline (PubMed), ProQuest, Scopus, Web of Science, and grey literature was conducted from January 2013 to June 2023. Preliminary search terms used included "real-time prescription monitoring", "my health record" and "electronic prescriptions." **Results:** Forty-six publications described the implementation of My Health Record, Real-Time Prescription Monitoring and Electronic Prescriptions, with six evaluating the implementation of these technology systems on community pharmacists. My Health Record had the most coverage in the literature, with all the Technology Evaluation Key domains addressed in those studies. **Conclusion:** While technology is part of the multifaceted approach to streamlining Australia's healthcare system, further evaluation of community pharmacists' technological needs is warranted. This will enable an understanding of the barriers and enablers to community pharmacists' adoption of technology and its impact on advanced practice and patient outcomes.

Keywords: community pharmacy; pharmacy technology; computer systems evaluation; realtime prescription monitoring; electronic prescriptions; electronic health record

INTRODUCTION

Australia's digital health transformation has seen the introduction of information and communication technologies (ICT) to connect a fragmented health system.[2] A key digitally enabled platform that facilitates collaboration and communication between health professionals and patients is My Health Record (MHR), Australia's cloud-based opt-out shared electronic health record.[6] Implementation of electronic prescriptions[8] (EP) and real-time prescription monitoring[8] (RTPM) have improved the timely access to medicines and clinical decision-making, respectively. Collectively, these technologies have the capacity to enhance connectivity and continuity throughout the Medication Management Pathway (MMP).[9] The MMP describes steps for continuity and safety when healthcare professionals provide medications, specifically decision making, supply, documentation, provision of medication information, administration, monitoring and review.[9]

Rapid introduction of technology in pharmacies presents a wealth of research opportunities relating to technology design, implementation, uptake and sustained utilization in pharmacists' clinical practice. Ideally, this research should maintain pace with and guide how technologies can advance clinical practice rather than evaluate the impact of technology retrospectively. This approach aligns with the hypothesis that health ICT should improve accessibility to reliable and comprehensive clinical information, be interoperable, reduce potential prescribing errors, and improve workflow and interprofessional collaboration.[10]

The ideal evaluation framework for health ICT should be applicable throughout the lifecycle of the ICT, with consideration of stakeholders at each stage.[11] There is a lack of published technology evaluation research specific to community pharmacy. This is particularly applicable given pharmacists' expanding scope of practice, increasing access to health data, and the unique practice setting and needs of pharmacists.

The Technology Evaluation Key (TEK) is the first published framework to guide evaluation of the implementation of pharmacy-related ICT.[12] The TEK framework depicts the dynamic interactions between the wider environment (the

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healthcare system and organization in which pharmacists practice), pharmacists' use of health ICT for clinical decision making or service delivery, and the ICT tool or platform itself.[12] In this instance, addressing how community pharmacists' adoption of technology to facilitate care is influenced by the healthcare system and organization in which they practice. These factors have direct implications on the success of ICT implementation and uptake.

This narrative review aims to describe and critique, using the TEK framework, the implementation of three Australian pharmacy-related technologies – MHR, RTPM and EP (Figure 1) – and their applications in clinical practice. This will provide guidance on the implementation success of these systems to date and areas of improvement.

METHODS

Five electronic databases (EMBASE, Medline (PubMed), ProQuest, Scopus and Web of Science) and grey literature were searched from January 2013 to June 2023. Preliminary searches for each database were conducted to determine keywords and index terms. Initial search terms used included "real-time prescription monitoring", "my health record" and "electronic prescriptions", as well as variants of these related terms and abbreviations utilized in different jurisdictions in Australia. These initial searches informed a comprehensive search strategy developed with assistance from a research librarian. The grey literature search strategy encompassed open-access resources from government departments, professional associations, and an open-source electronic database of Australian publications focused on humanities and social sciences (Informit). Citation lists of all studies and reports that met the inclusion criteria were screened for additional relevant publications (Table 1). Inclusion criteria for articles were their availability as full text and publication in English. Titles and abstracts (and executive summaries, where available for grey literature) were reviewed to determine eligibility. Publications published more than 10 years ago were included if considered seminal work.

Author AO independently conducted the initial screening and data extraction, with the data extraction table developed in consensus with authors LE and TFS. Extracted data included authors, year of publication, article type, and ICT described in the article. Publications were organized by the ICT described, with a narrative to compare published research with commentary, guidelines, policy and advocacy. MHR, RTPM and EP were selected for their relevance to the MMP, specifically in recording medicine orders or prescriptions, provision of medicines, and transferring verified medicines-related information between healthcare professionals.

RESULTS

The initial database search identified 478 publications (Figure 2). Following screening by title and abstract, 98 full-text publications were reviewed for eligibility. Further exclusions were conference abstracts, articles focused on medical

My Health Record

Introduced as the *Personally Controlled Electronic Health Record* in 2012, this platform was renamed the *My Health Record* (MHR) following a review in 2013.[2] The MHR is a national curated electronic summary of a patient's health information, designed to integrate into existing local clinical information systems.[4] The system transitioned from 'opt in' to 'opt out' in 2016,[2] designed to allow patients to control both the content and access rights of their electronic records.[4]

The MHR protects patients' privacy by restricting read/write access to healthcare providers or delegates authorized by their healthcare organization providing care to the patient.[4] Additionally, patients can opt to restrict access to specific documents in their record or their entire MHR. As such, MHR does not replace the direct sharing or transfer of health information and should not be relied upon as the sole source of patient health information.[4]

Pharmacists can upload dispensing information to a patient's MHR using conformant software, either directly or via prescription exchange.[4] Dispensing information is only uploaded if the pharmacy is registered and connected to the MHR system and the patient has not withdrawn consent.[4] Pharmacists can also create and upload a reconciled medicines list to a patient's MHR and contribute patient allergy information by uploading an event summary.[4] Event summary functionality may not be available in specific clinical information systems.[4] If a clinical document has been uploaded in error, the author of that document can delete it from their local system, which will remove the document from the patient's MHR.[4] When an error is identified within a document, the authoring pharmacist can replace the clinical document or dispense record by editing it in the pharmacy dispensing software, which will upload and supersede the original.[4]

Figure 1. My Health Record, Real time prescription monitoring and electronic prescription summary

Real Time Prescription Monitoring

RTPM provides real-time or near-real time patient history to prescribers and dispensers regarding controlled medicines[1] when prescribing or dispensing these medicines.[3] In Australia, each state or territory is responsible for managing controlled medicines in their jurisdiction.[3]

In 2018, the Commonwealth Department of Health, in collaboration with states and territories, proposed a federated RTPM solution in which states and territories integrated or intended to integrate with the National Data Exchange,[5] which captures information from state and territory regulatory systems, prescribing and dispensing software, and external data sources.[3] RTPM therefore comprises the National Data Exchange and regulatory systems within each state and territory that manage authorities or permits for controlled medicines.[3]

Electronic Prescriptions

Implemented in May 2020,[1] EPs are a legal way in which patients can access prescribed medicines through transmission between prescribers, patients and dispensers.[4] As with paper prescriptions, pharmacists must comply with all legal and ethical requirements when dispensing and supplying medicines from electronic prescriptions.[4] A single-use QR code, or "token", is generated and sent via prescribing software to a patient's mobile telephone or email or printed in hard copy. This token links to, and unlocks within dispensing software, the relevant information in the prescription delivery service (PDS).[4] The resulting electronic display contains the prescription details legally required to complete dispensing within the relevant state or territory.[4]

Figure 1. My Health Record, Real time prescription monitoring and electronic prescription summary

