Evaluation of a multifaceted intervention to change clinical practice using My Health Record (MHR) in primary care

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Report prepared for ADHA by the General Practice Academic Unit, School of Medicine, University of Wollongong.

Evaluation team: Professor Andrew Bonney, Dr Conrad Kobel, Ms Bridget Dijkmans-Hadley and Mr Jason Nunes

Medcast intervention team: Clinical A/Prof Stephen Barnett and Mrs Kate Clutton

Research Officer: Ms Alyssa Horgan

Report written by: Prof Andrew Bonney, Ms Bridget Dijkmans-Hadley, Dr Conrad Kobel, Mr Jason Nunes and A/Prof Joel Rhee

Acronyms

Acronym	Definition
ADHA	Australian Digital Health Agency
ECHO	Extension for Community Healthcare Outcomes
GP	General Practitioner
MBS	Medicare Benefits Schedule
MHR	My Health Record
PBS	Pharmaceutical Benefits Scheme
PPI	Proton Pump Inhibitor
UOW	University of Wollongong

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Executive Summary

Introduction

The rational ordering of pathology and radiology and appropriate prescription of medications have significant implications for patient safety and efficient utilisation of healthcare resources and budgets. There is evidence that training in rational test ordering reduces inappropriate use as practitioners become more experienced. In addition, system-based strategies such as protocol-based test ordering and use of clinical guidelines have been shown to promote rational ordering and cost savings. The roll-out of My Health Record (MHR), Australia's online patent controlled health record, provides a powerful opportunity to combine training in the use of this centralised health record with evidence-based prescribing and test ordering for practitioners.

This report presents the outcomes of the University of Wollongong's (UOW) evaluation of Medcast's multifaceted educational intervention, using MHR, for medical practitioners to encourage change in clinical behaviour and practice for pathology, diagnostic imaging ordering and deprescribing. The evaluation will appraise the outcomes of the educational intervention activities with doctors to understand attitudes to use of MHR and the role of MHR in quality use of medicines and diagnostic ordering, including the usefulness, acceptability and sustainability of the training.

Methods

Using the Medcast SupportQI methodology, a three-arm pragmatic, educational trial was developed and implemented. The three arms included a deprescribing intervention, a pathology-ordering intervention and a diagnostic-imaging intervention. All three arms explored and reinforced the role of MHR in realising the potential health care benefits and integration of MHR into clinical practice.

Utilising a responsive evaluation framework, participants were invited to undertake pre-and post-intervention interviews regarding their attitudes, expectations and experiences of this MHR-based education intervention. In addition, changes in practitioner knowledge, skills and intended behaviours were assessed using pre/post case scenario surveys and a practitioner post-intervention audit. The results were combined in a mixed-methods approach.

Information from the pre/post surveys, case scenarios and audits was used to conduct a Health Economic analysis. The economic analysis estimated the cost impact within the intervention and, where appropriate, modelled downstream health system effects. Secondary data sources as well as evidence from the literature were employed to supplement the economic evaluation where possible.

Results

Seventy one medical practitioners participated overall, distributed across the three educational arms of the trial. Fifteen practitioners participated in pre-intervention interviews and 13 in post-intervention interviews. A total of 60 participants completed pre-intervention surveys and quizzes and 44 post-intervention surveys and quizzes.

A thematic analysis of the interviews found that there were two overarching themes that emerged from the data. They were 'the Chimera of My Health Record (MHR)' and 'learning priorities'. GPs preconception of MHR at the commencement of the education intervention was a mixture of hope, distrust and apprehension, which has been characterised as the 'chimera' of the MHR. Following the training there was an evident shift in attitudes to MHR in response to more concrete appreciation of the opportunities, strengths and limitations of MHR gained through experience. However, there were still concerns about the reliability of the information in the MHR and the practicalities of using the online system.

Pre-education the GPs expressed interest in the topics of the education and saw it as relevant and important to their everyday practice. The interviewed participants enjoyed the self-paced, multi-faceted and social nature of the learning. They very much appreciated the case-based learning style and interaction with peers around the cases and the ensuing reflection. The interviews demonstrated clear evidence of embedding a change in participants' approaches to deprescribing, imaging and radiology. Some participants reported that they were interested in more education and practical tools and examples on how to use MHR for best practice.

The survey and quiz data demonstrated a significant increase in confidence in use of MHR and also in self-reported use of MHR in the deprescribing and the pathology ordering arms of the intervention. Beyond the use of MHR, there was increased confidence in deprescribing, guideline-based imaging and pathology test ordering following the education. There was an

increase in self-reported discussion with patients regarding deprescribing and increased rates of stopping medications that were no longer necessary.

