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Final Report

August 2018

The Impact of My Health Record Use in Primary Care: a mixed methods study

Reference No: DH0562

for The Australian Digital Health Agency

Executive summary

The Impact of My Health Record Use in Primary Care in Western Sydney: a mixed methods study

Research team

The chief investigators on this project were Dr. Kate McBride [1] and Ms. Patricia Cornell [2] and The MHR Impact Investigating Team[3]

[1] School of Medicine and Translational Health Research Institute, Western Sydney University;

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Acknowledgements

This executive summary combines the key mixed methods findings of the sub-study of the NSW GP Data Linkage Pilot Project which has been carried out in partnership between Pen CS, NSW Ministry of Health and Western Sydney Primary Health Network as well as that of The Impact of My Health Record use in Primary Care in the Western Sydney Primary Health Network Region: qualitative sub-study, carried out in partnership between Western Sydney Primary Health Network and Western Sydney University.

Neither projects would have been possible without the support of the general practices across Western Sydney that participated. Both projects were overseen by The MHR Impact Investigating Team.

Summary complied by Dr. Kate McBride, Western Sydney University and Ms. Patricia Correll, NSW Ministry of Health.

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Table of Contents

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Executive summary

1 Background

This executive summary describes the key triangulated mixed methods findings from the quantitative NSW GP Data Linkage Pilot Project: My Health Record sub-study and The Impact of My Health Record use in Primary Care in the Western Sydney Primary Health Network Region: qualitative sub-study. The methodology and findings from each of these studies is described in detail in the summary reports for each of the projects. The purpose of the mixed methods executive summary is to provide an overview of where the findings of each of these projects support each other within the context of the overarching aim of evaluating the benefits My Health Record (MHR) use in Primary Care in the Western Sydney Primary Health Network Region.

MHR is designed to be an effective digital system of shared and connected patient information to support improved health care, with key health information located on the system, which has been designed to be a central repository of an individual uploaded electronically in summary form. When using health services, a patient who has a MHR can grant the provider access to this summary information to inform their health care management. Currently MHR is an 'opt-in' system requiring patients and healthcare providers to register to participate, with the full roll-out of MHR in Australia ongoing. The system has been available for opt-in for some time, however recently, there have also been opt-out trials of my Health Record in selected regions. Western Sydney, the site of this project GP Data Linkage Pilot Project, is currently still an opt-in region of NSW for MHR.

Expectations of findings varied between the qualitative and quantitative research teams. The qualitative research team had no expectations of findings given they were based outside of the health care system at Western Sydney University. This adds to the strength of the qualitative findings as that research team had no pre-conceived ideas that could bias the data collection and

analysis. The quantitative sub-study sought to explore hypotheses based on previous research that shared patient records could improve medication safety and management through:

- Reduced incidence of medication errors and/or adverse drug events
- Reduced hospital admissions and/or cost of treatment and/or length of stay, ED and/or GP visits

2 Aim

To triangulate the quantitative findings from the GP Data Linkage Project: My Health Record sub-study with the qualitative findings of The Impact of My Health Record use in Primary Care in the Western Sydney Primary Health Network Region: qualitative sub-study, to examine benefits and impact of My Health Record in the Region.

3 Methods

The methods for each sub-study have been described in detail elsewhere (1, 2). For this overarching mixed methods study, a concurrent triangulation mixed methods approach was to be used, where quantitative and qualitative data were collected at the same time (3). Studies with a concurrent triangulation design prioritise both quantitative and qualitative methods, however results are separated for analyses, then integrated, or triangulated, during interpretation (4). The data collected in the qualitative evaluation was therefore initially analysed independently of the quantitative data before the findings were subsequently triangulated with the results of that analysis.

4 Findings

4.1 Key Findings of the NSW GP Data Linkage Project: My Health Record sub-study

The sub-study of the Pilot Project compared the characteristics and outcomes such as hospital admissions and emergency department presentations, duplication of services, and adverse events,

among patients who had a My Health Record (MHR) (n=9,154), with those who did not have a MHR (n= 116,515).

Approximately 7% of patients were identified in the participating Western Sydney general practices as having a MHR. However, this varied from around 2% to 20% depending on the type of source clinical information system used in each general practice. Compared to all other patients, patients with a MHR tended to be older, have more chronic conditions, use more medications and have more hospital admissions and ED presentations. From these findings, it appears that early adopters of MHR in Western Sydney were predominantly those patients who have poorer health.

4.2 Key Findings of The Impact of My Health Record use in Primary Care in the Western Sydney Primary Health Network Region: Qualitative sub-study

A total of 35 primary care practitioners and practice staff participated in the qualitative sub study between February 2018 and June 2018. Purposive sampling was used to recruit higher MHR use primary care participants in the Western Sydney PHN region (with a further 4 participants from the 'Opt Out' Nepean Blue Mountains Region).

Findings from this research revealed several insights into the primary care experience, in the Western Sydney Primary Health Network region, around satisfaction and impact of MHR on daily practice. The most promising finding of this sub-study were the positive perceptions of MHR among these primary care providers, despite current low usage of MHR in the context of some limitations and challenges to use. MHR was especially viewed as being beneficial in acute care settings and in the care of complex patients, for example patients with chronic conditions as well as the elderly and culturally and linguistically diverse (CALD) individuals, with these patients being encouraged to opt in as a priority. This research also found that the system needed to be populated with comprehensive high-quality data, presented in a user-friendly manner, in order for the use of MHR to improve. This is because some of the factors affecting motivation to use MHR are the limited availability of viewable data, data quality, low interaction with other health care providers and the lack of current clinical outcome improvements.

4.3 Mixed Methods Findings

Comparison of the qualitative findings with the quantitative findings revealed a number of consistencies, particularly in the characteristics of patients registering for MHR. For example, the quantitative study found patients in the MHR group tended to have higher proportions in the ages 55-75 years and less aged 25-45 years compared to patients in the No MHR group. Patients in the MHR group also tended to have a higher proportion of each of the selected chronic diseases than those in the No MHR group, with fewer patients (51%) in the MHR group having no identified chronic conditions compared to patients in the No MHR group (70%). These findings are reflected by the qualitative sub study primary care practitioner descriptions of the type of patients being registered for MHR as a priority at their practices. These patients were typically elderly, more complex patients with chronic conditions and co-morbidities as well as patients who were from CALD backgrounds. These patients were qualitatively perceived by primary care practitioners in the Western Sydney PHN region as those in the highest need of MHR, and who would benefit most from clinicians other than their general practitioner having ready access to their health information.

Primary care practitioners also reported multiple medication use in this priority group, which supports the quantitative findings showing a higher proportion of patients in the MHR group recorded as being prescribed selected medications than those in the No MHR group. Furthermore, a higher proportion of patients in the MHR group experienced hospital admissions (nearly 10% higher), and increased emergency department presentations when compared to the No MHR group. Again, this was consistent with qualitative interviewee accounts of the characteristics of the patients they encouraged to register with MHR, that is, those more likely to be experiencing poorer health. Significantly, this was reported by qualitative interviewees as the group of patients they could see MHR being of most benefit in terms of medication management and continuity of care.

The quantitative sub-study found there was an increased proportion of patients in the MHR group who were admitted to hospital for adverse drug events as compared to the No MHR group (10.7% and 6.6% respectively). This is also consistent with the qualitative primary care perspectives on the heightened need for MHR among the priority patients they identified, due to their greater risk of adverse drug events.

5 Future research

There is a need for ongoing enquiry in these areas. Specifically, mixed methods research examining case studies of individuals with chronic conditions as they navigate through the health system could add an important perspective to benefits and limitations of MHR to patients and clinicians. This could also highlight repetitions, such as duplication of pathology, experienced by patients during their healthcare journeys and help to reduce unnecessary servicing in the system. As experience and duration of MHR evolves, detection of the impacts of MHR will become more viable in quantitative and qualitative studies such as those presented here. Therefore these mixed methods approaches should be revisited as MHR becomes more established in Australia. Further, closer mixed methods scrutiny of uptake among the broader range of sectors of the healthcare system will be warranted.

6 References

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The impact of My Health Record use in primary care in the Western Sydney Primary Health Network region: Qualitative evaluation

August 2018

Research team

The chief investigators on this project were Dr Kate McBride [1], Prof Andrew Page [1] and Dr Shahana Ferdousi [2] with Ms. Sandra Sonego [1] as associate investigator.

[1] School of Medicine and Translational Health Research Institute, Western Sydney University;
[2] Western Sydney Primary Health Network.

Credits

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Contents

List of Figures and tables

7 Executive Summary

This report presents the findings of a qualitative evaluation of My Health Record (MHR) use among primary care practices in the Western Sydney Primary Health Network, who have been part of the Western Sydney General Practice Data Linkage Pilot Project (currently still an opt-in region of NSW for MHR). MHR is designed to be an effective digital system of shared and connected patient information to support improved health care with the introduction giving healthcare organisations the opportunity for faster, easier access to important summary health information for their patients. While there is some evidence that MHR improves the efficiency and effectiveness of the Australian health system, a consistent improvement of quality care has not yet been demonstrated and potentially may also be increasing healthcare provider workload.

The present study aimed to qualitatively examine how MHR may impact on clinicians and consumers by potentially improving work efficiency, reducing time spent on communication with other clinicians, improving medication safety, and reducing duplicative diagnostic imaging and pathology testing.

Findings from this research reveal several insights into the primary care experience, in the Western Sydney Primary Health Network region, around satisfaction and impact of MHR on daily practice. The most promising finding is the positive perceptions of MHR among these primary care providers, despite current low usage coupled with the limitations and challenges outlined in this study. For frequency of use of MHR to improve, however, population of the system with comprehensive high-quality data, presented in a manner that is user friendly and efficient to use is much needed as factors strongly affecting motivation to use MHR are the limited availability of viewable data, data quality, low interaction with other health care providers and the lack of current clinical outcome improvements. As one GP reported “I’d use it all the time if I could easily access everything on there, why wouldn’t I?”

7.1 Key messages

MHR is positively viewed by primary care practices in Western Sydney

Almost unanimously, interviewees were able to see to see the future potential benefits of MHR to both their practice, in terms of streamlining communication and reducing unnecessary tests as well as the optimising care of their patients and reduction of adverse medical events.

MHR can optimise patient care among particular patient groups

MHR was especially viewed as highly beneficial in acute care settings and for their complex patients, the elderly and CALD individuals. It should be noted, however, that while some actual accounts provided by interviewees of proven benefits for patients, the perceived benefits for the majority of those interviewed were largely theoretical and based on such a time that adequate information was being uploaded into MHR across all clinical areas.

Positive attitudes found in primary care need to be fostered and utilised

The positive attitudes about the potential benefits of MHR presently held by primary care practitioners in the Western Sydney Primary Health Network region need to be harnessed. Healthcare practitioners require further encouragement, support and continual communication, including updates, incentives and reminders of MHR's benefits to maintain these attitudes. Should these positive attitudes not be supported, they may diminish in the currently minimal actual benefits being seen.

Evidence of MHR success can motivate use

To address concerns around the current lack of tangible benefits in clinical outcomes, further studies are suggested. Practitioners also need to see evidence that MHR is making a difference in patient care, and this could be communicated through individual patient cases that illustrate MHR successes, serving as motivation for consistent use of MHR.

Further promotion of the potential positive benefits to the clinicians and consumers is needed

Awareness building and encouragement needs to be delivered to both clinicians and patients to maximise MHR use. Specifically, the benefits outlined in this study, such as MHR being beneficial in emergency hospital settings, being helpful with older patients, CALD individuals and people with chronic conditions, need to be highlighted and better communicated to clinical users and consumers in a meaningful way. Clinicians also need to be equipped with tools to help them address patient concerns around security and confidentiality.

Early adopters of MHR could be peer champions

Identification of clinicians who are early adopters, and are skilled high frequency users can encourage other clinicians to increase their use of MHR. They could act as facilitators, role models, peer supporters, and ambassadors, helping to foster acceptance of change.

Wider implementation of MHR in different healthcare settings is needed

An important motivator for primary care use appears to be uptake and use by specialists and hospital based clinicians. Broader use of MHR among these other healthcare providers would be one of the important strategies to increase MHR use by addressing the lack of viewable data available, as well as providing the incentive of interdisciplinary teamwork leading to better management of patients. This uptake is seen as being essential to truly see an improvement in communication efficiency.