Table 1. Electronic databases, search strategy and inclusion criteria

Electronic databases	Search strategy	Inclusion criteria
Multidisciplinary databases 1. EMBASE 2. Medline (PubMed) 3. ProQuest 4. Scopus 5. Web of Science Grey literature 1. Informit 2. Australian Digital Health Agency (ADHA) 3. Australian Commission on Safety and Quality in Health Care (ACSQHC) 4. Pharmaceutical Society of Australia (PSA) 5. Pharmacy Guild of Australia (PGA) 6. Department of Health (National and State/Territory)	Concept 1: Setting *pharmac** Concept 2: ICT system *RTPM or "real time prescription monitoring" or "real time script monitoring" or "my health record" or myhealthrecord or MyHR or MHR or "electronic prescri*" or "e-prescri*" or eprescri* or "e-script*" or escript** Concept 3: Geographical location *Australia* OR Canberra OR "New South Wales" OR Sydney OR Victoria OR Melbourne OR Queensland OR Brisbane OR Adelaide OR Tasmania OR Hobart OR Perth OR Darwin OR "northern territory"*	• Research: Original research, review, meta-analysis • Grey literature: government report, guideline, policy or advocacy document, theses, dissertations, conference reports, letters to editors, commentary, editorial, policy/blueprint/guidelines/position papers or statements, white/green/blue papers (published) • Primary focus on digital health systems (MHR, RTPM and electronic prescription/ prescribing) in Australia • Published in English • Full text available • Published between 2013 and 2023

prescribing, studies conducted outside of Australia, articles without a full-text record, practice settings other than primary care or community pharmacy, and standalone medication management systems or electronic medical records developed specifically for use in one organization. Eighty-five grey-literature publications were identified through other sources. Following screening, only 52 were reviewed in full for eligibility due to full text record availability.

Forty-six publications met the inclusion criteria (Table 2), of which 36 had a national focus. Twenty-three of the 46 publications described the implementation of MHR, 22 RTPM, and 12 EP. These comprised 3 qualitative studies,[13-15] 3 quantitative studies,[16-18] 17 guideline documents,[1, 3, 5, 7, 19-31] 2 practice alert guidelines,[32, 33] 3 policy and advocacy documents,[2,

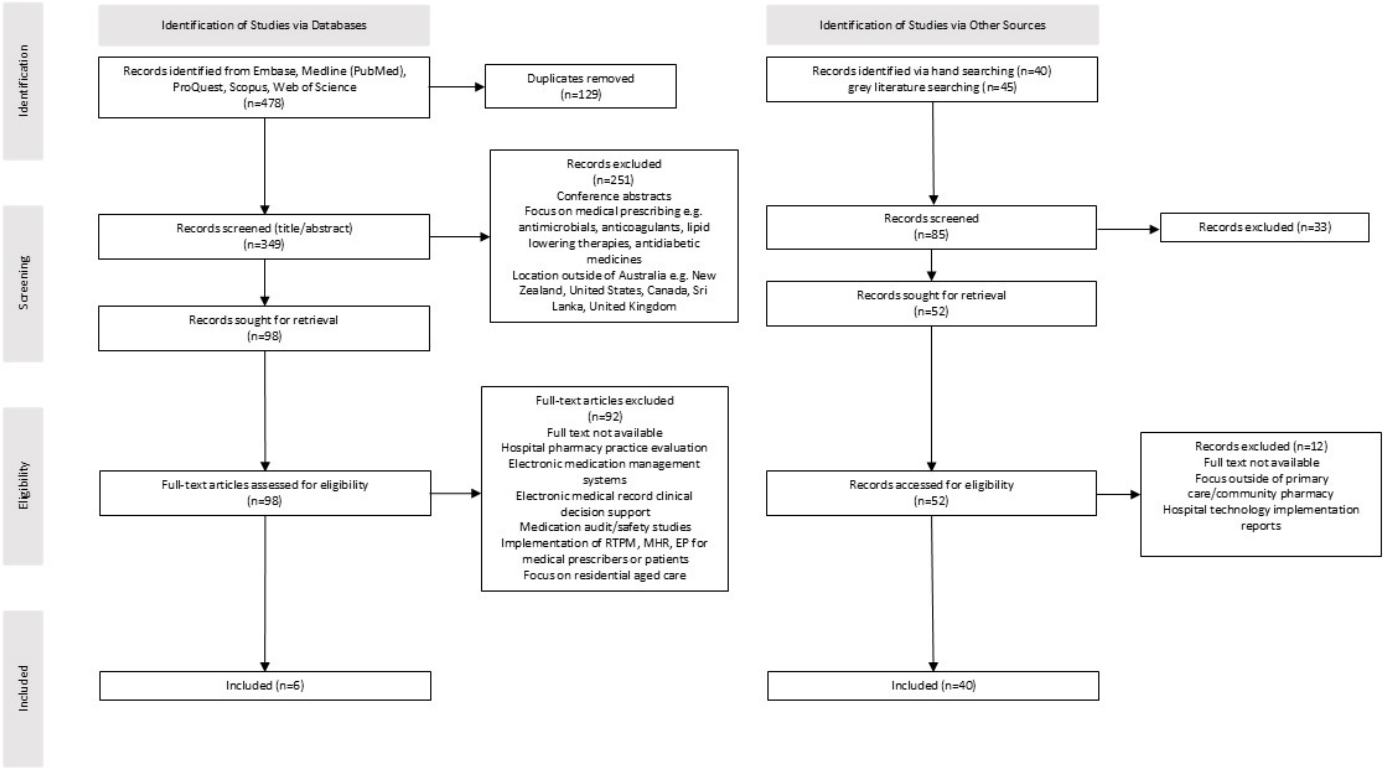

Figure 2. PRISMA flow diagram illustrating search strategy

Table 2. Overview of articles included in narrative review

Publication ID	Location	Article author	Article type	ICT system specified
ACT Government: Health – Canberra Script (2023)[18]	Australian Capital Territory	Government	Guideline	RTPM
Australian Commission on Safety and Quality in Health Care – Impact of digital health (2018)[34]	National	Government	Government report	MHR/EP
Australian Commission on Safety and Quality in Health Care – Tenth clinical safety review (2018)[35]	National	Government	Government report	MHR
Australian Commission on Safety and Quality in Health Care – Seventh clinical safety review (2016)[57]	National	Government	Government report	MHR
Australian Commission on Safety and Quality in Health Care – Safety issues at transitions of care (2017)[36]	National	Government	Government report	MHR
Australian Digital Health Agency – Electronic prescribing for dispensers (2023)[19]	National	Government	Guideline	EP
Australian Digital Health Agency – Electronic prescribing (2023)[20]	National	Government	Guideline	EP
Australian Digital Health Agency – Framework for action (2018)[33]	National	Government	Policy and advocacy	MHR, RTPM, EP
Australian Digital Health Agency – My Health Record: Information for healthcare providers and organizations (2023)[21]	National	Government	Guideline	MHR
Australian Digital Health Agency – My Health Record participation obligations (2022)[22]	National	Government	Guideline	MHR
Australian Digital Health Agency – Safe, seamless and secure (2018)[7]	National	Government	Policy and advocacy	MHR, RTPM, EP
Australian Government: Department of Health and Aged Care – National Real Time Prescription Monitoring (2023)[3]	National	Government	Guideline	RTPM
Barbeler D., Data security (2018)[37]	National	Peak body (Australian Pharmacist)	Commentary	MHR
Barbeler D., Prescription monitoring (2018)[38]	National	Peak body (Australian Pharmacist)	Commentary	RTPM