The interventions showed a potential to effect significant changes in GPs' prescribing and pathology test-ordering behaviours. There was a significant reduction in the prescription and dosage of Seretide™ and possibly metformin and Panadeine Forte, and ordering of several pathology tests in the case-scenarios following training. Such reductions could lead to significant reduction in government expenditure on health care through the use of cheaper medicines, ordering of fewer pathology tests, and reduction in medication-related complications and side-effects.

Limitations in the robustness of the conclusions of the evaluation arise from the scope of the project, the compressed timeframe, less-than-complete data capture and lack of a control group.

Conclusions

By the end of the education sessions, there was a change in knowledge, skills and behaviours regarding the use of MHR and evidence-based deprescribing, imaging and pathology ordering. The evaluation has demonstrated that the intervention can improve confidence in, and use of, MHR. It also shows potential to achieve change in clinical reasoning and some reduction in unnecessary health care expenditure. Limitations in the robustness of the conclusions of the evaluation arise from the scope of the project, the compressed timeframe, less-than-complete data capture and lack of a control group.

Key findings and recommendations

- This multi-faceted educational intervention was broadly successful in meeting participants' expectations and needs while also achieving knowledge, attitude and skill change in the use of MHR and evidence-based deprescribing, pathology testing and imaging
- Overall, there was good evidence that there was uptake of an 'is this needed' step in participants' clinical reasoning and increased attention to reducing unnecessary health care expenditure

- In this small sample, there was evidence of a significant reduction in quiz responses to the use and dosage of Seretide™ inhaler and possibly metformin and Panadeine Forte and several pathology tests, with potential implications for health care expenditure
- The conclusions of this evaluation are that the interventions is successful educationally and there is evidence that it could lead to tangible improvement in evidence-based use of medicines and pathology ordering
- Limitations in the robustness of the conclusions of the evaluation arise from the scope of the project, the compressed timeframe, less-than-complete data capture and lack of a control group

Introduction

Background

Rationale

The rational ordering of pathology and radiology and appropriate prescription of medications, has significant implications for patient safety and efficient utilisation of healthcare resources and budgets. There is some evidence in Australia that training in rational test ordering reduces inappropriate use as practitioners become more experienced. (1) In addition, system-based strategies such as protocol-based test ordering and use of clinical guidelines have been shown to promote rational ordering and cost savings. (2, 3)

Education Interventions

The literature cites numerous interventions that have been trialed in an attempt to change prescribing and test ordering patterns. The most effective interventions are those adopting a multifaceted approach, in particular practitioner education and feedback combined with systems change. (4) Interventions that include the use of guidelines, audit, reflective practice (usually by way of clinical audit), workshops and academic detailing show the most benefit. (5-10)

In addition, general practitioner (GP) alerting systems combined with practitioner education (including online tools) and feedback have been shown to be beneficial in changing test ordering practices, (11-13) as have clinical decision support technologies and drug usage advice for rational prescribing. (14, 15) To this end, primary care ‘groups’ have been shown in trials to effectively receive education and allow practitioners to compare ordering and prescribing statistics. (16)

Education and eHealth

Exploring and influencing medical practitioner habits can be challenging and requires a pragmatic approach. The opportunity to deploy a multifaceted intervention in conjunction with the alerting and audit capacity facilitated by MHR has the potential to augment educational impact. The additional benefits of MHR with respect to shared decision-making and the future possibilities of patient interventions should also be considered. (17) Patient engagement and health responsibility is enabled by MHR, and improvements in

multimorbidity outcomes in primary care have resulted from better case planning and care coordination, further acknowledging the intended benefits of eHealth. (18) An exemplar of the synergies between education interventions and eHealth can be seen in the North American Extension for Community Healthcare Outcomes (ECHO) project which utilised telehealth, best practice protocols and multidisciplinary case based learning to improve Hepatitis C healthcare outcomes in an underserved population. (19)

Even in the absence of education interventions, the implementation of eHealth records has proven to be beneficial in areas such as smoking cessation, through increased documentation. (20) In addition, eHealth data can be used to facilitate primary care audit and research (21) and enable collation of prescribing utilization analysis and related cost data which can enable reflective practice to explore prescribing and test ordering habits. (22)

Health system potential savings

Educational interventions in general practice have the potential for significant savings to the Medicare Benefits Schedule (MBS) and Pharmaceutical Benefits Scheme (PBS), with potentially important effect sizes resulting from interventions. For example, with three recent systematic reviews including trials resulting in 15-20% reductions in prescriptions (23), a 10-25% reduction in diagnostic imaging (24) and 10-20% reductions in pathology ordering (4), the potential for MBS and PBS savings is substantial.