7.2 Key recommendations

- Development of an easy to follow checklist for clinicians to improve completeness of medication records, including reasons for medication changes, and to strengthen trust in MHR, in clinical care decision making
- Clear guidelines for clinicians on timelines for entering data to support currency of MHR information
- Improved presentation of the medicines information view to allow more efficient medication reconciliation activities, including classification and linking of medication listings, and incorporation of efficient and easy to use search functions
- Regular updates for primary healthcare providers on newly added features to MHR, such as private pathology and diagnostic imaging reports
- Increased compatibility between existing practice software and MHR as well as greater integration of information, to minimise duplication of medical reports received in GP software and MHR
- Improvement of navigation and data view of pathology and diagnostic imaging reports to include a summary of results overview page (request and summary of results) and addition of search functions
- Targeted education and awareness raising of MHR among hospital clinicians focussed on the benefits of MHR to improve continuity of patient care on admission to hospital and following discharge
- Development of an easy to follow tailored checklist for hospital based clinicians to improve completeness of medication records, including reasons for medication changes
- Provision of support and incentives to accelerate the connection of private hospitals to MHR
- Consultation and/or research to investigate the barriers to MHR use among specialists and hospital clinicians
- Leveraging early adopters of MHR to be peer champions of MHR to encourage use among their peers

- Creation of a simple visual prompt for GPs consultation rooms to encourage, remind and explain step-wise the MHR data entry processes as well as security of data, during consultation with patients
- Automated built-in reminder systems that delivers prompts to upload to MHR on GP software
- Introduction of MHR in medical curriculums
- Development of features on MHR that generate greater interactivity between clinicians, for example, a communication screen that could be used with patients under the care of multiple clinicians
- Investigation into an update function for records that may need to be amended, for example, care plans
- Consultation with clinicians on their workloads to determine how MHR can be better integrated into the existing daily workflow and become a routinely used system
- Assistance provided to practices to get patient data uploaded into MHR
- Attachment of CPD points to the MHR training to increase the uptake of this training

7.3 Study limitations

Some of the limitations of this study include the small sample size and restriction to practices in the Western Sydney region, that may affect generalisability of the findings. A further limitation of this study is that despite 'high MHR users' being targeted as participants, in reality usage in general was much lower than anticipated. Due to this overall low usage of MHR, some of the interview questions were unable to be answered by interviewees, as they had not yet accessed certain functions or were unaware of their availability. Consequently, while still valuable in being able to highlight possible future benefits of MHR, responses from interviewees on certain topics were largely hypothetical.

8 Background

The prevalence of medication use in the Australian general population is approximately 60% with the proportion of the population using prescription medications increasing with age, as does the number of medications used per person[1,2]. Approximately 2% to 3% of hospital admissions in Australia are caused by avoidable medication errors[3,4]. Medication errors are associated with considerable healthcare costs[5]. Further, it has been estimated that 13% of patients have experienced an adverse drug reaction after taking prescription drug medication prescribed by their primary care provider[6] It is also estimated that approximately 14% of pathology tests are duplicated as a result of doctors' lack of access to prior test results[7]. Electronic health records have been proposed as an important means to improve quality of patient care, reduce medical costs and improve safety[2,8].

My Health Record (MHR) is designed to be an effective digital system of shared and connected patient information to support improved health care and is a key element of the National Health Reform agenda. The introduction of MHR has given healthcare organisations the opportunity for faster, easier access to important summary health information for their patients, with an overall aim of creating a more efficient health system. Currently MHR is an 'opt-in' system requiring patients and healthcare providers to register to participate. In October 2016, the Australian Government trialled 'opt-out' sites in Northern Queensland and the Nepean Blue Mountains of New South Wales to assess the public response to different participation arrangements and guide strategies to improve MHR use. The 'opt-out' arrangement involves the automatic creation of a MHR unless individuals choose not to have one. Recommendations from a recent evaluation[9] have led to the MHR National 'opt-out', scheduled to roll-out later this year. This should accelerate improvements in continuity of care, reduced adverse events due to medication errors, reduced hospital admissions and improved medication management, particularly for chronic conditions[10-12].

While there is some evidence that MHR improves the efficiency and effectiveness of the Australian health system, a consistent improvement of quality care has not yet been demonstrated and potentially may also be increasing healthcare provider workload. The present study aims to qualitatively examine how MHR may impact on clinicians and consumers by potentially improving work efficiency, reducing time spent on communication with other clinicians, improving medication safety, and reducing duplicative diagnostic imaging and pathology testing. By gaining a better understanding of the impact of MHR on clinical practice, recommendations to guide and improve MHR adoption could be developed, and areas identified where current systems can be improved.

9 The Research Study

The aims of this study were to qualitatively explore GP and practice staff experiences of, and satisfaction with, using MHR in primary care in the 'opt in' site of Western Sydney Primary Health Network (PHN). This included the impact of MHR use on the improvement of medication safety and reduction of pathology and diagnostic imaging test duplication. A small sample of interviewees from the Nepean Blue Mountains (NBM) PHN were also included to examine any variance in MHR experiences and satisfaction of MHR due to NBM PHN's status as an 'opt out' site. These findings will be triangulated with quantitative findings from the NSW Ministry of Health led GP Data Linkage Project. It is anticipated that this study will contribute to the continual quality improvement of MHR, as well as highlight gaps in usage by primary care providers in the Western Sydney PHN. Identification of issues and gaps in usage will inform potential improvements that may in turn lead to an increase in quality patient care, enhanced medication safety and reductions in duplicative diagnostic imaging and pathology test requests.

This report presents the views of GP and practice staff experiences on the satisfaction and impact of MHR in daily practice, as well as their perspectives on the utility of MHR in being able to reduce adverse medical events as well as duplicate pathology and diagnostic imaging requests.

9.1 Research Methodology

A total of 39 primary care practitioners and practice staff participated in the study between February 2018 and June 2018. Purposive sampling was used to recruit high MHR use primary care participants in the Western Sydney PHN region. Potential participants were first identified and approached by Western Sydney PHN through existing communication channels. A list of select practices with known higher use of MHR was generated by Western Sydney PHN and provided to the Western Sydney University research team who contacted practices from the list to further explain the project, confirm participation and organise consent and interviews. Thirty-five interviewees were from primary care practices in the Western Sydney PHN region with an additional 4 interviewees from the Nepean Blue Mountains PHN region. Interviewees included 23 GPs, 5 practice managers, 8 practice nurses and 3 administrative staff (Table 1). Data was collected via one-on-one interviews and focus groups using a semi-structured interview schedule (Appendix 1).

9.1.1 Interviews

Trained interviewers from the Western Sydney University team conducted the interviews. Interviews and focus groups took place at the interviewees' place of work. In the few cases where it was not possible to conduct the interview at their practice, phone interviews were arranged. Primary care interviewees gave informed consent with all interviews and focus groups digitally recorded with permission. Reflective notes were also taken by the researcher conducting the sessions and interviewees were able to withdraw at any time without penalty. Topic areas focussed on the feasibility of MHR in being able to reduce adverse medical events, duplicate pathology requests and diagnostic imaging requests as well as satisfaction, impact and usability of MHR and recommendations to improve the use of MHR.

9.1.2 Data Analysis

All interviews and focus group content were transcribed verbatim by a professional transcription service. Interviewee contributions were de-identified as they were converted to transcribed text with names replaced by interviewee numbers. Transcripts were analysed by thematic (inductive) analysis [13], a qualitative method for identifying, reporting and interpreting patterns within interview data, informed by grounded theory methodology.

Table 1. Characteristics of primary care interviewees

Primary care role	Number of participants
Western Sydney region:	
General practitioner	22
Practice manager	5
Practice nurse	5
Administrative staff	3
Nepean Blue Mountains region:	
General practitioner	1
Practice nurse	3

10 Findings

10.1 General characteristics of MHR Use

10.1.1 There are positive perceptions of the potential benefits of MHR

In general, interviewees had a positive perception of MHR, speaking favourably about its potential to increase the efficiency of health services and deliver better quality of care to patients. Although interviewees indicated overall satisfaction with the use of MHR and could see its value as a tool for enhanced data sharing, interviewees reported that the clinical benefits of MHR were not yet being realised. Concrete examples of MHR's benefits are lacking, at this stage, in daily practice as the majority of clinicians could only speak about future hypothetical digital health benefits, rather than being able to provide real accounts of benefits actually being experienced. This is interesting given that MHR (previously named Personally Controlled Electronic Health Record) has been active since 2012, yet the interviewees in this study still viewed MHR as a 'new' system in the preliminary stages of adoption, believing it would take some further time to see the full benefits of the system. It is possible that the general low uptake of MHR among practitioners and the resultant limited availability of data on MHR contributed to this perception.

10.1.2 Patients with poorer health are being registered for MHR as a priority

MHR registration was considered to be a straight-forward and easy process, mostly without issue. Registration was primarily conducted by practice nurses. Only a few difficulties were cited with patients that had minimal or no technical ability, in particular elderly CALD individuals with language barriers. Other issues specified in the creation of MHR included mismatches with patient names, date of births, registration of newborns and patients with certain visa status. Of note, the majority of practices identified priority registration groups such as the elderly, those with chronic diseases and CALD individuals, consistent with the MHR patient characteristics identified in the Western Sydney General Practice Data Linkage Pilot Project.

10.1.3 Existing low frequency of MHR use

No interviewees considered themselves high users of MHR, with most classifying themselves as low to medium frequency users. High frequency use was defined by interviewees as routinely accessing and uploading data on MHR for the majority of patients as an integral part of daily practice. A number of interviewees described an initial increased frequency of use when MHR was introduced at their practices. This was followed by a decrease in frequency of use over time, when they found limited perceptible benefits (largely due to lack of content on MHR). The majority of practitioners who we

spoke to indicated they regularly uploaded health summaries to MHR, though several indicated this was largely due to the need to meet their 'quota' of uploads as required by the PHN, with several interviewees estimating the proportion of patients registered with MHR at their practices to be around 10%, which appears to be consistent with this quota fulfilling. Few reported consulting MHR routinely when seeing patients. Taken together with the low proportion of patients registered with MHR, high frequency use is not apparent among our interviewees.

10.1.4 Functions most commonly used on MHR

The most commonly reported functions accessed in MHR were the shared health summary, event summary, hospital discharge summaries, medicines information view, PBS data, MBS data, immunisation data and advanced care planning documents. Interviewees indicated infrequent utilisation of other features such as e-referral letters, pathology reports and diagnostic imaging, specialist letters, child development information and any patient-entered data. As GPs access MHR through their various clinical information systems (CIS), it is anticipated that function use may be affected by differences in each CIS, however it should be noted that number the interviewees we spoke to had limited knowledge around information technology (IT).

10.1.5 MHR is easy to use with regular use

Interviewees on the whole described MHR as being easy to use and navigate, though there were some issues with specific areas of MHR. While MHR was considered easy to use, the low frequency of use meant that building familiarity and confidence through the routine practice of accessing MHR was difficult to achieve. There was one case of a completely paper-based GP that was entirely unfamiliar with MHR. Although this GP may represent a small minority it is expected that competency in dealing with technology would affect MHR's perceived ease of use. Other specific issues related to usability are discussed further in the relevant sections.

10.1.6 In general, patients are positive and receptive to MHR

Interviewees viewed their patients as positive and receptive to MHR once the benefits to their health outcomes were clearly explained to them, such as improving the patients' critical safety when they are not in the vicinity of their practice.

All are quite accepting, especially when you really talk about the positive factors, like nobody is confused about your medications, nobody is going to forget about your allergies and this is a medical record that you can take wherever you go (General Practitioner, P03)

Without explanation and encouragement to their patients, interviewees perceived the awareness and priority of MHR among these patients to be low. Some patients assumed an advanced level of data upload to MHR, often asking healthcare providers to "look up their file", believing all their past medical records were readily accessible. Interviewees indicated that only a very small group of patients had concerns about privacy and data security. This, however, may be due to the specific characteristics of the patients currently enrolled in MHR. It is likely they have considerable health concerns, given the priority enrolment of patients with complex and chronic conditions, with these health concerns outweighing any privacy and data security concerns.

Of note, however, interviewees in this study reported they were unclear on how to address the patients' concerns, as they were not experts in IT, with one interviewee expressing it was unfair to place the responsibility on GPs of explaining this type of information (around security and confidentiality) to patients. If clinicians are unable to adequately deal with patient's privacy and data security concerns it may potentially represent a barrier to consumer uptake of MHR for the general population.

I'm not an IT person. Any security – If they can hack the American Government, they can hack anyone. I don't know. This is not my area (General Practitioner, P29)

It's impossible. And to shove this to me and make me responsible for it and I have to convince the patient and teach the patient all that kind of stuff. It's really unfair, totally unfair, 'cause the government haven't done their homework, they haven't advertised it, they haven't explained it to patients what it's all about, and most of them, the people have some kind of worries about this – who's gonna know what and when? It might affect my WorkCover cases, it might affect my ex-wife, whatever it is. So there's issue of privacy which really hasn't been explained properly which I understand for the patient. (General Practitioner, P06)

Recommendations:

- **Provision of clear explanatory materials for GPs to use to address patient concerns around security and confidentiality of data on MHR**
- **Broader marketing strategy of MHR potential benefits e.g. for patients with complex conditions, to the general public**
- **Distribution of clear guidelines on who can access MHR data to reduce public confusion around safety and visibility of their medical records**

10.2 Medicines information view and medication safety

10.2.1 Primary care providers see themselves as having a key role in medication safety

The medicines information view was stated by interviewees as being an increasingly common function used within MHR. Most interviewees were satisfied with this aspect of MHR and expressed optimism regarding its benefits, praising the ability to access and update patient medication data efficiently. The majority of our interviewees were optimistic about the contribution this function of MHR could make towards reducing medication errors in the future. Medication tracking on MHR was believed to provide the opportunity for increased transparency and improved quality of care for their patients.

GPs clearly identified themselves as holding the primary responsibility for providing and maintaining accurate medication information for their patients and recognised their central role in medication safety. Though some physicians could at times feel overburdened by meeting MHR upload quotas, ensuring and improving the safety of their patients was a strong motivator to continue uploading data to MHR.