Brooker C., (2021)[39]	National	Peak body (Australian Journal of Pharmacy)	Commentary	EP
Cooke J., (2021)[40]	National	Peak body (Australian Pharmacist)	Commentary	RTPM
Cowie T., (2018)[41]	National	Peak body (Australian Pharmacist)	Commentary	MHR
Cowie T., (2019)[42]	National	Peak body (Australian Pharmacist)	Commentary	MHR, RTPM, EP
Cowie T., (2020)[43]	National	Peak body (Australian Pharmacist)	Commentary	RTPM
Daniels A., (2017)[44]	National	Grey (PostScript)	Commentary	MHR
Doherty et al., (2021)[45]	National	Peak body (Australian Pharmacist)	Commentary	RTPM
Government of South Australia: SA Health – ScriptCheckSA (2023)[23]	South Australia	Government	Guideline	RTPM
Government of Western Australia Department of Health – Real time prescription monitoring (2023)[24]	Western Australia	Government	Guideline	RTPM
Hoppe et al., 2023[17]	National	Researchers	Original research	RTPM
Jackson et al., 2019[46]	National	Researchers	Commentary	MHR
Jackson S., (2018)[47]	National	Peak body (Australian Pharmacist)	Commentary	MHR
Kosari et al., 2020[16]	National	Researchers	Original research	MHR
Lee, K., (2018)[48]	National	Peak body (Australian Pharmacist)	Commentary	MHR
Mooranian et al., (2013)[54]	Western Australia	Researchers	Original research	MHR
Northern Territory Government: NT Health – NTScript (2023)[25]	Northern Territory	Government	Guideline	RTPM
NSW Government – SafeScript (2023)[26]	New South Wales	Government	Guideline	RTPM
Pharmaceutical Defence Limited – MHR (2019)[31]	National	Indemnity insurance provider	Guideline (practice alert)	MHR
Pharmaceutical Defence Limited – Schedule 8 medicines management (2022)[32]	National	Indemnity insurance provider	Guideline (practice alert)	RTPM
Pharmaceutical Society of Australia – Connecting the dots (2019)[6]	National	Peak body	Policy and advocacy	MHR, RTPM, EP
Pharmaceutical Society of Australia – Electronic prescriptions (2023)[1]	National	Peak body	Guideline	EP
Pharmaceutical Society of Australia – Digital health guidelines (2021)[4]	National	Peak body	Guideline	MHR, RTPM, EP
Pharmacy Guild of Australia – Electronic health records (2012)[27]	National	Peak body	Guideline	Personally Controlled Electronic Health Record (PCEHR – now MHR)
Pharmacy Guild of Australia – My Health Record (2016)[28]	National	Peak body	Guideline	MHR
Queensland Government: Queensland Health – QScript (2023)[5]	Queensland	Government	Guideline	RTPM
Sim et al., 2020[14]	Western Australia	Researchers	Original research	MHR
Tambassis G., (2014)[49]	National	Peak body (Australian Journal of Pharmacy)	Commentary	EP
Tan et al., 2023[13]	National	Researchers	Original research	EP

Tasmanian Government: Department of Health – Real time prescription monitoring (2023)[29]	Tasmania	Government	Guideline	RTPM
Victoria State Government: Department of Health - SafeScript (2023)[30]	Victoria	Government	Guideline	RTPM
Watts B., (2017)[50]	National	Peak body (Australian Pharmacist)	Commentary	RTPM
Zhang et al., 2022[15]	National	Researchers	Original research	RTPM

Table 3. Mapping publications to Medication Management Pathway and the Technology Evaluation Key

Publication ID	ICT	MMP 1.Recording medicine orders/prescriptions 2.Provision of medicines 3.Transfer/sharing of pharmacist or prescriber verified information	Healthcare System	Organization	Practitioner	User experience	Logistics and Operations	System Integrity	Clinical Impact	Advanced Practice
ACT Government: Health – Canberra Script (2023)[18]	RTPM	1 2 3	✓	✓	✓	Usefulness	Effectiveness	Data security	Patient care Quality of care	✓
Australian Commission on Safety and Quality in Health Care – Impact of digital health (2018)[34]	MHR/EP	3	✓	✓	✓	Usability Usefulness	Efficiency Effectiveness	Data security	Patient care Quality of care	✓
Australian Commission on Safety and Quality in Health Care – Tenth clinical safety review (2018)[35]	MHR	3	✓	✓	✓	Ease of use Usability	Efficiency	Feedback to vendor	Patient care Quality of care	
Australian Commission on Safety and Quality in Health Care – Seventh clinical safety review (2016)[57]	MHR	1	✓	✓	✓	Usability				
Australian Commission on Safety and Quality in Health Care – Safety issues at transitions of care (2017)[36]	MHR	3	✓	✓	✓	Usability Usefulness	Effectiveness		Patient care Quality of care	✓
Australian Digital Health Agency – Electronic prescribing for dispensers (2023)[19]	EP	1 2	✓	✓	✓	Usefulness	Efficiency Effectiveness		Patient care Quality of care	✓
Australian Digital Health Agency – Electronic prescribing (2023)[20]	EP	1 2	✓	✓	✓	Usefulness	Efficiency Effectiveness		Patient care Quality of care	✓
Australian Digital Health Agency – Framework for action (2018)[33]	MHR, RTPM, EP	1 2 3	✓	✓	✓	Usability Usefulness	Effectiveness		Patient care Quality of care	✓

Australian Digital Health Agency – My Health Record: Information for healthcare providers and organizations (2023)[21]	MHR	3	✓	✓	✓	Usefulness	Effectiveness	Data security	Patient care Quality of care	✓
Australian Digital Health Agency – My Health Record participation obligations (2022)[22]	MHR	3	✓	✓	✓	Usefulness	Effectiveness	Data security	Patient care Quality of care	✓
Australian Digital Health Agency – Safe, seamless and secure (2018)[7]	MHR, RTPM, EP	1 2 3	✓	✓	✓	Usability Usefulness	Effectiveness		Patient care Quality of care	✓
Australian Government: Department of Health and Aged Care – National Real Time Prescription Monitoring (2023)[3]	RTPM	1 2 3	✓	✓	✓	Usefulness	Effectiveness	Data security	Patient care Quality of care	✓
Barbeler D., Data security (2018)[37]	MHR	3	✓	✓	✓			Data security		
Barbeler D., Prescription monitoring (2018)[38]	RTPM	2 3	✓	✓	✓				Patient care Quality of care	✓
Brooker C., (2021)[39]	EP	1 2	✓	✓	✓	Satisfaction Ease of use Usability Usefulness	Efficiency Effectiveness	Data security	Patient care Quality of care	
Cooke J., (2021)[40]	RTPM	2	✓	✓	✓	Usefulness			Patient care Quality of care	✓
Cowie T., (2018)[41]	MHR	3	✓	✓	✓	Usefulness			Patient care Quality of care	✓
Cowie T., (2019)[42]	MHR. RTPM, EP	1 2 3	✓	✓	✓	Usefulness	Efficiency Effectiveness		Patient care Quality of care	✓
Cowie T., (2020)[43]	RTPM	1 2 3	✓	✓	✓	Usefulness			Patient care Quality of care	✓
Daniels A., (2017)[44]	MHR	3	✓	✓	✓	Usefulness	Efficiency Effectiveness		Patient care Quality of care	✓
Doherty et al., (2021)[45]	RTPM	1 2 3	✓	✓	✓	Usefulness	Effectiveness		Patient care Quality of care	✓