10.2.2 MHR has the potential to improve patient care

The MHR medicines information view was seen as being able to provide direct benefits to patients as well as having the potential to reduce medication errors and adverse drug events. These benefits were perceived to be especially accentuated in acute health settings where patients were suddenly admitted to hospital, had limited English language skills or were unconscious. Rather than needing to call GP surgeries to obtain medication information or if the emergency event occurred after-hours, the immediate access to the patient's most updated medication data could facilitate and improve the quality of care provided in these crisis situations and could save lives in time-critical conditions, if the information was being accessed by other clinicians. Interviewees reported that the anxiousness often experienced by patients and their families during an emergency could affect their recall of medication details and this feature of MHR could greatly alleviate stress and worry, overcoming obstacles to optimal care. However, it was reported that GPs still received calls from emergency departments who failed to access relevant information on MHR, indicative that routine use of MHR is still sub-optimal in other healthcare settings.

Interviewees also believed that the availability of medication data on MHR was especially valuable in managing their complex patients, such as those with multiple chronic conditions. Complex patients are typically on numerous medications and the opportunity to enhance the tracking of their medications was well regarded, and could be seen to reduce the potential risks of medication errors

in this group. Primary care providers expressed great satisfaction at being able to re-assure their complex patients that their records would be accessible in any healthcare setting, including overseas.

> ***I have lots of complex patients so I can see the value to my complex patients of having an accurate health record so that when they do go somewhere else, whoever is treating them has access to accurate information. (General Practitioner, P29)***

Elderly patients, especially those that frequently travel ('grey nomads') were mentioned on several occasions as being excellent candidates for MHR. Other specific groups that were described as gaining most benefit were culturally and linguistically diverse (CALD) patients, where MHR could overcome language barriers, and patients who have memory issues or intellectual disabilities.

> ***Like I said, the different groups of people, like our seniors who travel a lot who are on multiple medications, or culturally and linguistically diverse population where English is a barrier for them to explain what exactly is happening, so they don't have to go a whole a lot and explaining, even for other patients who have certain problems that when they meet somebody new, they need to explain that with them, so everything is there. (General Practitioner, P03)***

Furthermore, there were both perceived and actual advantages identified for new patients coming to their practices or patients moving to another location. Although patients can often list their medications from memory, they may forget doses or confuse medication names. Accessibility to an up-to-date MHR medications view in these cases was seen to save time, without having to re-gather clinical information or request records from other medical practices. Instead that time was used for the actual consultation. In two of the practices within the sample, this benefit had already been experienced.

> ***That's been so helpful. It's happened a few times. I'm like, "Oh, that's good," 'cause they were out of area and they were travellers or new to the practice. And then looking again at their medical history, so then we know what we're dealing with or like why they're – they might be on Warfarin and, "Why are you on Warfarin?" We have no idea why they're on Warfarin. And you have a look. Oh, it's because they've had a DVT. (General Practitioner, P35)***

Regarding the transition of patient care, the ability to access any changes to medications upon discharge from hospital was also highly valued and deemed helpful in clarifying the patient's continued care and preventing possible medication misadventures. One criticism of the electronic discharge summaries however was that sometimes when medications were changed during hospital visits, the explanation for the changes were lacking, with GPs stressing the importance of providing

complete medicines information. This concern is consistent with previous research comparing electronic and paper-based discharge summaries [14].

> ***I don't know that I've used it at all for the moment. I mean, 'cause you've got to have data up there, you've got to have something to download. And I think when it comes to medication safety, the potential is I've got my accurate – this is what they're on and so when they go to the hospital, they know. But the question is how good are the quality of data that I get back from them because if they change their medications, I not only need to know what they've been discharged on but why. (General Practitioner, P29)***

An additional benefit of medicine record management on MHR was its promotion of continuous 'data cleaning' to keep records updated. This increased monitoring and added incentive to keep medication records frequently updated was a welcomed tool for continuous improvement and increased level of medication safety.

Although there were some actual accounts provided by interviewees of proven benefits for patients, the perceived benefits for the majority of those interviewed were largely theoretical and based on such a time that adequate information was being uploaded into MHR across all clinical areas. Currently, an observed low use of MHR in the broader medical population was reported, with the exception of medication updates from discharge summaries, GPs were primarily viewing their own uploaded information. Quantifiable improvements in medication safety could not yet be detected by interviewees, however they remained positive about the future of medication safety with the use of MHR and expressed that in order to reap the full benefits it could only work if all healthcare providers including hospital clinicians and specialists were all on board and contributing.

10.2.3 There is a concern in accuracy of medication information on MHR

A common concern expressed by interviewees was about the accuracy of medication information and its timeliness. Although the medicines information view is intended as a decision-making support tool, there was low confidence and trust that the record is a complete picture of the patient's medication history. Some of the reasons cited were that the accuracy of the records was highly dependent on whether the patients were granting access to their MHR when visiting other healthcare providers. Among our interviewees, there was both scepticism and curiosity about whether other healthcare providers were uploading medication data in a timely manner or whether any medication reconciliation was being conducted. The prospect of incomplete medication records appeared to

reduce the perceived reliability of the MHR medicines view and could present some challenges in clinical care decision making.

10.2.4 There is low confidence in MHR's ability to reduce 'doctor shopping'

Most practices did not report a high volume of 'doctor shopper' type of patients, such as those with opioid dependencies. However, interviewees did not feel confident that medication monitoring through MHR could result in a reduction of doctor-shopping, believing that patients would either choose to opt-out or restrict access to their record, rendering MHR inadequate for tracking medication use for this purpose. Interviewees felt limited in being able stop it, with some suggesting compulsory real-time prescription monitoring as a possible solution to the problem.

10.2.5 Issues exist with the usability and display of medication data

A number of interviewees discussed issues with the display of the medication data on the MHR medicines view. It is unclear whether this was dependent on the type of CIS used. In cases where patients were on multiple medications and had a high frequency of prescription and dispensing records, the medication items listing could be too numerous and overwhelming to view, which could cause confusion for healthcare practitioners and an increased risk of prescribing errors. Additionally, this presentation of medicines information could be time consuming to view. Some interviewees suggested the linking of medication items and enhanced search features to improve this medicines display issue.

Recommendations:

- **Development of easy to follow checklist for clinicians to improve completeness of medication records, including reasons for medication changes, and to strengthen trust in MHR, in clinical care decision making**
- **Clear guidelines for clinicians on timelines for entering data to support currency of MHR information**
- **Improved presentation of the medicines information view to allow more efficient medication reconciliation activities, including classification and linking of medication listings, and incorporation of efficient and easy to use search functions**

10.3 Pathology reports and diagnostic imaging

10.3.1 Viewing rates of pathology and diagnostic reports are currently low

There was low awareness and access of pathology reports and diagnostic imaging by interviewees on MHR, with only a small number of interviewees reporting use of the pathology reports function, and fewer having accessed diagnostic imaging due to the limited availability on MHR. Access to pathology and diagnostic imaging reports from public hospitals has been in place since April 2017, with private pathology and diagnostic imaging laboratories in the process of connecting to MHR at the time of this study. The limited use of these functions by interviewees is consistent with the low number pathology reports being uploading at the time of interview. Nonetheless, all interviewees could identify the substantial future theoretical benefits in the reduction of test duplications, cost and time savings, all which could lead to an increased quality of care for their patients. It is promising that despite not yet being able to fully benefit from these features, interviewees maintained a positive outlook about its use and looked forward to seeing the wider availability and use of these functions, indicating that primary care providers are no longer questioning the introduction and use of MHR in their practice.

As a more recently added function of MHR, limited use and viewing of the pathology reports and diagnostic imaging features were attributed to low awareness of their availability and reduced familiarity. Furthermore, interviewees reported a lack of available reports to view, with very few having encountered any uploaded pathology reports or diagnostic imaging as yet.

> ***I don't think that the rest of it, the ancillary parts, have been used much at all because the pathology and imaging is so new to be added to the My Health Record. I don't think that our providers here would have had much experience with that yet. (Practice Manager, P28)***

10.3.2 Immediate access to pathology and diagnostic imaging reports through MHR can optimise continuity of care

Most interviewees recognised the potential benefits of secure digital access to pathology and diagnostic imaging reports that could lead to timely viewing of reports and follow-ups, improved patient monitoring and minimisation of unnecessary duplication of tests. Among interviewees that had the opportunity to view pathology and imaging reports, GPs described the very satisfying experience of promptly and easily accessing pathology reports (where available), including being able to see follow up details clearly, saving time and receiving positive responses from their patients.

Yeah, because like I said, I haven't – actually, radiology, I have not had the opportunity to have a look as yet, but pathology definitely, because it's so much –my patients, they feel much more relieved because we have the time to sit down with them and then go through all the results with them like what we do here on an everyday basis, and explain to them what each of these results mean. Some results might be actually very comforting or would be a positive and that really helps them, so, yeah, definitely. (General Practitioner, P03)

Interviewees also mentioned the benefits in emergency situations when patients go to hospital out of hours, saving the need to re-do tests and providing clinicians with critical clinical information that could improve the patient's outcome. Similarly, upon being discharged from hospital it was considered potentially very valuable and efficient to have immediate access to the pathology and diagnostic imaging reports conducted while in hospital, reducing the time spent requesting copies of results.

Due to the very limited use of the pathology and diagnostic imaging reports on MHR, interviewee views on its advantages were mostly restricted to their envisaged potential benefits rather than current benefits being experienced. Some GPs stated that all patients' past pathologies and diagnostic imaging records would need to be available in order for these features to be truly useful, reduce duplicate testing and save costs.

10.3.3 Perceptions exist that MHR records may be incomplete, impacting on use

Some GPs indicated that the pathology reports and diagnostic imaging functions are currently somewhat limited and unreliable, and believed they would not represent a complete record of the patient's test history due to the patient being able to pick and choose what is uploaded and accessible. It is unclear whether this situation differs to patients providing selective verbal medical histories. It is possible it may indicate clinician expectations of higher standards for an electronic health system (perhaps due to the permanency and visibility by others of electronic records) compared to current practice. Additionally, interviewees mentioned that there did not appear to be many pathology laboratories or diagnostic imaging centres currently uploading reports to MHR, with only public pathology reports being available so far and none from private pathology companies.

I think pathology report as well, I think it's only from the hospital labs. I don't know if they are talking to the private pathology labs. I'm not sure whether that's come through and – radiology, I haven't had any patients so far, yet, but pathology yes. (General Practitioner, GP02)

This was reflected in several interviewees reporting that while they had accessed the pathology and diagnostic imaging features on MHR, they had not yet seen any reports available for view. Encountering this lack of data seemed to act as a barrier to continued use.

So, this one I'm looking at, at the moment, hasn't got anything in here. And he's in, I know he's had lots, so I – there's nothing actually in there. There's no pathology in there for some reason. (Practice Nurse, P36)

The combination of low data availability and low usage appeared to create a perception of limited current accessibility of pathology and diagnostic imaging records. Moreover, interviewees expressed the need for all healthcare providers to be contributing at the same level, with greater communication and collaboration in order to achieve the objectives of MHR.

Yeah, it's ridiculous the amount of waste that goes on just because people are too lazy to go and look and see if there's a result, or the patient doesn't remember or is sickly, just wanting to repeat everything because they don't trust the first result. So, if we had that information easily accessible, and at the moment, My Health Record is not easily accessible. (General Practitioner, P30)

There's no doubt, but the problem is, the objective of this – actually to save the government money, communicate well, so no doubling of tests and you know what safety of these drugs. That's not achieving at this stage because all players has to be playing the same game and the same level. (General Practitioner, P06)

10.3.4 Confusion around integration of existing CIS and ease of navigation in MHR is a barrier to MHR use

There were a few interviewees who indicated dissatisfaction with the navigation and data view of the pathology reports in their CIS, describing it as cumbersome, time consuming and laborious, requiring each test to be opened individually.

Yeah, as I said, I haven't seen any diagnostics but the pathology –and it was a hospital one, I think. It was very laborious to click, and save it in to your notes. There has to be an easy way to save things. I don't know, I'm not an IT but there has to be something that does not take – because, it's just – it wasn't worth my time. I looked at them but to actually save them into the file would have been very laborious. (General Practitioner, P29)

Other interviewees seemed to be confused about the clinical software requirements to access pathology reports, highlighting a need for further support and training in these MHR functions.

Pathology report, we have to – we still have to save it. I don't know whether we know how to do it or I'm not sure– I was told that should be able to December, but last year – but still, I don't know how to get that pathology report integrated as a report. Yeah. I don't know. (General Practitioner, P34)

In practices where pathology was already part of the GP clinical software, such as Medical Director, interviewees commented that there was an element of duplication, indicating that better integration of MHR and their practice software would be desirable. As non-IT specialists, GPs were unable to describe how this increased integration would work. In consideration of the current variability in practice CIS, one possible solution could be the standardisation of practice software, utilising one default CIS for MHR use.