Government of South Australia: SA Health – ScriptCheckSA (2023)[23]	RTPM	1 2 3	✓	✓	✓	Usefulness	Effectiveness	Data security	Patient care Quality of care	✓
Government of Western Australia Department of Health – Real time prescription monitoring (2023)[24]	RTPM	1 2 3	✓	✓	✓	Usefulness	Effectiveness	Data security	Patient care Quality of care	✓
Hoppe et al., 2023[17]	RTPM	2 3	✓	✓	✓	Usefulness	Effectiveness		Patient care Quality of care	✓
Jackson et al., 2019[46]	MHR	1 2 3	✓	✓	✓	Usefulness	Effectiveness		Patient care Quality of care	✓
Jackson S., (2018)[47]	MHR	3	✓	✓	✓	Usefulness	Effectiveness		Patient care Quality of care	✓
Kosari et al., 2020[16]	MHR	1 2	✓	✓	✓	Satisfaction Ease of use Usability Usefulness	Productivity Efficiency Effectiveness	Data security	Patient care Quality of care	✓
Lee, K., (2018)[48]	MHR	3	✓	✓	✓	Usefulness		Data security	Patient care Quality of care	
Mooranian et al., (2013)[54]	MHR	3	✓	✓	✓					
Northern Territory Government: NT Health – NTScript (2023)[25]	RTPM	1 2 3	✓	✓	✓	Usefulness	Effectiveness	Data security	Patient care Quality of care	✓
NSW Government – SafeScript (2023)[26]	RTPM	1 2 3	✓	✓	✓	Usefulness	Effectiveness	Data security	Patient care Quality of care	✓
Pharmaceutical Defence Limited – MHR (2019)[31]	MHR	3	✓	✓	✓			Data security	Patient care Quality of care	
Pharmaceutical Defence Limited – Schedule 8 medicines management (2022)[32]	RTPM	1 2 3	✓	✓	✓				Patient care Quality of care	
Pharmaceutical Society of Australia – Connecting the dots (2019)[6]	MHR, RTPM, EP	1 2 3	✓	✓	✓	Usefulness	Effectiveness	Data security	Patient care Quality of care	✓
Pharmaceutical Society of Australia – Electronic prescriptions (2023)[1]	EP	1 2	✓	✓	✓	Usability Usefulness			Patient care Quality of care	✓

Pharmaceutical Society of Australia – Digital health guidelines (2021)[4]	MHR, RTPM, EP	1 2 3	✓	✓	✓	Usability Usefulness	Efficiency Effectiveness	Data security	Patient care Quality of care	✓
Pharmacy Guild of Australia – Electronic health records (2012)[27]	MHR	3	✓	✓	✓	Usefulness	Effectiveness		Patient care Quality of care	✓
Pharmacy Guild of Australia – My Health Record (2016)[28]	MHR	3	✓	✓	✓	Usefulness	Effectiveness		Patient care Quality of care	✓
Queensland Government: Queensland Health – QScript (2023)[5]	RTPM	1 2 3	✓	✓	✓	Usefulness	Effectiveness	Data security	Patient care Quality of care	✓
Sim et al., 2020[14]	MHR	3	✓	✓	✓	Usefulness	Efficiency	Data security	Patient care Quality of care	✓
Tambassis G., (2014)[49]	EP	1 2	✓	✓	✓	Ease of use Usability Usefulness	Efficiency Effectiveness		Patient care Quality of care	
Tan et al., 2023[13]	EP	1 2	✓	✓	✓	Ease of use Usability Usefulness	Efficiency	Data security	Patient care Quality of care	✓
Tasmanian Government: Department of Health – Real time prescription monitoring (2023)[29]	RTPM	1 2 3	✓	✓	✓	Usefulness	Effectiveness	Data security	Patient care Quality of care	✓
Victoria State Government: Department of Health - SafeScript (2023)[30]	RTPM	1 2 3	✓	✓	✓	Usefulness	Effectiveness	Data security	Patient care Quality of care	✓
Watts B., (2017)[50]	RTPM	1 2 3	✓	✓	✓				Patient care Quality of care	✓
Zhang et al., 2022[15]	RTPM	2 3	✓	✓	✓	Usefulness			Patient care Quality of care	✓

[6, 34] 4 government reports[34-37] and 14 commentaries.[38-51] Mapping of each publication to the Medication Management Pathway and the TEK framework confirmed its relevance to this study (Table 3). The following describes and critiques the implementation of MHR, RTPM and EP with respect to the TEK framework in the context of their applicability to recording medicine orders/prescriptions, provision of medicines and the transfer of verified medicines-related information.

My Health Record

TEK Domain 1: Healthcare System

The Healthcare System domain encompasses policy and advocacy, as well as legislative changes to support community pharmacists, other healthcare providers and patients in adopting new technologies.[12]

There was a strong alignment of the MHR's evolution against the TEK framework's Healthcare System domain. The predecessor to the MHR was the Personally Controlled Electronic Health Record (PCEHR),[4, 52] which was developed with significant stakeholder consultation across the healthcare sector. Since its renaming in 2016 to MHR, the platform has been promoted through practitioner and health consumer groups to improve adoption and foster utilization by pharmacists.[4] Part of this transformative strategy included the advocacy reports of the Australian Digital Health Agency (ADHA) – Safe, Seamless and Secure (2018) and Framework for Action (2018) – to

provide strategic direction to digital health transformation at a national (healthcare system) level,[6] and the Pharmaceutical Society of Australia's advocacy report, Connecting the Dots (2019), outlining the impact of digital health transformation in improving patient access to care through safe and timely access to medicines.[2] These advocacy and policy reports describe the MHR as a secure system to provide and transfer accurate patient information, call for continued uptake of the MHR system, and the need for usability and interoperability to improve to facilitate functionality such as secure messaging.[34] While the work of representative and government organizations in the healthcare system has been strategic in direction and aim, it is unclear to what extent end user consultation has taken place as part of these processes, and more specifically, to engage community pharmacists. Since this database search was conducted, a newly published ADHA policy has highlighted the need to modernize the MHR.[53] This is significant as it highlights the importance of interoperability and functionality for clinicians to access pathology results through MHR.

TEK Domain 2: Organization

Organization in this context is the community pharmacy and that organization's readiness to implement new technologies through training or professional development of staff and policies and procedures for ICT use by employees.[12]

The Pharmacy Guild of Australia[1] launched a member-exclusive tool to assist pharmacy owners in implementing the former PCEHR in their organizations.[52] This tool mentioned the need for infrastructure, staff training, procedures, and policies.[52] Further to this was the launch of the Pharmacy Guild's MHR fact sheet to promote community pharmacists' adoption of the MHR, highlighting benefits such as improved access to verified medicines-related information and improved patient care.[29] While these documents were beneficial to members of the Pharmacy Guild, their uptake is unclear. Other member-only resources were reportedly available.

Limited research has been conducted to evaluate organizational readiness for MHR implementation in community pharmacy practice. A qualitative study (2012) with 24 community pharmacist owners and manager practicing in Western Australia highlighted practical constraints of the implementation of the then PCEHR.[15] Barriers to implementation included impact on time management and workflow changes to incorporate the use of computers. The study reported the need for adequate remuneration to facilitate technology uptake.[15] Additionally, the introduction of guidelines and education to support implementation in practice, specifically addressing use, liability and responsibilities when interacting with the technology, were reported as both facilitators and barriers in practice.[15]

Commentary around MHR implementation at an organizational level has consistently highlighted the importance of training and education to ensure appropriate access of MHR by pharmacists and supporting staff.[42, 45]

The National Department of Health MHR resource website for health professionals provides practice guidance, including training, participation obligations, and incident management.[22] "Participation obligation" highlights several distinct areas to which organizations must adhere, including establishing a security and access policy for MHR, staff training and education, reporting and response strategies to data breaches, or unauthorized access to MHR record(s).[23]

TEK Domain 3 and 4: Practitioner and User Experience

The Practitioner and User Experience domain of the TEK framework encompasses practitioners' willingness to adopt technology and their technology proficiency, along with ease of use[2] of the technology, usability,[3] satisfaction and usefulness.[4] Pharmacists have been among the "most enthusiastic" adopters of MHR, with more than 80% of community pharmacists registered for connection to the MHR system.[43] Evaluation of community pharmacists' MHR use has been piecemeal compared to its implementation and adoption, noting that the number of pharmacists who routinely use the MHR has not been reported.[17]

In the aforementioned Western Australian study, while participants generally agreed that the PCEHR would enhance service provision, the majority commented that patients' privacy settings could result in poor data quality.[15] Furthermore, concerns were reported around confidentiality breaches and subsequent liability issues, and access to patient information outside of consultations.[15] Participants also discussed the need for training and interpretation of clinical data within a PCEHR.[15] Finally, participants called for the PCEHR to be flexible in facilitating documentation of clinical services, such as blood pressure screening, and for the addition of clinical support tools such as prescription monitoring and medication reminder aids.[15]

A study reported mostly negative experiences and viewpoints of the MHR in practice, eight years after its implementation. In an online survey of 63 pharmacists, 65% being community pharmacists, participants agreed that the MHR could assist with continuity of care, improving the safety and quality of care and reducing medication errors during dispensing, potentially enhancing their professional relationships with general practitioners and patients.[17] However, participants reported both their own and patients' concern for privacy as barriers in utilizing the MHR.[17] Furthermore, a reported lack of IT support, implementation support to adopt the system within an organization, training and the potential for MHR to interfere with the existing dispensing process were reported as additional barriers.[17] Participants were concerned with MHR not being user friendly or easy to navigate, hence slowing down the dispensing process.[17] Additionally, the accuracy of the information in MHR meant that it could not solely be relied on as a source of patient information, with only 48%

1 The Pharmacy Guild of Australia: *National pharmacy owners' organization representing community pharmacy in the Australian healthcare system*[54]

2 Ease of use: *the relationship between a user's perception of what technology can do and what is required to undertake a task*[12]

3 Usability: *technology design based on the dynamic interaction of a user-system situation: user, task, tool and environment*[55]

4 Usefulness: *a user's perception of a technologies relevance or applicability when performing a task*[12]

of participants reporting overall system satisfaction.[17] Areas reported for improvement included security and privacy of patient data, user interface, training, timely user support and improved integration with dispensing software.[17]

In a qualitative study in 2020 involving 20 community pharmacists practicing in Western Australia, participants described the importance of having a national real-time digital health record in checking patient's health information to make clinical recommendations, noting a need for integration with existing infrastructure and processes.[14] The MHR was described as having potential to assist with time management and improved efficiency; however, privacy was perceived to be a concern for some participants.[14] Despite this, participants were confident that the MHR would help to facilitate interprofessional interactions and communication.[14]

These findings further highlight the lack of applicable and available practice support and guidance specifically for community pharmacists in adopting the MHR, and limited studies to evaluate user experiences and perspectives of community pharmacists. More research is needed to understand the current needs of community pharmacists incorporating MHR in their clinical practice.

TEK Domain 5: Logistics and Operations

Logistics and Operations refers to the organizational impact of technology adoption on practice, noting the need for existing infrastructure or technology to change or adapt to enable technology implementation. Additionally, this domain encompasses the impact of technology use on productivity, which comprises efficiency and effectiveness. The only publication citing the infrastructure or technological changes to adopt the MHR was the Pharmacy Guild's development template, which specified the need for dispensing software compatible with the then PCEHR.[29]

Several publications mentioned practice support or guidance for the MHR system, including the Pharmaceutical Society of Australia Digital Health Guidelines[5] and Pharmaceutical Defense Limited[5] Practice Alert.[32] Furthermore, several publications discussed strategies to prevent unauthorized access and requirements around mandatory reporting of breaches.[38, 49]

While MHR implementation guidance for organizations exists from the Federal government and pharmacy associations, its applicability and availability have been limited. Programmatic evaluation of MHR in community pharmacies was also limited and likely outdated, with research primarily conducted before the implementation of the MHR. Further research is needed to understand the contemporary needs of pharmacy organizations to implement and use the MHR in practice.

TEK Domain 6: System Integrity

The System Integrity domain of the TEK framework represents operational aspects such as data security and feedback to the technology vendor. While support exists through cybersecurity policies and managing access to MHR,[5, 23] there were no publications addressing the implications of patient consent, privacy and confidentiality on adopting or using the MHR in practice. Furthermore, the Australian Commission on Safety and Quality in Health Care more broadly reported the lack of clinical safety testing of MHR data to minimize errors in accessing patients' medication records.[57] This is further complicated by the MHR being patient-controlled, i.e. the patient determines what clinical information, e.g. medication dispensing, is uploaded to their MHR, and which clinician(s) can access their record.[22] Therefore, while the MHR system has robust system integrity,[22] the accuracy of the information presented is potentially unreliable.

The Australian Commission on Safety and Quality in Health Care's 10th Clinical Safety Report (2018) provided formative feedback to MHR vendors, including the presentation of clinical information in the MHR and integration with local prescribing or dispensing systems to enhance system integrity.[36] Furthermore, the report described practitioners' perceptions that usability-related feedback had not been incorporated into the MHR system, particularly with unclear system warnings, inconsistency in clinical information view, and the interface being challenging to navigate.[36] The Australian Commission on Safety and Quality in Health Care recommended enhanced interoperability with other practitioner-facing software to support clinical decisions.[35]

TEK Domains 7 and 8: Clinical Impact and Advanced Practice

The Clinical Impact domain includes patient care and quality of care and describes patient outcomes as a result of technology adoption by community pharmacists. Advanced Practice refers to the new or additional services or skills of community pharmacists as a result of technology adoption. Prior to the implementation of the then PCEHR, one study reported agreement amongst community pharmacists that the PCEHR offered potential to facilitate role expansion.[15] No literature has addressed how community pharmacists use the MHR to support their practice.

The then PCEHR primarily supported access to patient health information, and thereby improved quality and safety of care and facilitating decision making.[52] This initial functionality included patient prescription information, pharmacy services, pathology results and hospital discharge information.[52] Use of the PCEHR was proposed to facilitate advanced practice such as medication reviews and interventions using up-to-date medication profiles, staged medication supply services and medication adherence programs.[52] More recently, the role of the MHR has been described in advanced practice to improve medication reconciliation, medication review services and care transitions, particularly for at-risk patients.[48] No literature was located evaluating the impact of the MHR on patient care and advanced practice.

The Australian Commission on Safety and Quality in Health Care's Seventh Clinical Safety Review (2016) reported the MHR had an integral role in facilitating the transfer of verified medicines-related information across practice settings for prescribers and dispensers.[57] Despite this, the Australian Commission on Safety and Quality in Health Care's 2017 report on transitions of care called for improved clinician access

5 Pharmaceutical Defense Limited (PDL): An Australian professional indemnity insurance provider for pharmacists[56]

to patient data across clinical information systems, secure communication systems and improved access for discharge care planning and communication between healthcare providers at transitions of care.[37] No formative evaluation was reported on the impact of these barriers on community pharmacists' services in transitions of care at hospital discharge and for residential aged care patients.

The Australian Commission on Safety and Quality in Health Care's 2018 report on the impact of technology on patient care later called for engagement with practitioners to address critical usability issues with MHR to help realize safety and quality outcomes.[35] Proposed functionality for the platform included secure messaging for patients and clinicians.[35] While the MHR can play a crucial role in preventing medication misadventure and improving patient-centered care,[47, 48] it is unclear to what extent subsequent consultation with practitioners has occurred to address these issues, specifically with community pharmacists. Further research is warranted into the integration of shared electronic health records in community pharmacies.[47]

Real-time prescription monitoring

TEK Domain 1: Healthcare System

Considerable literature was located regarding national and jurisdictional implementation of RTPM. RTPM had been identified as a priority for all states and territories to ensure patient safety when accessing medicines,[6] to help prescribers and dispensers minimize patient harm.[34] Commentary, policy and advocacy on RTPM[39, 43, 44, 46] saw SafeScript as the first RTPM system implemented in Victoria, Australia in 2020.[31] Following this, all other states and territories subsequently introduced an RTPM system.[18] Each jurisdiction (state or territory) is responsible for the system features, including the monitored medicines, resulting in a heterogeneous approach in legislative use and system functionality.[18]

Research on Australian RTPM systems is limited, with most of the literature on prescription drug monitoring systems originating from the United States of America.[18] Worth noting is the mandate to use RTPM as a clinical decision making tool in almost all Australian jurisdictions, depending on the medicine, and the system negating the need for patient consent before accessing their RTPM record. While jurisdictional differences exist between RTPM systems, there is harmonization between policy, advocacy and practice support. These publications demonstrate clear value to practitioners, including community pharmacists, of the purpose of RTPM as a clinical decision-support tool. Further to this, there has been support at a health-system level to facilitate adoption.