Recommendations:

- **Regular updates for primary healthcare providers on newly added features to MHR, such as private pathology and diagnostic imaging reports**
- **Increased compatibility between existing practice software and MHR as well as greater integration of information, to minimise duplication of medical reports received in GP software and MHR**
- **Improvement of navigation and data view of pathology and diagnostic imaging reports to include a summary of results overview page (request and summary of results) and addition of search functions**

10.4 Availability of hospital discharge summaries increases use of MHR

One of the most favourably viewed and mentioned features of MHR were the hospital discharge summaries, which were a source of confidence in the potential benefits MHR could offer.

Interviewees identified several advantages of the electronic discharge summaries. One highly valued aspect was the improved legibility, providing greater ease in interpreting the document. Digital discharge summaries were also seen to facilitate the patient's transition of care, preventing any delays in the continuity of medical care and reducing any clinical information gaps. The discharge summaries were regarded as particularly useful in cases where patients forget or misplace their paper discharge summaries at follow up. Many patients may not know the precise names of surgeries, procedures, diagnosis or recall any alterations to their medications during their hospitalisations. The prompt access to this information allows the provision of quality, appropriate follow-up care by the GP, at the same level as when they were discharged.

Although the electronic discharge summaries were highly regarded, many interviewees had experienced delays and inconsistencies in their uploading. For example, one GP reported receiving a discharge summary four months after the patient's hospitalisation. Another GP told of a patient who had been hospitalised twice in the month, one discharge summary was uploaded while the other was not, highlighting inconsistent use among hospital clinicians. Additionally, interviewees stated they were not yet able to see discharge summaries from private hospitals.

Many of the interviewees emphasised the importance of complete, accurate and timely hospital discharge summaries (that could often be lacking), to ensure continuity of care among their patients.

Recommendations:

- **Targeted education and awareness raising of MHR among hospital clinicians focussed on the benefits of MHR to improve continuity of patient care on admission to hospital and following discharge**
- **Development of easy to follow tailored checklist for hospital based clinicians to improve completeness of medication records, including reasons for medication changes**
- **Provision of support and incentives to accelerate the connection of private hospitals to MHR**

10.5 Optimising MHR use among specialists and other healthcare providers could realise MHR's full potential

Very few of the interviewees reported encountering any information uploaded to MHR by specialists or other healthcare settings. Almost ubiquitously, the primary care providers we interviewed strongly believed that the full benefits of MHR would only be realised once specialists became active on MHR. Given their central role in coordinating the care of patients, GPs proposed that multi-disciplinary communication via MHR and more efficient communication would facilitate and enhance patient management.

And same with specialists, they play a big part in our management. If we don't have them on board as well, then that's a big gap 'cause we're focused so much on team management, multidisciplinary management with all the government sort of Medicare things like arrangements and management plans that we're coordinating. If we are seen as – GPs are coordinators of care for patients –how can we coordinate things if we don't have the information? So it's really hard for us to do (General Practitioner, P35).

Currently, letters from specialists can take several weeks to arrive with the primary care provider, with patients typically following up with their GP before the letter arrives. This results in time being needed to chase up specialist letters or even an element of guesswork in follow-up treatment while waiting for the letter. Having the capability to access specialist letters on MHR was considered to be a key aspect in making use of MHR an integral part of everyday practice. According to most of our interviewees, higher availability of information from specialists and other healthcare providers was seen to be a key incentive to routine use MHR and could function as a powerful motivator to increase MHR use.

Recommendations:

- **Consultation and/or research to investigate the barriers to MHR use among specialists and hospital clinicians**
- **Incentives for specialists, private hospitals, pathology labs and diagnostic imaging company to upload results and communication to MHR in a timely manner**

10.6 Factors affecting consistent use of MHR

10.6.1 MHR is seen as an 'empty bag'

As one GP described, MHR commenced as an 'empty bag', with most 'bags' still waiting to be filled with patient information. The minimal amount of viewable clinical data was frequently cited by interviewees as a reason for the lack of motivation to routinely use MHR.

So, we have patients that come in as they're from interstate and they – "Oh, I've left my prescription. I need this. I need that." So I go in and check. It's always empty. So I do my part when the patient leaves, I upload it. So it's going to help the person that tries 'til next time, but it's always empty. Everything's empty. (General Practitioner, P06)

Continually encountering empty records was discouraging to the primary care practitioners that we interviewed and deterred use of MHR. Our interviewees expressed that MHR generally did not currently offer new data to be viewed, with practitioners accessing their own entered data the majority of the time. This created difficulty maintaining the motivation to keep checking MHR and a persistent theme was the need for all healthcare providers to become active on MHR. For example, several of our interviewees reported feeling very deflated after they had spent time and effort uploading patient health summaries, only for a hospital clinician to call them requesting results. This

resulted in a further increase in their workload and made the information as well as the time they had spent entering the information into MHR redundant.

10.6.2 Quality of clinical data on MHR impacts usability

Several interviewees expressed concern about the quality and relevance of clinical data being entered on MHR. In addition to the low amount of data available to view on MHR, the usefulness of the data itself was reported as lacking due to poor documentation. For example, some clinicians mentioned coming across incomplete information, incorrect coding of medical history, and inaccurate and out-dated medicines data. The absence of explanations for medication changes done by other clinicians was reported as being common.

> ***I think it has a great potential. It's just a matter of – and it's like any data, you've got to put quality there to have useful information (General Practitioner, P29).***

An important point highlighted by interviewees was that the use of electronic medical records did not necessarily imply better quality of information, and that healthcare practitioners were still required to include the same essential clinical data as paper-based records. Some interviewees feared that electronic records minimised clinical information. Establishing a criterion for the minimum required clinical data and routine data 'cleaning' were regarded as imperative to ensuring information on MHR was clinically useful and up to date.

> ***It should be fabulous but it depends on the data being uploaded. So, I've had one patient who came from another practice transfer here, and her health summary had been uploaded with antibiotics. I know that she wasn't on anymore and never had been for a long time, it was as if it hadn't really been cleaned and, I don't know, that's useless. So, I think that as long as the quality of the information that goes up is good, it will be very useful but it needs to be constantly updated when there has been a change, and that's really important. (General Practitioner, P30)***

One interviewee also commented that there was insufficient information on shared health summaries for the management of chronic diseases such as COPD, where clinical details like traits of disease and flare-up frequency are usually lacking.

This decreased usefulness and clinical value of low quality data was seen as a significant factor discouraging the use of MHR further. Also, considering that the drive to utilise MHR may stem from

meeting minimum upload quotas, rather than confidence in the system and being invested in MHR, it is likely that this may also influence the quality of data uploaded.

10.6.3 Increased interactivity through MHR can motivate use

Another important issue identified by interviewees was the minimal level of interactivity offered by MHR - this was also associated with reduced motivation to use MHR. This limited interactivity referred to the low communication activity with other healthcare providers on MHR, creating a sense of isolation. Clinicians also envisaged the management of patients as a multi-disciplinary team on MHR and expressed frustration that this type of communication and coordination was not yet present. Other interactivity limitations included restrictions in the static nature of the MHR data collection system itself.

The majority of interviewees, particularly GPs, characterised their experience with MHR as uploading and viewing their own information, with very little data being accessed from other healthcare providers. This lack of interactivity with other healthcare practitioners dis-incentivised interviewees. There was also an assumption that other healthcare providers would not be accessing the information they themselves had uploaded, and that MHR was generally not being utilised very much by the wider medical community. For example, one physician remarked that they would use MHR more if they knew that someone else would be reading their information.

Given that hospital discharge summaries were one of the most popularly described current benefits of MHR suggests that improving communication and interaction with other healthcare providers is likely to increase the use of MHR. The reduced awareness of MHR in other healthcare settings, such as hospitals and among specialists, was a source of frustration for many interviewees. For instance, one GP spoke about an occasion where an elderly patient with an up-to-date MHR was admitted to hospital, however hospital staff failed to check whether the patient had a MHR and instead called the GP's surgery to request medical information. Hospital staff were reportedly not aware of the existence of MHR in this case, and had to ask the GP to explain how to access the record.

Other interviewees identified interactivity limitations inherent in the design of MHR, due to it being a clinical document repository instead of a 'live' system that is easily updated, searched and accessed. For example, one physician criticised the inability to easily update fields in care plans in 'real time', instead having to upload a new PDF each time details had to be updated.

Because that's been the biggest drawback about it right from the beginning, is that it's been static, dead, almost out of date by the time it's put up. Otherwise – you know, the fact that it's a static upload, that's really annoying. I should be able to put a care plan up that' s a dynamic thing that I can just cross out and change so that, as time goes on, I have some patients who have enormously long list of things that is unfolding (General Practitioner, P30).

10.6.4 MHR impacts on workload

With few exceptions, the use of MHR was associated with increased workload, changed workflow and presented challenges to productivity that need to be resolved in the future. In many practices the practice nurse had the primary role of uploading health summaries, as GPs were either too busy seeing their patients, or were not as familiar or confident with using MHR. A number of practice nurses felt overburdened by the increased workload while others seemed able to integrate registrations and uploading into their work routine.

Some GPs mentioned the inability to upload during consultations due to time constraints, requiring them to stay back after work to complete the uploads for the day. In some instances, the uploading was completed the following day after the consultation. Uploading to MHR was also considered to have repetitiveness and duplication as information had already been uploaded on to the usually used practice software, for example Medical Director.

Shared health summary takes a bit of time. You've got to go through all the history, which one is active, what's not active, and then you go through all the medications and their presentations. It does take a lot of time because when I do it, I would like it to be accurate and I check which of these are current and which can be left out. (General Practitioner, P07)

Other GPs however did not see MHR tasks as very time consuming and described uploading as quick and easy taking only a few minutes. These mixed responses may reflect varied levels of familiarity with MHR as well as access to training materials. Many GPs spoke about feeling under immense pressure and overloaded with competing tasks and multiple program requirements. The utilisation and minimum upload requirements of MHR were at times regarded as an added stress to this already high-volume workload.

10.6.5 Lack of tangible improvements in patient outcomes is a de-motivator in MHR use

One of the most potent factors affecting the current usage of MHR was the absence of any currently detectable improvements in the clinical outcomes of patients. Interviewees explained that maintaining motivation and confidence in the ongoing use of MHR without direct evidence of clinical benefits for their patients was challenging, despite future promise of such benefits. However,

perceived satisfaction with future MHR impact on patient outcomes was a facilitator to MHR adoption and continued use.

10.6.6 MHR affects patient-clinician interactions

There were a few GPs, who we interviewed, who were concerned MHR caused disruption to the physician-patient interaction. Viewing the time spent with their patient as most important, MHR was seen to take time away from the interpersonal and clinical aspects of the consultation.

10.6.7 Transparency of the information on MHR makes clinicians feel they may be under scrutiny

Another proposed factor reported by two of our interviewees that could potentially affect the uptake of MHR among healthcare providers is a vulnerability that practitioners may feel when uploading their clinical documentation. The enhanced transparency of shared digital health records opens clinicians' work to possible scrutiny or judgement by peers and may contribute to MHR uptake reluctance.

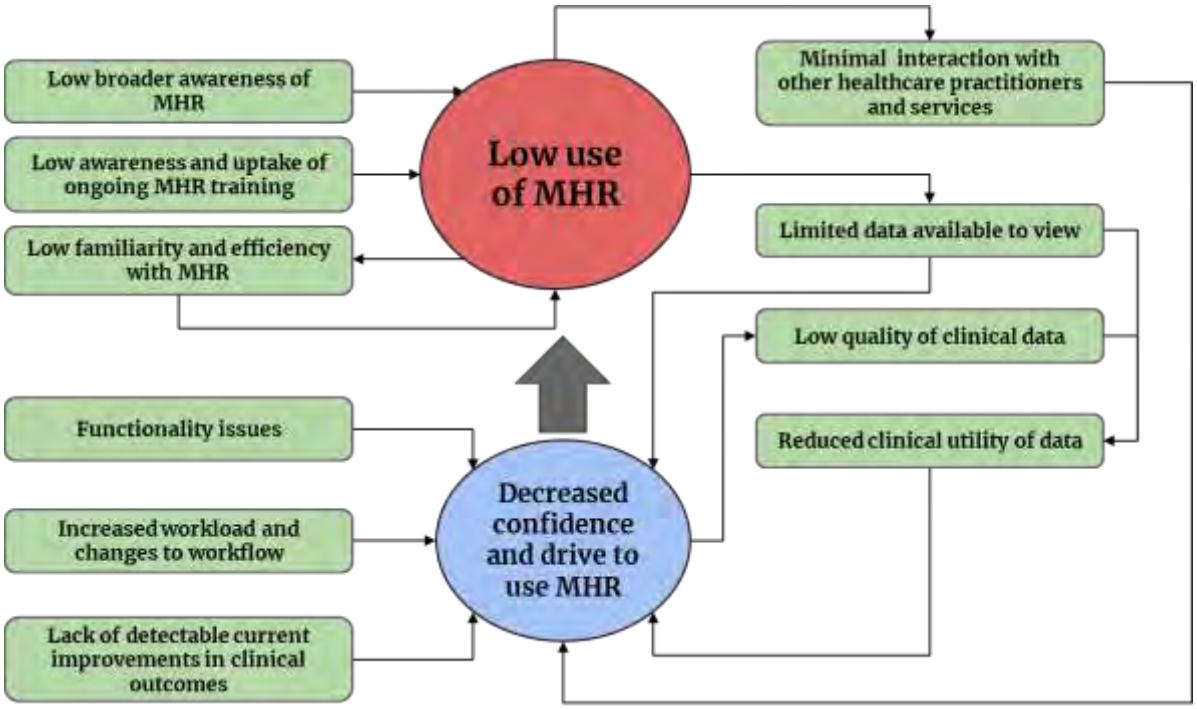
10.6.8 Clinicians lack awareness of existing training resources

There was low awareness of the availability of online MHR training, with moderate awareness of the availability of workshops conducted by the PHN. Most training occurred in the setup stage at their practices, delivered by Western Sydney PHN staff. Interviewees expressed great satisfaction in the MHR introduction, training and continued support provided by Western Sydney PHN. Among the few interviewees that had attended training workshops, most had completed these early on when MHR was introduced at their practice, however ongoing training appeared to be lacking. Some interviewees suggested the addition of CPD points as a possible incentive to increase the uptake of training.