TEK Domain 2: Organization

Robust practice support and guidance from an organizational standpoint has facilitated implementation of RTPM. Each jurisdiction has provided training and education for its respective RTPM system, including lists of the medicines whose prescriptions are monitored in real time.[3, 7, 19, 24-27, 30, 31] Additional practice organizational support, through the Pharmaceutical Society of Australia's Digital Health Guidelines, provide legal and practical considerations around the use of RTPM; however, they refer specifically to state and territory supporting guidelines to facilitate use.[5] Finally, PDL released a practice alert in 2022 following increased scrutiny of dispensed medicines by RTPM sections of state or territory health departments.[33] The guideline outlines the purpose of RTPM, practitioner obligations and considerations regarding clinical decisions, and practical considerations regarding monitored medicine storage and supply.[33] Practice support is robust and accessible, and encompasses staff training. Worth noting is the ability for community pharmacists to access RTPM data without patient consent, implications for patient privacy have not been explored in the literature.

TEK Domain 3: Practitioner

Only one study was identified, reporting, prior to its launch, a general awareness and willingness to adopt RTPM among Western Australian pharmacists.[16] Perceived barriers to implementation included lack of remuneration, potential conflict with prescribers, increased workload, staff safety concerns and a lack of knowledge regarding RTPM systems, and participants indicated the need for training.[16]

TEK Domain 4: User Experience

There was also limited research into community pharmacists' adoption or user experiences regarding RTPM. An online survey of 102 healthcare practitioners from across Australia, excluding Western Australia, investigated health practitioners' use of RTPM. RTPM was reported to assist clinical decision making, improve clinical practice and reduce clinical risk.[18] Pharmacists reported that following their refusal to dispense a monitored medicine, they typically contacted the prescriber and/or other pharmacies.[18] Less commonly, they referred patients to pain management services, substance use disorder services, opioid replacement therapy and mental health services.[18] Additionally, a commentary exploring user experiences with RTPM described RTPM as vital in supporting clinical decision making around the supply of monitored medicines.[41]

Electronic prescriptions

TEK Domain 1: Healthcare System

The ADHA's Safe, Seamless and Secure strategy predicted that by 2022, digitally enabled paper-free options for electronic prescribing and dispensing would be available.[6] The national approach commenced at the end of 2019.[43] The implementation was described as "slow and arduous", despite being supported with nationally negotiated funding[50] of AU$28.2 million over five years.[34] This incentive was credited as essential to improve the uptake of EP technology, and henceforth accurate, efficient medication dispensing and management.[50] In the case of EP, healthcare system enablers for implementation included incentives to promote adoption, and hence change subjective norms in the medicine supply process.

TEK Domain 2: Organization

Implementation of EP significantly improved patient outcomes through timely access to care.[35, 40, 43] Modified workflow, cybersecurity processes and staff education were highlighted

as considerations in its adoption.[40] Organizational support for EP includes resources that describe the benefits of EP, and jurisdiction-specific training.[20, 21] The Pharmaceutical Society of Australia's Digital Health Guidelines include a high-level summary of legal requirements for dispensing EP, including workflow changes, and guidance for community pharmacists and supporting staff within an organization to adopt EP dispensing.[5]

TEK Domain 3: Practitioner

Benefits and challenges of EP in the first year of implementation were explored via semi-structured interviews with two general practitioners and four community pharmacists in regional New South Wales.[13] Identified benefits of EP were efficiency in prescribing and dispensing, improved patient adherence, improved safety and security (in preventing medication theft or forged prescriptions) and EP being an enabler of telehealth during the COVID-19 pandemic, particularly for regional or rural locations.[13] Challenges associated with EP included uncertainty with technology breakdowns, ongoing implementation costs, increased workload (through patient and staff education) and user issues to adapt to changing workflows.[13]

DISCUSSION

This narrative review uniquely describes and critiques the implementation of three key technologies – RTPM, MHR and EP – in Australian pharmacy practice, with reference to the TEK framework. The literature revealed limited research into community pharmacists' adoption and use and the impact of these technologies on pharmacists' clinical practice. While RTPM and EP have been the subjects of more robust commentary than the MHR, gaps were evident in relation to numerous domains of the TEK framework: User Experience, Logistics and Operations, System Integrity, Clinical Impact and Advanced Practice. Research on community pharmacists' experiences with the MHR was more limited, despite it being the longest-established technology included in this review.

Jurisdictional differences across Australia have impeded consistent implementation of these systems. Stakeholder engagement is essential in evaluating these systems and should include healthcare system representatives, professional organizations, health professionals, patients, ICT vendors and software developers. Stakeholders called for pragmatic approaches to address the needs of patients[2, 6, 34] and were met with a health system that could not necessarily sustain rapid implementation of new systems. In the case of MHR, implementation took place over several years with engagement of multiple groups of stakeholders.[4] However, there was limited guidance to support its adoption among community pharmacists, possibly delaying its adoption. The "patient-controlled" functionality of the MHR made it inherently difficult to use as a single source of verified medical information, particularly for community pharmacists.[17] EP also has an element of "patient control", whereby patients can opt to have a medicine prescribed via EP or paper-based prescription.[5] Functionality and patient control should be balanced with utility for clinical practitioners.

The implementation of RTPM has been attributed to clear policy and advocacy in addressing the misuse of controlled medicines,[2, 6] financially incentivized implementation,[50] expedited deployment during the COVID-19 pandemic,[13] and its availability as a reliable, real-time source of verified medicines-related information.[3, 18] Its applicability to existing processes relating to the record and provision of medicines make it a technology that is, in theory, easy to adopt.

It follows that digital streamlining of workflow assists with the integration of advanced systems, enabling advanced practice. If the MHR is anticipated to have similar adoption as RTPM and EP, there needs to be some pragmatism in how it meets community pharmacists' needs. Complex standalone platforms such as the MHR offer the capability to detect patterns and anomalies and predict risk, and this capability would be exponentially greater if integrated with pharmacy dispensing software.

Implementation of these systems was evidently supported by published guidelines rather than practical training. This limitation is compounded by the paucity of research exploring the usability of these technologies and their impact on pharmacists' workflow and patient outcomes.

The professional and legal obligations of community pharmacists alone should be sufficient drivers of their adoption of technologies; however, willingness to provide advanced clinical services is required to move beyond a 'process' mindset. Implementation of the MHR was coupled with commentary on the benefits of accessing patient health information to guide clinical decision making.[29] While community pharmacists were highlighted as early adopters of MHR,[43] there has been little in the way of programmatic research to establish drivers of this adoption and useful aspects of MHR in enabling clinical decision making.[17] Barriers to pharmacists' adoption revolved around the initial "opt-in" patient-controlled nature of the system.[17, 49] In addition, patient-restricted access limiting the clinical utility of the system.[17]

Jurisdictional guidelines for the RTPM were more detailed than national resources due to differences in RTPM platforms and the medicines to be monitored around Australia.[7, 19, 24-27, 30, 31] Indeed, national guidelines directed pharmacists to their local resources.[3] Commentary around the importance of RTPM in preventing patient harm may have aided its implementation;[39, 41, 44, 46] however, this has not been explored in community pharmacy.

Following this narrative review, the following points summarize areas of improvement for the MHR, RTPM and EP in community pharmacy:

1. There needs to be national harmonization in advocacy for technology systems and the provision of practice support for pharmacy organizations and community pharmacists.
2. Federal and state/territory governments should ensure timely dissemination of information to pharmacy organizations and community pharmacists to support the implementation of technologies.

3. Pharmacy organizations and community pharmacists need to be willing to adopt new technologies.
4. Greater investment in evaluating newly implemented technology will enable an understanding of the needs and user experiences of community pharmacists.
5. Automation that supports administrative tasks will enhance the adoption of more advanced technology systems.

Strengths and limitations

The key strength of this narrative review is its coverage of pharmacy technologies that support advanced practice. Evaluating literature relating to the MHR, RTPM, and EP through the lens of the TEK framework has identified numerous gaps that we pose as directions for further research and enablers for noting by software vendors and government agencies. The key limitation of this review was its restriction to Australian technologies and exclusion of resources that were not publicly available.

CONCLUSIONS

Digitally enabled platforms are part of the multifaceted approach to address the needs of Australia's healthcare system. As community pharmacists' roles expand, pharmacists require timely, reliable access to clinical decision support and digital communication with patients and other healthcare professionals. The MHR, RTPM and EP have capacity to support the medication management pathway. Evaluation of these systems is essential in addressing barriers to adoption and ensuring they can support community pharmacists and, where relevant, patients. Critique of the MHR, RTPM and EP literature against the TEK framework identified a knowledge gap in the evaluation of these systems in the context of community pharmacy and an apparent need to ensure that community pharmacists, among other stakeholders, are included in plans to assess and implement technology into practice.

CONFLICTS OF INTEREST

None declared.

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References

1. Pharmaceutical Society of Australia. Electronic prescriptions. https://www.psa.org.au/ep/; 2023 . (Accessed 21 June 2023).
2. Implementation of the My Health Record System https://www.anao.gov.au/work/performance-audit/implementation-the-my-health-record-system; 2019. (Accessed 25 August 2023).
3. Australian Government: Department of Health and Aged Care. National Real Time Prescription Monitoring (RTPM). https://www.health.gov.au/our-work/national-real-time-prescription-monitoring-rtpm?language=en; 2023 . (Accessed 21 June 2023).
4. Pharmaceutical Society of Australia. Digital health guidelines for pharmacists. https://www.psa.org.au/resource/digital-health-guidelines-for-pharmacists/; 2021. (Accessed 21 June 2023).
5. Queensland Government: Queensland Health. QScript. https://www.health.qld.gov.au/clinical-practice/guidelines-procedures/medicines/qscript; 2023. (Accessed 21 June 2023).
6. Pharmaceutical Society of Australia. Connecting the dots: Digitally empowered pharmacists. https://www.psa.org.au/wp-content/uploads/2019/07/Connecting-the-dots-Digitally-Empowered-Pharmacists.pdf; 2019. (Accessed 21 June 2023).
7. Australian Digital Health Agency. Safe, seamless and secure: evolving health and care to meet the needs of modern Australia. https://www.digitalhealth.gov.au/sites/default/files/2020-11/Australia%27s%20National%20Digital%20Health%20Strategy%20-%20Safe%2C%20seamless%20and%20secure.pdf; 2018. (Accessed 21 June 2023).
8. Pharmaceutical Society of Australia. Digital Health Guidelines for Pharmacists. https://www.psa.org.au/3d-flip-book/digital-health-guidelines-for-pharmacists-adha/; 2021. (Accessed 16 May 2022).
9. Australian Government, Department of Health and Aged Care Achieving continuity in medication management: Guiding principles. https://www.health.gov.au/resources/publications/guiding-principles-to-achieve-continuity-in-medication-management?language=en; 2022. (Accessed 7 August 2023).
10. Shah S, Coughlan J. How prescribers can use technology to improve patient care. Journal of Prescribing Practice. 2019;1:198-203. https://doi.org/10.12968/jprp.2019.1.4.198
11. Stylianides A, Mantas J, Roupa Z, Yamasaki EN. Development of an evaluation framework for health information systems

(DIPSA). Acta Informatica Medica. 2018;26:230-4. https://doi.org/10.5455/aim.2018.26.230-234
12. Ogundipe A, Sim TF, Emmerton L. Development of an evaluation framework for health information communication technology in contemporary pharmacy practice. Explor Res Clin Soc Pharm. 2023;9:100252. https://doi.org/10.1016/j.rcsop.2023.100252
13. Tan T, Chan S, Ind M, Pace G, Bailey J, Reed K, et al. Benefits and challenges of electronic prescribing for general practitioners and pharmacists in regional Australia. Aust J Rural Health. 2023;31(4):776-81. https://doi.org/10.1111/ajr.12999
14. Sim TF, Hattingh HL, Sunderland B, Czarniak P. Effective communication and collaboration with health professionals: A qualitative study of primary care pharmacists in Western Australia. PLoS One. 2020;15(6):e0234580. https://doi.org/10.1371/journal.pone.0234580
15. Zhang Z, Guo L, Si R, Chalmers L, Filippin P, Carpenter J, et al. Pharmacists' perceptions on real-time prescription monitoring (RTPM) systems - a cross-sectional survey. Explor Res Clin Soc Pharm. 2022;5:100122. https://doi.org/10.1016/j.rcsop.2022.100122
16. Kosari S, Yee KC, Mulhall S, Thomas J, Jackson SL, Peterson GM, et al. Pharmacists' Perspectives on the Use of My Health Record. Pharmacy (Basel). 2020;8. https://doi.org/10.3390/pharmacy8040190
17. Hoppe D, Liu CG, Khalil H. Healthcare practitioner use of real-time prescription monitoring tools: an online survey. Aust Health Rev. 2023;47:208-16. https://doi.org/10.1071/ah22257
18. ACT Government: Health. Canberra Script information for health practitioners. https://www.health.act.gov.au/canberrascript/health-practitioner-information; 2023. (Accessed 21 June 2023).
19. Australian Digital Health Agency. Electronic prescribing for dispensers. https://www.digitalhealth.gov.au/healthcare-providers/initiatives-and-programs/electronic-prescribing/for-dispensers; 2023. (Accessed 21 June 2023).
20. Australian Digital Health Agency. Electronic prescribing. https://www.digitalhealth.gov.au/healthcare-providers/initiatives-and-programs/electronic-prescribing; 2023. (Accessed 21 June 2023).
21. Australian Digital Health Agency. My health record: Information for healthcare providers and organisations. https://www.digitalhealth.gov.au/healthcare-providers/initiatives-and-programs/my-health-record; 2023. (Accessed 21 June 2023).
22. Australian Digital Health Agency. My Health Record participation obligations. https://www.digitalhealth.gov.au/healthcare-providers/initiatives-and-programs/my-health-record/register-and-set-up-access/participation-obligations; 2022. (Accessed 7 August 2023).
23. Government of South Australia: SA Health. ScriptCheckSA. https://www.sahealth.sa.gov.au/wps/wcm/connect/public+content/sa+health+internet/clinical+resources/clinical+programs+and+practice+guidelines/medicines+and+drugs/drugs+of+dependence/scriptchecksa+real+time+prescription+monitoring+in+south+australia/scriptchecksa+real+time+prescription+monitoring+in+south+australia; 2023. (Accessed 21 June 2023).
24. Government of Western Australia Department of Health. Real time prescription monitoring. https://www.health.wa.gov.au/Articles/N_R/Prescription-monitoring-in-Western-Australia; 2023. (Accessed 21 June 2023).
25. Nothern Territory Government: NT Health. NTScript information for health professionals. https://health.nt.gov.au/professionals/medicines-and-poisons-control2/ntscript-information-for-health-professionals; 2023. (Accessed 21 June 2023).
26. NSW Government. SafeScript NSW: Health practitioners. https://www.safescript.health.nsw.gov.au/health-practitioners; 2023. (Accessed 21 June 2023).
27. Pharmacy Guild of Australia. Electronic Health Records for Prescribed Supply and Services: A- Prescribed Medicines – Services and programs. https://www.guild.org.au/__data/assets/pdf_file/0019/5941/electronic-health-records-for-prescribed-supply.pdf 2012. (Accessed 21 June 2023).
28. Pharmacy Guild of Australia. My Health Record: Pharmacy – what's in it for me and my patients? ; https://www.guild.org.au/__data/assets/pdf_file/0016/9106/my-health-record-pharmacy-whats-in-it-for-me-and-my-patients.pdf; 2016. (Accessed 21 June 2023).
29. Tasmanian Government: Department of Health. Medicines and poisons regulation information for health professionals: Real time prescription monitoring. https://www.health.tas.gov.au/health-topics/medicines-and-poisons-regulation/medicines-and-poisons-regulation-information-health-professionals/real-time-prescription-monitoring; 2023. (Accessed 21 June 2023).
30. Victoria State Government: Department of Health. SafeScript. https://www.health.vic.gov.au/drugs-and-poisons/safescript; 2023. (Accessed 21 June 2023).
31. Australian Pharmaceutical Publishing Company Ltd. PDL practice alert: MHR: What are the rules? AJP: The Australian Journal of Pharmacy; https://search.informit.org/doi/10.3316/informit.337970537497818; 2019. (Accessed 21 June 2023).
32. Australian Pharmaceutical Publishing Company. PDL practice alert: Schedule 8 medicines management. AJP: The Australian Journal of Pharmacy; https://search.informit.org/doi/10.3316/informit.529468843709329; 2022. (Accessed 21 June 2023).
33. Australian Digital Health Agency. Framework for action: How Australia will deliver the benefits of digitally enabled health and care. https://www.digitalhealth.gov.au/sites/default/files/2020-11/Framework_for_Action.pdf; 2018 . (Accessed 21 June 2023).
34. Australian Commission on Safety and Quality in Health Care. Impact of digital health on the safety and quality of health care. https://www.safetyandquality.gov.au/sites/default/files/migrated/Report-The-Impact-of-Digital-Health-on-Safety-and-Quality-of-Healthcar....pdf; 2018. (Accessed 21 June 2023).
35. Australian Commission of Safety and Quality in Health Care. Tenth clinical safety review of the My Health Record system.