Recommendations:

- **Leveraging early adopters of MHR to be peer champions of MHR to encourage use among their peers**
- **Creation of a simple visual prompt for GPs consultation rooms to encourage, remind and explain step-wise the MHR data entry processes as well as security of data, during consultation with patients**
- **Automated built-in reminder systems that delivers prompts to upload to MHR on GP software**
- **Introduction of MHR in medical curriculums**
- **Development of features on MHR that generate greater interactivity between clinicians, for example a communication screen that could be used with patients under the care of multiple clinicians**
- **Investigation into an update function for records that may need to be amended, for example, care plans**
- **Consultation with clinicians on their workloads to determine how MHR can be better integrated into the existing daily workflow and become a routinely used system**
- **Assistance provided to practices to get patient data uploaded into MHR**
- **Attachment of CPD points to the MHR training to increase the uptake of this training**

Figure 1. Low use of MHR promotes even lower use when coupled with functionality and data completeness issues



10.7 Perceptions of the upcoming opt-out and comparison with the Nepean Blue Mountains opt-out region

Most interviewees in the Western Sydney PHN region were optimistic about the upcoming opt-out, believing this move would eventually lead to the wider use of MHR. Compulsory use of MHR had been suggested by some GPs as a means to get the full potential from the system. When this idea of compulsory use of MHR was suggested to other interviewees, a surprising majority supported this as being an important strategy to maximise the potential benefit of MHR.

A comparison of data from the interviewees in the Western Sydney region to the interviewees interviewed from the NBM region (n=4) revealed no major differences in perspectives around current use and feasibility of MHR. While primary care interviewees from the NBM region reported that the opt-out had facilitated the opportunity to utilise MHR by eliminating the registration process for their patients and the associated workload, their use of MHR was still being affected by many of the factors raised by the Western Sydney PHN interviewees.

11 Commentary and next steps

Two distinct groups were identified among our interviewees: 1) early adopters who found no difficulty in the use of MHR who were using MHR frequently and 2) reluctant adopters who saw the whole system as being difficult and time consuming. Irrespective of group, however, almost unanimously, interviewees were able to see to see the future potential benefits of MHR to both their practice, in terms of streamlining communication and reducing unnecessary tests as well as the optimising care of their patients and reduction of adverse medical events. MHR was especially viewed as highly beneficial in acute care settings and for their complex patients, the elderly and CALD individuals.

For this to occur, however, frequency of use of MHR must improve, with comprehensive, high quality data, presented in a manner that is user friendly, and efficient to use combined with consideration of impact of MHR on workflow is also needed as it may negatively impact on efficiency and productivity, particularly around the duplication of tasks. Factors strongly affecting the drive to use MHR were the limited availability of viewable data, data quality, low interaction with other health care providers and the lack of current clinical outcome improvements with an important motivator for primary care use appearing to be uptake and use by hospital based clinicians and specialists. This uptake is seen as essential to truly see an improvement in communication efficiency as maintaining motivation and confidence in the ongoing use of MHR without direct evidence of clinical benefits for their patients was challenging for primary care practitioners, despite future promise of such benefits.

11.1 Key findings

- Primary care providers expressed satisfaction at being able to re-assure their complex patients that their records would be accessible in any healthcare setting, including overseas
- MHR could greatly alleviate stress and worry often experienced by patients and their families during an emergency and assist with recall of medications
- Primary care providers identified themselves as holding the chief responsibility for providing and maintaining accurate medication information
- Primary care providers still receive calls from emergency departments who have not accessed relevant information on MHR which undermines trust and confidence in MHR and leads to scepticism as to whether other healthcare providers are uploading medication data in a timely or accurate manner
- Interviewees are optimistic about the benefits of pathology reports and diagnostic imaging reports when they become more available on MHR

- In cases where pathology and imaging reports were available, primary care providers in this study were very satisfied with prompt and easy to access pathology reports, including being able to see follow up details clearly, which is saving time for them and is receiving positive responses from their patients
- Digital discharge summaries were highly regarded and are seen to facilitate transition of care, preventing any delays in the continuity of medical care and reducing clinical information gaps
- Primary care providers strongly believe that the full benefits of MHR will only be realised once specialists become active on MHR, as being able to access specialist letters on MHR was considered to be one key aspect in making use of MHR an integral part of everyday practice
- The limited availability of data on MHR was identified as a critical factor in the low uptake of MHR among interviewees in this study, and has implications for the future usability of the system
- Healthcare providers experienced some disillusionment in MHR, believing MHR was generally not being utilised very much by the wider medical population, as well as being associated with lower motivation to use MHR
- Many GPs mentioned feeling under immense pressure and overloaded with competing tasks and multiple program requirements

11.2 Next Steps

Further research exploring the barriers and facilitators to use among specialists and hospital based clinicians is much needed to establish how best to implement MHR beyond primary care and across the wider health system. Quantification of the impact of MHR on patient outcomes, such as better management of chronic disease as well as case studies on how MHR can maximise efficiency within daily practice also appear warranted, with this evidence disseminated widely to healthcare providers to encourage wider implementation and increased use of MHR.

Research focused on exploring and developing technical and organisational innovations on how MHR can be utilised to promote and support collaborative behaviours between healthcare providers to generate greater multi-disciplinary interaction and team-based care also appears warranted.

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13 Appendix – Interview Schedule

1. General awareness, understanding and use of MHR

- *What is your awareness and understanding of MHR?*
- *What are your general experiences of using MHR?*
- *What are your perceptions of MHR, i.e. the benefits and drawbacks and the circumstances where you would consider it to be most effective?*
- *What general issues, if any, have you experienced using MHR?*
- *What benefits do you think there could be for your patients?*
- *Do you use MHR yourself?*

2. Ease of use: Training

- *What training have you had around MHR?*

Prompts: training webinars, Australian Digital Health Agency training request, PHN training, other practice member e.g. practice manager, simulation of digital health functionality of software, self-paced learning modules, downloadable guides for healthcare providers, MHR Developer (customised guides and resources for integrating digital health products into their platforms)

- *How easy were these resources to access?*
- *If not had training – why not had training?*

3. Ease of use: registering patients

- *How easy has the process been gaining consent from patients*
- *Have you had any patients who have refused to register? If yes, approximately how large a proportion*
- *What concern, if any, did your patients express about their information being shared on MHR?*

4. If practitioner DOES NOT use MHR:

Have you ever used MHR, even very infrequently?

- *Which functions did you use?*
- *Why did you choose to use these functions?*
- *What has discouraged you from using my HR further/discourage you from using it further?*

Prompts: lack of access, do not use computer in my practice, not confident computer applications, not had training/training insufficient, patients expressed concern about confidentiality, lack trust in security and confidentiality of the system, too hard to register, limitations in practice IT system, concerns about at risk patients

- *What might encourage you to use MHR in future?*

Prompts: IT support, ePIPs, training, more information available e.g. diagnostic reports, patients want it, opt out scheme, medicine safety, pathology and/or diagnostic test ordering

- *Who else, if anyone, uses MHR in your practice?*
- *How do you communicate with clinicians from within and outside of your practice?*
- *How much time is spent communicating with other clinicians from within your practice when following up on your patients?*
- *How much time is spent communicating with other clinicians from outside your practice when following up on your patients?*
- *How do you think MHR could save time on communication with clinicians from both within and outside of your practice?*
- *What do you see as being your roles and responsibilities in medication safety?*
- *How do you perceive the feasibility and appropriateness of MHR in engaging in safe medication practice?*

Prompt: can patients' electronic health records be screened to identify potentially hazardous prescribing events?

- *How do you think MHR could assist you in identifying patients who may be at risk of adverse drug reactions (e.g. patients with chronic conditions) or patients who may be 'doctor shopping'*

Prompts: Would you able to clearly identify medication errors using MHR? How would being able to see previously prescribed medications assist you in managing your patients' medication regimes?

- *Overall, what benefits do you think MHR could introduce around medication safety?*

Prompts: reduce ED visits, reduce GP visits, improved medication management, reduced hospital admissions/ cost of treatment hospital/length of stay,

PROCEED TO SECTION 13 FOR NON-USERS IF INDIVIDUAL INTERVIEW

5. If practitioner USES MHR (Skip for non-users):

- *What has motivated you to use MHR?*

Prompts: encouragement by PHN/Digital health Agency, patients want it, desire/necessity to track patients e.g. with complex or chronic conditions, desire to save time on communicating with other practitioners, improved communication concerns over 'doctor shopping', overall improvement in practice, ePIPs, patient wanted to use it, able to access otherwise unknown information, gave confidence in clinical decision making,

- *What has enabled your use of my MHR?*

Prompts: training, support from PHN/ Digital health Agency, improved communication, assistance with IT issues, resources for patients

6. Ongoing use of MHR: confidence, issues and incentives (NB. ascertain frequency of use)

- *How often do you use my HR?*

Prompts: everyday, only for particular patients for example complex patients

- *What would you consider to be frequent or high use of MHR?*
- *Would you consider yourself to be a frequent, high user?*
- *How confident are you using MHR?*
- *How easy do you find it to navigate MHR?*
- *What issues (if any) have you had using MHR?*

Prompts: adds time to work, technical difficulties, information missing, information incorrect

- *What ongoing support do you receive to use MHR (prompt PHN, Digital Health Agency)*
- *What incentives are there e.g. ePIPS that encourage your use of MHR?*

7. Ongoing use of MHR: what used for

- *How do you use MHR/what functions do you use?*

Prompts: uploading documents only (e.g. event summaries), viewing only (e.g. hospital discharge or medication records), both

- *Which of the following have you created and/or uploaded on MHR?*

Prompts (for each ask frequency e.g. always, sometimes (e.g. for complex patients, never):

- *Shared health summary*
- *Event summary*
- *eReferral letters*

- *How easy is it for you to create each of these items?*
- *Which of the following have you viewed on MHR?*

Prompts (for each ask frequency e.g. always, sometimes, never and why they choose to use these views):

- *Hospital discharge summaries*
- *Medicines Information view*
- *Advanced care planning documents*
- *PBS data*
- *MBS data*
- *Immunisation data*
- *Pathology reports*
- *Diagnostic imaging reports*
- *Specialist letters*
- *Prescription and dispensing information*
- *Patient-entered personal health summaries*
- *Health notes entered by the patient*
- *Child development information*

- *How easy is it for you to view each of these items?*

- *What is easier, viewing these items on MHR or communicating with other practitioners (e.g. discharge summaries)*

We would now like to ask you more about three specific functions of MHR: Medicines information view, pathology reports and diagnostic imaging reports

8. Medicines Information view (and medication safety)

- *How easy is it to view or track medicines prescribed by yourself or others clinicians in MHR?*
- *How often do you use the medicines information view?*
- *What do you think about when you hear the words 'medication safety'?*
- *What do you see as being your role and responsibility in medication safety?*
- *How has your use of MHR provided easier access to prescription data or facilitated your ability to assess quality and safety of prescribing?*
- *How do you perceive the feasibility and appropriateness of MHR in engaging in safe medication practice?*

Prompt: can patients' electronic health records be screened to identify potentially hazardous prescribing events?

- *How does use of MHR assist you in identifying patients who may be at risk of adverse drug reactions (e.g. patients with chronic conditions) or patients who may be 'doctor shopping' (e.g. patients with opioid dependencies)*

Prompts: Are you able to clearly identify medication errors using MHR? How does being able to see previously prescribed medications assist you in managing your patients' medication regimes?