https://www.safetyandquality.gov.au/sites/default/files/migrated/My-Health-Record-Clinical-Safety-Review-10-Summary-Report-Feb-2018.pdf; 2018. (Accessed 21 June 2023).
36. Australian Commission on Safety and Quality in Health Care. Safety issues at transitions of care. https://www.safetyandquality.gov.au/sites/default/files/migrated/Safety-issues-at-transitions-of-care-consultation-report.pdf; 2017. (Accessed 21 June 2023).
37. Pharmaceutical Society of Australia. Data security: For your eyes only. Australian Pharmacist; https://search.informit.org/doi/10.3316/informit.223750423685052; 2018. (Accessed 21 June 2023).
38. Pharmaceutical Society of Australia. Prescription monitoring: Keeping watch. Australian Pharmacist; https://search.informit.org/doi/10.3316/informit.222706977294593; 2018. (Accessed 21 June 2023).
39. Australian Pharmaceutical Publishing Company Ltd. Eprescribing: Keeping to the script. AJP: The Australian Journal of Pharmacy; https://search.informit.org/doi/10.3316/informit.721673627962135; 2021. (Accessed 21 June 2023).
40. Pharmaceutical Society of Australia. Real-time prescription monitoring: RTPM experiences how it works well. Australian Pharmacist; https://search.informit.org/doi/10.3316/informit.458980313439558; 2021. (Accessed 21 June 2023).
41. Pharmaceutical Society of Australia. Feature: Health records: Unlocking my health record. Australian Pharmacist; https://search.informit.org/doi/10.3316/informit.765155722287784; 2018. (Accessed 21 June 2023).
42. Pharmaceutical Society of Australia. Digital innovation in pharmacy - what your future looks like. Australian Pharmacist; https://search.informit.org/doi/10.3316/informit.464905598299666; 2019. (Accessed 21 June 2023).
43. Pharmaceutical Society of Australia. Real-time update. Australian Pharmacist; https://search.informit.org/doi/10.3316/informit.451322162252438; 2020. (Accessed 21 June 2023).
44. Australian Pharmaceutical Publishing Company. Do you know about my health record? PS Post Script; https://search.informit.org/doi/10.3316/informit.201135682767731; 2017. (Accessed 21 June 2023).
45. Pharmaceutical Society of Australia. Real-time prescription monitoring: Dispensing in the dark for some, RTPM will come too late. Australian Pharmacist; https://search.informit.org/doi/10.3316/informit.458831249669493; 2021. (Accessed 21 June 2023).
46. Jackson S, Peterson G. My Health Record: a community pharmacy perspective. Aust Prescr. 2019;42:46-7. https://doi.org/10.18773/austprescr.2019.009
47. Pharmaceutical Society of Australia. President: My health record: A game-changer in provision of pharmacist care. Australian Pharmacist; https://search.informit.org/doi/10.3316/informit.638395619283911; 2018. (Accessed 21 June 2023).
48. Pharmaceutical Society of Australia. Member opinion: My Health Record: To opt out or not to opt out: Patients and My Health Record. Australian Pharmacist; https://search.informit.org/doi/10.3316/informit.227626081706758; 2018. (Accessed 21 June 2023).
49. Australian Pharmaceutical Publishing Company Ltd. Pharmacy Guild of Australia: eScripts: The shining light in eHealth. AJP: The Australian Journal of Pharmacy; https://search.informit.org/doi/10.3316/informit.309689798917149; 2014. (Accessed 21 June 2023).
50. Pharmaceutical Society of Australia. Real-time prescription monitoring for Victoria. Australian Pharmacist; https://search.informit.org/doi/10.3316/ielapa.643072495069719; 2017. (Accessed 21 June 2023).
51. Australia PGo. Community Pharmacy Roadmap Program Development Template Program/Service Quadrant: Pharmacist Prescribing - Protocol Driven D - Outreach Health Services and Programs 2011.Available: URL|.
52. Australian Government: Department of Health and Aged Care. Modernising My Health Record - Improved sharing of pathology and diagnostic imaging information. https://www.health.gov.au/our-work/modernising-my-health-record-improved-sharing-of-pathology-and-diagnostic-imaging-information; 2023. (Accessed 13 November 2023).
53. About the Guild. https://www.guild.org.au/about-us; 2023. (Accessed 20 October 2023).
54. Mooranian A, Emmerton L, Hattingh L. The introduction of the national e-health record into Australian community pharmacy practice: pharmacists' perceptions. Int J Pharm Pract. 2013;21:405-12. https://doi.org/10.1111/ijpp.12034
55. Shackel B. Usability – Context, framework, definition, design and evaluation. Interact Comput 2009;21:339-46. https://doi.org/10.1016/j.intcom.2009.04.007
56. PDL. About. https://pdl.org.au/about/; 2023. (Accessed 4 September 2023).
57. Australian Commission on Safety and Quality in Health Care. Seventh clinical safety review of the My Health Record system. https://www.safetyandquality.gov.au/sites/default/files/migrated/Seventh-7.2-Medicines-view-Clinical-Safety-Review-of-the-My-Health-Record-System.pdf; 2016. (Accessed 21 June 2023).