- *What, in your experience, is the effect of MHR on safe medication practices? Have you experienced fewer medication errors/fewer adverse events?*
- *Overall, what benefits do you think MHR could introduce around medication safety?*

Prompts: reduce ED visits, reduce GP visits, improved medication management, reduced hospital admissions/ cost of treatment hospital/length of stay,

9. Pathology tests

- *How easy is it to view or track pathology test reports for your patients on MHR?*
- *How often do you view pathology test reports on MHR?*
- *How do you perceive the feasibility of MHR in influencing the ordering of duplication of pathology tests in your patients?*
- *How has access to pathology test results available on MHR facilitated higher quality/prompter care for your patients?*
- *How has being able to access/view pathology results made your practice more efficient?*

Prompts: reduced your need to communicate with other clinicians, reduced need to create imaging request

10. Diagnostic imaging

- *How often do you view diagnostic imaging on MHR?*
- *How easy is it to view or track diagnostic imaging reports for your patients on MHR?*
- *How do you perceive the feasibility of MHR in influencing the ordering of or duplication of diagnostic imaging in your patients?*
- *How has access to diagnostic imaging results available on MHR facilitated higher quality/prompter care for your patients?*
- *How has being able to access/view diagnostic imaging made your practice more efficient?*

Prompts: reduced your need to communicate with other clinicians, reduced need to create imaging request

11. Ongoing general use of MHR: currency of information

- *How safe do you think it is to assume the information in a patient's My Health Record is a complete record of a patient's clinical history?*
- *What information do you think should be verified from other sources?*
- *Which other sources might you verify this information with?*

Prompts: with the patient, other health care providers

- *Overall, how does MHR facilitate data linkage?*

12. Ongoing use of MHR: tracking patients and communicating with other healthcare professionals

Prompt: Ascertain frequency of use

- *Can you tell us about a particular patient (either with or without chronic/complex disease) where MHR has been of benefit to them?*
- *What type of patient, if any, would make you more likely to use their MHR?*

Prompts: on multiple (5 or more) medications, has a chronic or complex condition, drug and/or alcohol issues, visits GP frequently, known to visits multiple practices, recent hospital discharge, mental health issues, patients you think may be 'doctor shopping', patient visiting after hours

- *Which patients, if any, would you be reluctant to use MHR with? Why?*
- *How many of your patients do you think visit multiple practices?*
- *How valuable is MHR for tracking patients who may visit multiple practices?*
- *How useful is MHR in caring for your patients who have chronic/complex conditions?*
- *What benefits do you think there may be to patients with chronic/complex conditions if you and other practitioners use MHR*
- *How much time is spent communicating with other clinicians from outside your practice when following up on your patients?*
- *How much time is spent communicating with other clinicians from within your practice when following up on your patients?*
- *Approximately much time do you think you have save on communication because of MHR?*

Prompts: Daily, weekly, overall

- *How can MHR help you care for your patients after hours?*
- *How much do you think MHR has improved communication around patients and helped to reduce your time spent on communication?*

13. Overall - users

- *How does MHR help you manage your workflow?*

Prompts: time saved communicating with other health professional, time wasted looking for information expect to be on there but it isn't there, no impact as rarely use

- *How much has your use of MHR increased since it was introduced?*
- *How valuable is MHR in your practice?*
- *How does MHR help facilitate negotiation of the complex nature of primary care?*
- *How capable is your IT system in being able to handle the higher volumes of information that can be uploaded and viewed?*

14. Overall - users and not users

- *What confidence do you have in the security and confidentiality of the MHR system?*
- *How helpful do you think MHR may increase your ability to assist your patients in future? Why?*
- *How would you feel if use of MHR was compulsory for all health practitioners?*
- *What could assist you to use MHR more?*
- *Any other general comments or questions?*

Impact of My Health Record

A sub-study of the Western Sydney General Practice Data Linkage Pilot Project

July 2018

NSW GOVERNMENT

Acknowledgements

This report is a sub-study of the NSW GP Data Linkage Pilot Project which has been carried out in partnership between NSW Ministry of Health and Western Sydney Primary Health Network. This project would not have been possible without the support of the general practices across western Sydney that participated.

This project has been overseen by the NSW GP Data Linkage Pilot Project Steering Committee chaired by Professor Anne-Marie Feyer.

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Contents

Figures and Tables

Executive Summary

This report presents the findings of a sub-study of the Western Sydney General Practice Data Linkage Pilot Project to evaluate the impact of My Health Record on patient outcomes.

My Health Record is a central repository of key health information for an individual uploaded electronically in summary form. When using health services, a patient who has a My Health Record can grant the provider access to this summary information to inform their health care management. The full roll-out of My Health Record in Australia is ongoing. The system has been available for opt-in for some time, however recently, there have also been opt-out trials of my Health Record in selected regions. Western Sydney, the site of the GP Data Linkage Pilot Project, is currently still an opt-in region of NSW for My Health Record.

The Western Sydney General Practice Data Linkage Pilot Project is a project overseen by NSW Ministry of Health that has linked patient clinical records from participating general practices to state health system hospital, emergency department and mortality records. The sub-study of the Pilot Project presented here, compares the characteristics and outcomes such as hospital admissions and emergency department presentations, duplication of services, and adverse events, among patients who have a My Health Record (n=9,154), with those who do not have a My Health Record (n= 116,515).

Approximately 7% of patients were identified in the participating western Sydney general practices as having a My Health Record. However this varied from around 2% to 20% depending on the type of source clinical information system used in each general practice.

Compared to all other patients, patients with a My Health Record tended to be older, have more chronic conditions, use more medications and have more hospital admissions and ED presentations. Therefore it appears that early adopters of My Health Record in Western Sydney were predominantly those patients who have poorer health.

Future investigation may repeat and build on these findings to investigate a broader range of outcomes and explore whether, with the currently available data, it is possible to detect differences in outcomes among patients who have a My Health Record. This report establishes a method for observing outcomes that may be concurrent with My Health Record in general practices that can be repeated over time.

Background

Internationally, electronic health record systems have been operating in some countries since approximately 2008. Countries where national electronic health record systems are being developed or have been implemented include (as well as Australia) Austria (ELGA, Dorda, et al), Canada (Infoway), Denmark (Kushniruk et al 2010), Estonia (ENHIS 2008), China (Gao et al 2013), India (Ministry of Health and Family Welfare, India, 2016), Jordan (Nassar et al 2013), Netherlands (Barjis 2010), Switzerland (Pietro et al 2018), United Arab Emirates (El-Hassan 2017), the United Kingdom (Houses of Parliament briefings 2016) and Singapore (Singapore Ministry of Health). In New Zealand, progress towards finalising a detailed business case for a national electronic health record is also nearing completion (New Zealand Ministry of Health 2018).

My Health Record exists as an electronic summary of key information pertaining to an individual. It pulls together information from other existing record systems and is designed to integrate into local clinical information systems. The aspired benefits of electronic summary health records like My Health Record include:

- Reduced need for patients to repeat their health history each time they visit a new clinician.
- Ensures a reliable and complete source of medical information that doesn't depend on accurate patient recollection.
- Provides a broader indication to clinicians about the range of other health professionals that their patients use.
- Provides a rich source of health service data that would inform health system policy, planning and decision making to guide the development of effective programs that target appropriate populations.

At the time of writing, approximately 5.5 million Australians (23%) had registered for a My Health Record, and 10,754 health care providers were connected ranging from GPs, allied health and pharmacies, to hospitals and aged care facilities (Australian Government Department of Health 2018).

The full roll-out of My Health Record in Australia is ongoing. Since 2012, it has been possible for Australians to opt-in to create a My Health Record that can be used as a repository of information about their health care. However recently, there have also been opt-out trials of my Health Record in selected regions including Nepean Blue Mountains Primary Health Network, whereby a My Health Record is created automatically unless individuals specifically opt-out. In this region, coverage of My Health Record reached approximately 98% and has been well received in the population (Nepean Blue Mountains PHN personal communication 22/05/2018).

In September 2017, the Australian Digital Health Agency (the Agency) issued a request for proposals to evaluate the impact of My Health Record on patient outcomes. In particular proposals were sought investigate whether My Health Record showed impacts on errors

and wastage in health. The Agency cited a number of statistics including: "*Approximately 2% to 3% of hospital admissions in Australia are caused by avoidable medication errors*". This had come from a literature review carried out by the Australian Commission on Safety and Quality in health Care (2013). A key source of these statistics came from research carried out at Monash Medical Centre using International Classification of Disease Version 10 Australian Modification (ICD-10-AM) codes to carry out surveillance of hospitalisations for adverse drug reactions (Hodgkinson et al 2009). They concluded that ICD-10-AM coding is an effective and efficient means of improving the reporting of adverse drug reactions using administrative data.

In response to the Agency's request, it was agreed that data from an existing project; the Western Sydney GP Data Linkage Pilot Project (the Pilot Project), would be modified to replicate the methods by Hodgkinson et al among GP patients using hospital diagnosis codes.

The Pilot Project is a highly productive collaboration between the western Sydney Primary Health Network, General Practices and Local Health Districts and the Ministry of Health and Pen CS Computing. It has delivered a proof of concept for the extraction and linkage of GP clinical information to health system data. With this achievement, the Pilot Project has been the first of its kind in Australia and has provided a rich source of patient clinical information across the care continuum. The data produced in the Pilot Project has already demonstrated its ability to provide unique information and insights around the patient journey across primary, acute and other healthcare services. It has also demonstrated the benefits of effective private-public partnerships, collaboration, policy formulation and resource allocation around an agreed, data-informed and comprehensive system-wide approach.

The instigation of a sub-study of the Pilot Project responding to the Agency's request, provided an opportunity to further test the real-world policy relevance of linked GP data. It afforded an ideal opportunity whereby the outcomes of patients with a My Health Record could be compared with those who do not have My Health record. This report provides the findings of this sub-study.

Methods

The Western Sydney GP Data Linkage Pilot Project (the Pilot Project) is a current activity of the Systems Information and Analytics Branch at NSW Ministry of Health in collaboration with the Western Sydney Primary Health Network and participating western Sydney general practices and enabled through Pen CS computing software. The Pilot Project has extracted and linked patient clinical records from general practices to state health system hospital, emergency department and mortality records.

Western Sydney, the site of the GP Data Linkage Pilot Project, is currently an opt-in region of NSW for My Health Record. In order to address the needs in the request by the Australian

Digital Health Agency (the Agency), a sub-study was approved by the NSW Population and Health Services Research Ethics Committee to add a flag for My Health Record to patient records extracted from the GP systems. This enabled examination of the differences in hospital events among patients with early adoption of My Health Record (MyHR group) and those remaining without a My Health Record (No MyHR group).

Aims

This sub-study aimed to generate evidence of the impacts of the My Health Record across primary and acute health care sectors. Specifically, the study investigated whether having a My Health Record influences medication safety by observing the incidence of hospital admissions for adverse drug events. The study also compared total number of hospital admissions and emergency department presentations among GP patients with and without a My Health Record.

Study population

The study population of the Pilot Project comprised all patients who attended participating general practices over the preceding five years (all ages). All patients in the cohort were linked to records from the NSW Health system including NSW emergency department (the Emergency Department Data Collection) and hospital admissions (the Admitted Patient Data Collection). The Pilot Project has been carried out in multiple tranches, with each building on those preceding. Since its commencement in 2016, the Pilot Project has successfully linked approximately 300,000 patients from 29 general practices over in three Tranches. The sub-study has only been incorporated into the third tranche of the Pilot Project whereby a My Health Record (MyHR) flag was added to identify case cohorts (MyHR group) and comparison cohorts (no MyHR group). The third tranche linked 125,669 patients from 17 practices, with inclusion of a MyHR flag.

Data linkage

Data linkage was carried out by the Centre for Health Records Linkage at NSW Ministry of Health using best practice techniques that have been documented in detail elsewhere (http://www.cherel.org.au/). Briefly however, linkage was carried out by using automated probabilistic techniques to match the identifying particulars of general practice patients within and across multiple data collections. A key feature of the linkage was that personally identifying information of patients was separated from their clinical content information at the time records were extracted from GP practices. This separation was maintained at all steps of the project. The result was the creation of de-identified clinical data that linked the patients' journeys across primary and other health service settings with a high degree of accuracy while adhering to stringent privacy standards that prevented the discovery of health information about an identified individual. Proposals are currently being considered to continue and expand GP data linkage, and if adopted, it will be possible to repeat the methodology described here in the future.

Statistical methods

For each linked dataset, the data were summarised to enumerate the proportion of individuals with GP, emergency department, and hospital episodes.

Initially, the likelihood of having a My Health Record was evaluated in relation to other characteristics such as age, sex, chronic disease and medications. A logistic regression model was developed to assess whether these characteristics were associated with having a My Health Record after adjusting for one another. Additional adjustments were made for the clinical information system of the source general practice. This was because different systems ascertained and flagged My Health Record in different ways which would potentially affect the attribution of My Health Record to an individual.

The impact of having a My Health Record was further evaluated, with adjustments for the previous characteristics, on the following outcomes:

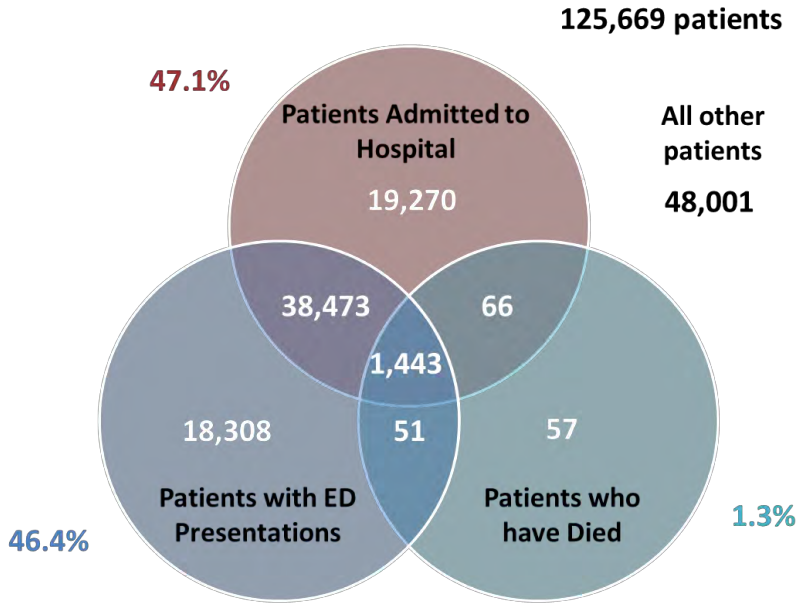
- An adverse drug event (ADE) hospitalisation
- Hospital admissions
- Emergency department (ED) presentations
- Potentially preventable hospitalisations (PPH)
- Unplanned readmissions within 28 days of a previous admission

It is recognised that among patients with a My Health Record, their use of the Record, and therefore its ensuing impact, may vary considerably. Therefore among patients with a My Health Record, whether or not they also had a shared health summary uploaded was be used to create groups as a proxy of 'active' My Health Record vs 'inactive' use. The above list of outcomes was then compared in these two groups.

Findings

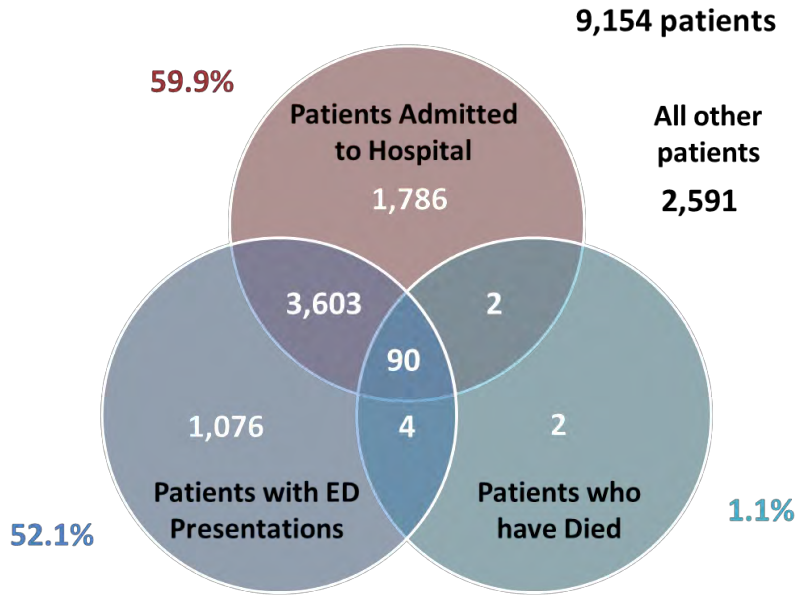
Of the 125,669 patients with My Health Record information in Tranche 3 of the Pilot Project, 58,275 (46.4%) presented to emergency departments, 59,252 (47.1%) were admitted to hospital, and 1617 (1.3%) died in NSW over the five years (Figure 1).

Figure 1: Tranche 3 Pilot Project overview, practices with My Health Record in the extraction, 2012-2017.



Among these, there were 9154 (7.3%) individual patients who were flagged as also having a My Health Record. Of these, 4,773 (52.1%) presented to emergency departments, 5481 (59.9%) were admitted to hospital, and 98 (1.1%) died in NSW in the preceding five years (Figure 2).

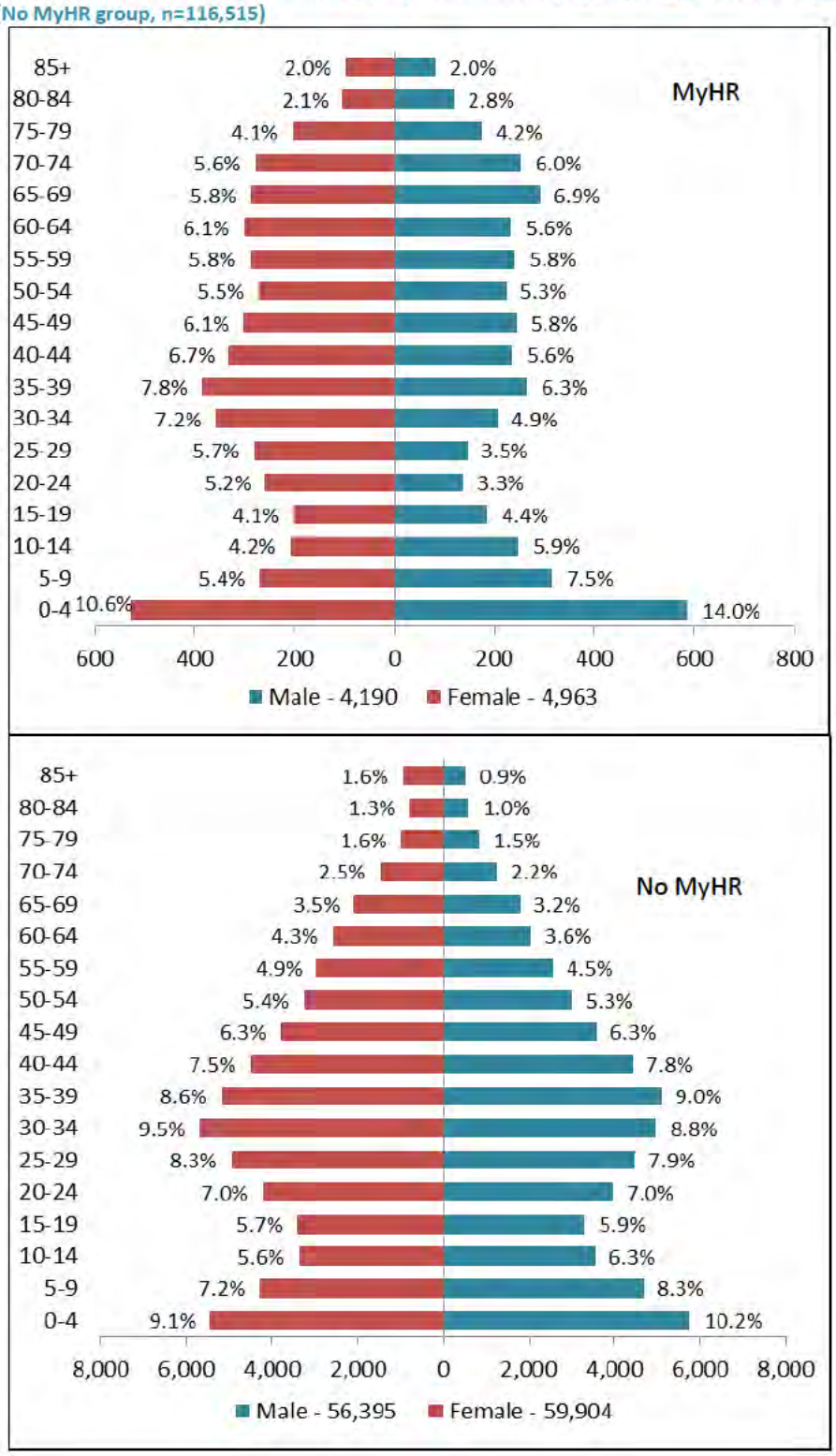
Figure 2 Tranche 3 Patients with a My Health Record Overview.



Characteristics of people who have a MyHR

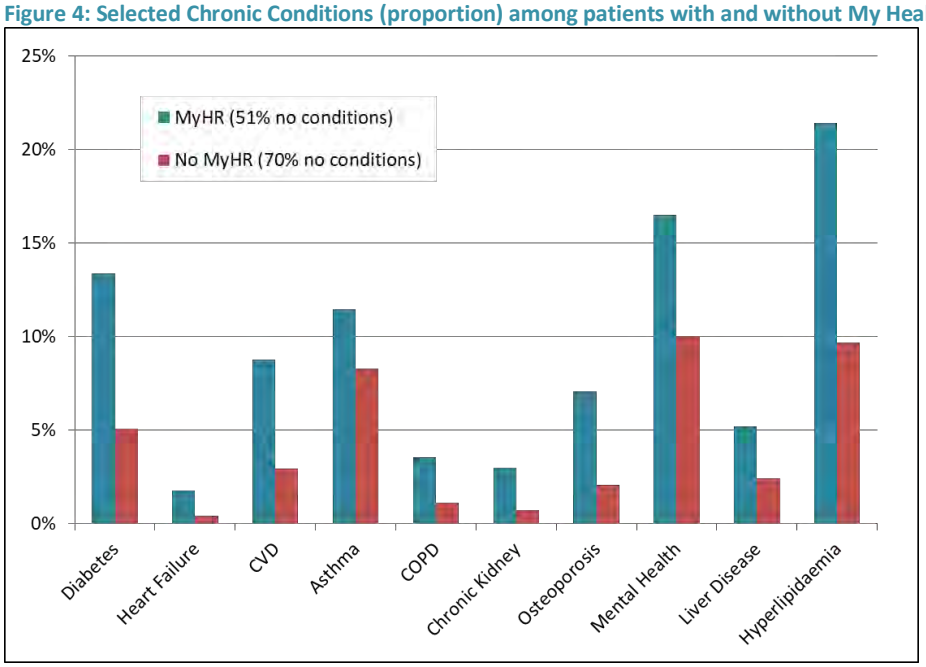
The majority of patients (N= 116,515; 92.7% of total) did not have a My Health Record (No MyHR). Patients in the MyHR group tended to have higher proportions in the ages 55-75 years and less aged 25-45 years compared to patients in the No MyHR group. In both groups, there were more females than males (Figure 3).

Figure 3: Age and sex distribution – GP patients with (1) My Health Record (MyHR group, n=9154) and (2) with No My Health Record (No MyHR group, n=116,515)



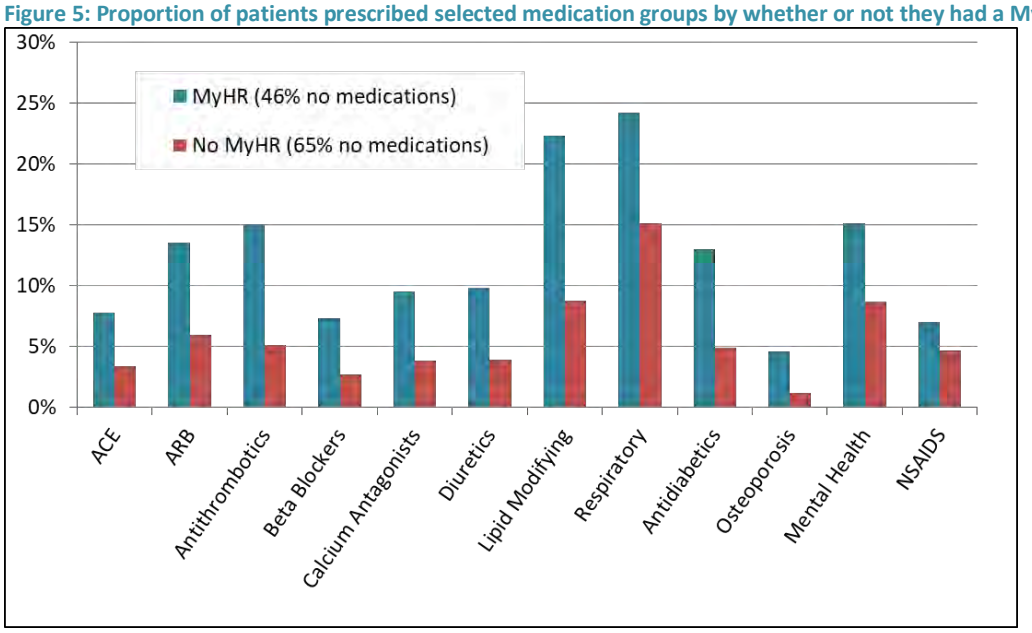
Patients in the MyHR group tended to have a higher proportion with the selected chronic diseases than those in the No MyHR group (Figure 4). Overall, fewer patients (51%) in the MyHR group had no identified chronic conditions compared to patients in the No MyHR group (70%).

Figure 4: Selected Chronic Conditions (proportion) among patients with and without My Health Record.



Higher proportions of patients in the MyHR group were also recorded as being prescribed selected medications than those in the No MyHR group (Figure 5). Overall, fewer patients (46%) in the MyHR group had none of the selected medications compared to 65% of patients in the No MyHR group.

Figure 5: Proportion of patients prescribed selected medication groups by whether or not they had a My Health Record.



Adjusted analyses

Table 1 shows the unadjusted (crude) and adjusted effects of selected chronic conditions as odds ratios. The likelihood of having a My Health Record is slightly higher for most chronic conditions after accounting for differing age, gender and medications. Therefore, having a chronic disease could be a driver for having a My Health Record.

Table 1: Likelihood of having a MyHR among people with selected chronic diseases and after adjustment

Chronic condition flag	Crude Odds ratio of Having MyHR	95% CI OR	Adjusted Odds ratio* of Having MyHR	95% CI OR
Diabetes	2.90	(2.71 - 3.10)	1.27	(1.11 - 1.46)
Heart Failure	4.34	(3.60 - 5.21)	1.06	(0.84 - 1.34)
CVD	3.16	(2.91 - 3.43)	1.04	(0.92 - 1.18)
Asthma	1.43	(1.34 - 1.53)	1.28	(1.17 - 1.40)
COPD	3.37	(2.97 - 3.81)	1.30	(1.11 - 1.52)
Chronic Kidney	4.43	(3.84 - 5.10)	1.73	(1.45 - 2.06)
Osteoporosis	3.58	(3.27 - 3.92)	1.66	(1.44 - 1.93)
Mental Health	1.78	(1.68 - 1.88)	1.45	(1.33 - 1.57)

* Adjusted for age group, gender, clinical information system, and medication flags

Table 2 shows the effects of selected medications, after adjusting for other characteristics, as odds ratios. The likelihood of having a My Health Record is slightly higher for most of the medications even after accounting for differences in age, gender and chronic condition. Therefore, most of these medications also appear to remain as a residual driver of having a My Health Record.

Table 2: Likelihood of having a MyHR among people taking selected medications and after adjustment

Medication flag	Odds ratio of having MyHR	95% CI OR	Adjusted Odds ratio* of having MyHR	95% CI OR
ACE	2.40	(2.20 - 2.61)	1.38	(1.23 - 1.54)
ARB	2.45	(2.30 - 2.62)	1.19	(1.07 - 1.31)
Antithrombotics	3.25	(3.05 - 3.46)	1.21	(1.09 - 1.34)
Beta Blockers	2.82	(2.59 - 3.08)	1.12	(1.00 - 1.26)
Calcium Antagonists	2.66	(2.46 - 2.87)	1.16	(1.05 - 1.29)
Diuretics	2.68	(2.48 - 2.89)	1.09	(0.98 - 1.22)
Lipid Modifying	3.00	(2.84 - 3.16)	1.41	(1.28 - 1.55)
Respiratory	1.78	(1.70 - 1.88)	1.17	(1.09 - 1.26)
Antidiabetics	2.92	(2.73 - 3.12)	1.22	(1.07 - 1.40)
Medication Osteoporosis	3.91	(3.49 - 4.37)	1.46	(1.23 - 1.75)
Medication Mental Health	1.87	(1.76 - 1.99)	1.27	(1.17 - 1.38)
NSAIDS	1.53	(1.40 - 1.67)	1.15	(1.04 - 1.26)

* Adjusted for age group, gender, clinical information system, and chronic conditions

Impact of My Health Record on health related outcomes

Using diagnostic coding from ICD-10-AM in the Admitted Patient Data Collection, it was possible to identify hospital admissions where adverse drug events (ADEs) had occurred (based on methods in Hodgkinson et al 2009). The proportion of patients in the MyHR group who were admitted to hospital for ADEs in the last 12 months was higher than the proportion in the No MyHR group (3.0% and 1.4% respectively, Figure 6 and Table 3).

Figure 6: The proportion of patients with and without a MyHR by whether or not they also had a hospital admission with an adverse drug event (ADE) over the preceding year.

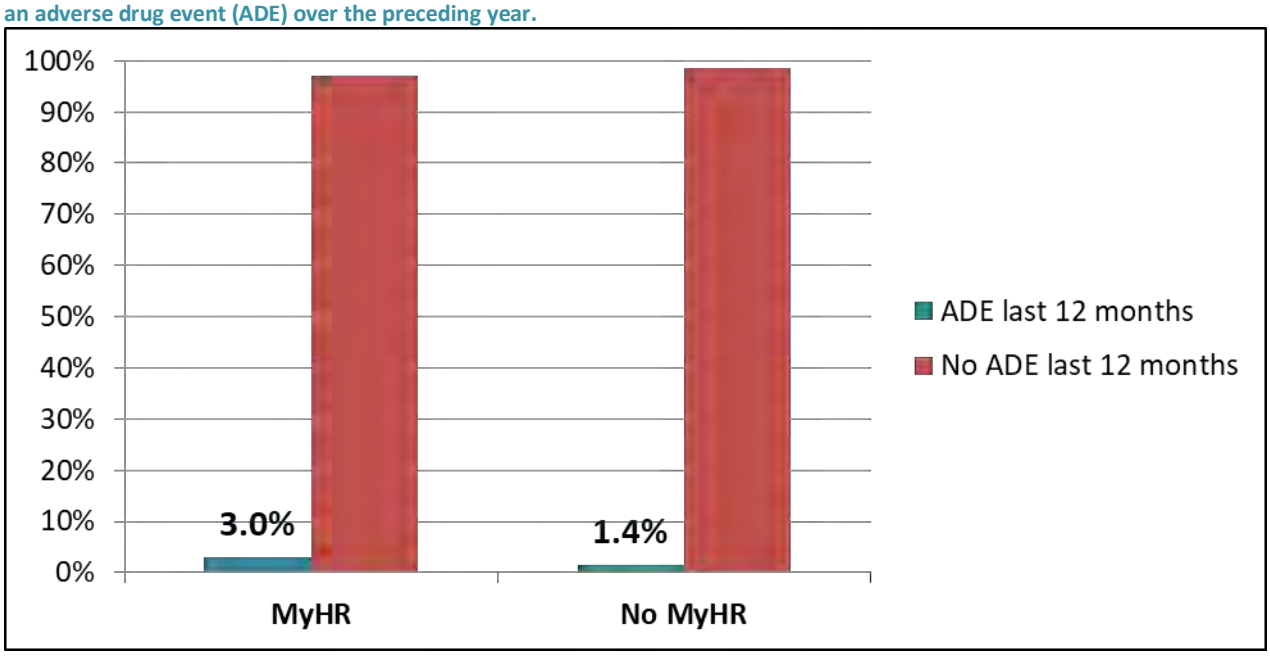


Table 3: The proportion of patients with or without a MyHR by whether or not they also had a hospital admission with an adverse drug event (ADE) and for all Tranche 3 patients over the preceding year.

	ADE last 12 months	No ADE last 12 months	Total
My HR	272 (3.0%)	8,882 (97%)	9,154
No My HR	1,667 (1.4%)	114,848 (99%)	116,515
All GP Patients	1,939	123,730	125,669

The impact of My Health Record was further investigated on other adverse health events over the preceding 12 months including admissions, ED presentations, potentially preventable hospitalisations and unplanned readmissions within 28 days. The proportion of patients with each of these outcomes is shown in Figure 7.

In Table 4, the effects of having a My Health Record, after adjusting for other characteristics, is shown as odds ratios. The likelihood of having an adverse health event is slightly higher among patients with a My Health Record. This is consistent with earlier analyses showing that patients with a My Health Record tend to be older and have more chronic conditions and medications.

Figure 7: Proportion of patients with a My Health Record by selected adverse health events

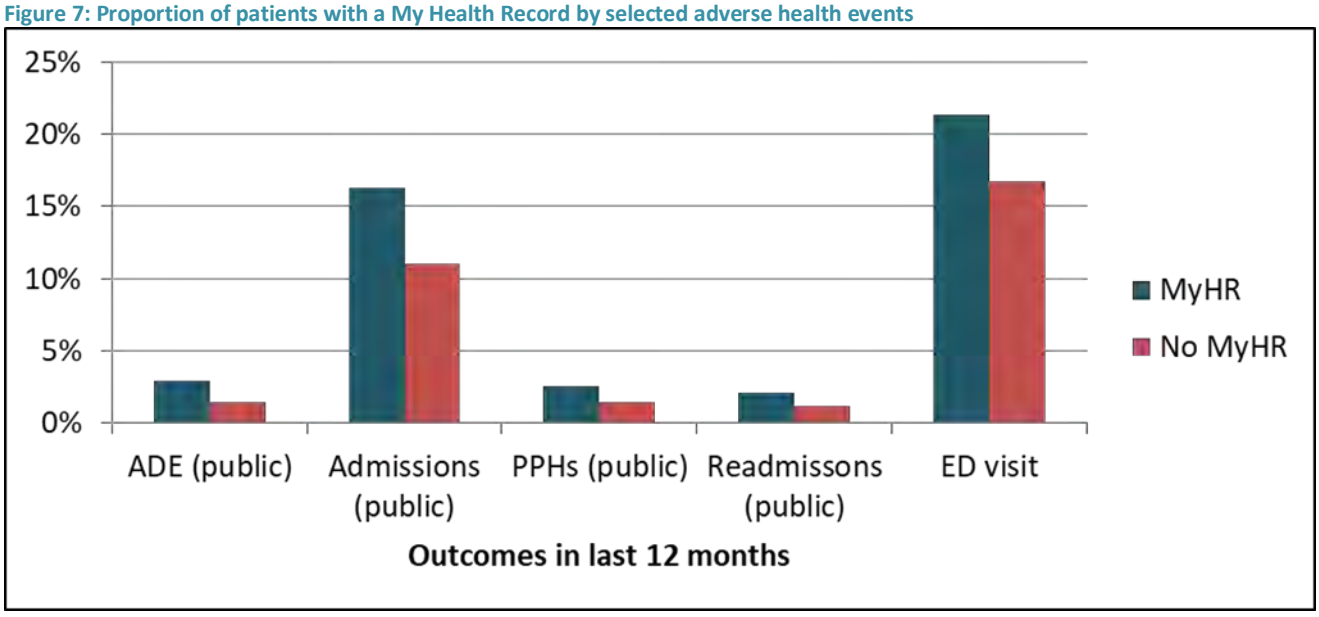


Table 4: Likelihood of selected health events among people with and with no My Health Record, and after adjustment

Outcome (MyHR vs No MyHR)	Crude Odds ratio of having MyHR	95% CI OR	Adjusted Odds ratio* of having MyHR	95% CI OR
ADE last 12 months	2.11	(1.85 - 2.40)	1.43	(1.24 - 1.66)
Admissions last 12 months	1.57	(1.48 - 1.66)	1.31	(1.23 - 1.40)
ED last 12 months	1.35	(1.28 - 1.42)	1.27	(1.20 - 1.34)
PPH last 12 months	1.86	(1.61 - 2.13)	1.30	(1.11 - 1.51)
Readmissions last 12 months	1.81	(1.55 - 2.11)	1.31	(1.11 - 1.56)

*Adjusted for age group, gender, clinical information system, chronic conditions and medication flags

Impact of using My Health Record

It is possible that patients who have a My Health Record do not actively use it. Active use of My Health Record may, in turn, have an impact on incidence of adverse health events among patients with My Health Record. To explore this, further analyses carried out among patients with a My Health Record who had an uploaded shared health summary compared to those who did not. It was found that My Health Record patients with a shared health summary had higher rates of adverse health outcomes than those who did not. However when this was adjusted for other characteristics, this difference was not significant. See Table 5.

Table 5: In patients with My Health Record, likelihood of having an adverse health event and a shared health summary.

Outcome (health summary yes or no)	Crude odds ratio of having shared health summary	95% CI OR	Adjusted odds ratio* of having shared health summary	95% CI OR
ADE last 12 months	2.31	(1.80 - 2.96)	1.05	(0.76 - 1.46)
Admissions last 12 months	1.72	(1.53 - 1.94)	1.11	(0.95 - 1.30)
ED last 12 months	1.30	(1.17 - 1.45)	0.92	(0.80 - 1.06)
PPH last 12 months	2.03	(1.55 - 2.65)	1.00	(0.71 - 1.41)
Readmissions last 12 months	2.44	(1.82 - 3.28)	1.30	(0.89 - 1.88)

* Adjusted for age group, gender, clinical system information, disease and medication flag

Commentary and next steps

Patients in the My Health Record group tended to be older, have a higher proportion with chronic conditions and use more medications than patients in the No My Health Record group. Furthermore, the proportion of patients experiencing hospital admissions in the My Health Record group was around 5% higher than those in the No My Health Record group and was also similarly elevated for ED presentations. Therefore it appears that patients who had characteristics of poorer health were more likely to have a My Health Record.

This finding is unsurprising, given that the Project was based in the Western Sydney Primary Health Network region, which required patients and carers to 'Opt-In' to have a My Health Record. It might be expected that patients with poorer health, more complex health care needs and requiring more regular contact with health services, were also those most likely to be early adopters of the My Health Record in Western Sydney. To summarise, the uptake of My Health Record in Western Sydney was much lower than in an opt-out trial region (98%, Nepean Blue Mountains Primary Health Network) and predisposed towards sicker individuals.

Adverse health outcomes were also higher among patients in the My Health Record group than among patients in the No My Health Record group. Again, this likely reflects the generally poorer health among the My Health Record group rather than any impact of having a My Health Record per se and that having a My Health Record was not, at this early stage of roll out, sufficient to mitigate, or even detect, adverse health outcomes for patients with more complex health care needs.

Adverse health outcomes and the active use of My Health Record was explored among those patients with a My Health Record. This was done because it is conceivable that while a My Health Record may be created, the Record is not subsequently accessed and used. The GP records included in Tranche 3 of the Pilot Project include shared health summary upload dates to My Health Record. These dates were used to further categorise My Health Record patients into those with and without a shared health summary. However no difference was detected in adverse health outcomes among these two groups after adjustment for other characteristics.

The information here provides an initial look at the early uptake of My Health Record. Even with further investigation it remains to be seen whether the currently available data are sufficient to detect differences outcomes such as service duplication, particularly diagnostic services, in relation to whether a patient has a My Health Record.

We conclude that this report establishes a plausible methodology for monitoring some characteristics and outcomes of individuals that may be concurrent with and without having a My health Record that can be repeated over time if primary care data continues to be linked to health system data collections in other regions of NSW.

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