In summary, an appropriately designed, multifaceted education intervention, coupled with MHR, has the potential to improve quality of care and lower the burden of illness for patients whilst reducing costs from test duplication, overprescribing and low-value test ordering.

Education intervention

Medcast

The education intervention conducted by Medcast is based on the Medcast SupportQI methodology, designed for GP Quality Improvement activities.

Medcast, founded by Associate Professor Stephen Barnett in 2013, is an education company that provides e-learning solutions and collaborative technology services for the health industry, organisations and educators. Medcast's vision is to improve healthcare in Australia and around the world using high-quality, collaborative, online, social learning. Medcast develops independent, evidence-based education and does not work with pharmaceutical sponsors.

Medcast SupportQI methodology

Medcast uses best practice e-learning development, with a focus on social, interactive learning opportunities. The educational theory underlying their work is *Communities of Practice*, with tacit knowledge sharing ("know how") as well as formal, explicit knowledge sharing ("know what"). Learning experiences are mostly case-based (scenario-based) learning and use a variety of modalities including webinars, self-paced learning, blended activities, quizzes and discussions.

Intervention

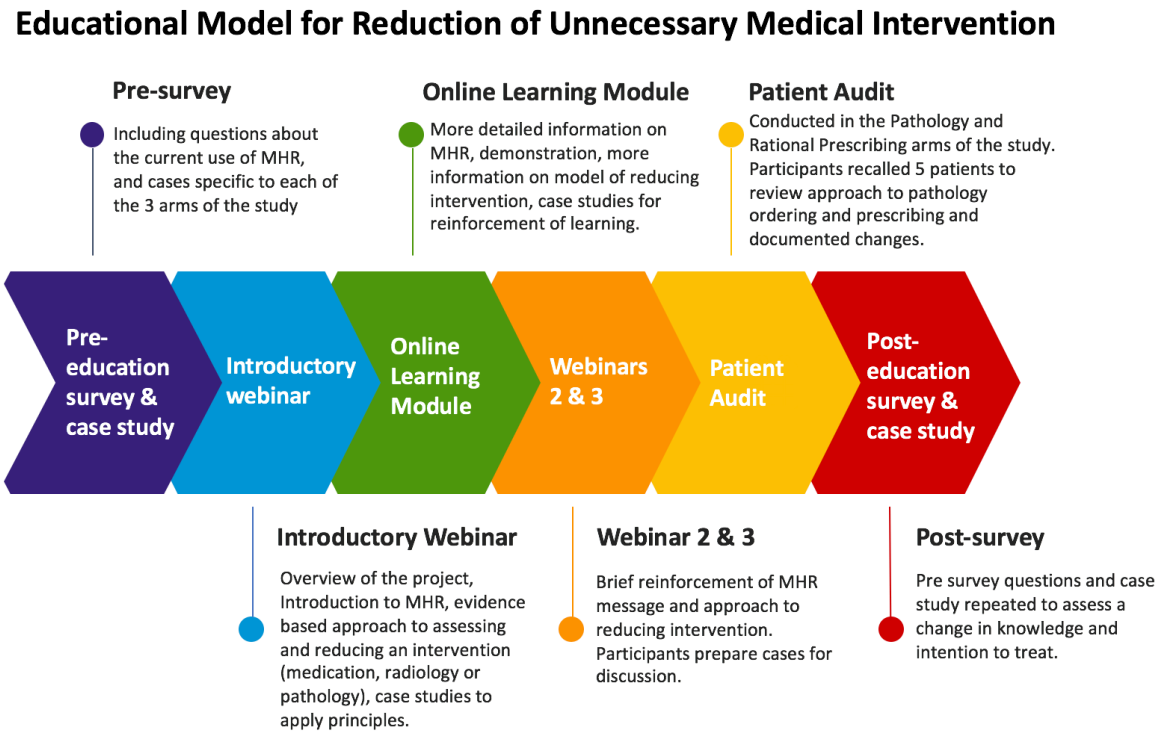
Using the Medcast SupportQI methodology, a three-arm pragmatic, educational trial was developed and implemented (see Table *1*). The three arms included a deprescribing intervention, a pathology-ordering intervention and a diagnostic-imaging intervention. All three arms explored and reinforced the role of MHR in realising these benefits, and integrating MHR into clinical practice.

Table 1 Medcast SupportQI methodology for the three arms of the intervention

Intervention activities	Deprescribing arm	Pathology arm	Diagnostic-imaging arm
Pre-intervention survey (30 minutes)	☒	☒	☒
Initial engagement webinar (1.5 hours)	☒	☒	☒
Online education module (1 hour)	☒	☒	☒
Audit (1 hour)	☒	☒	☐
Interactive webinars x 2 (45 minutes each)	☒	☒	☒
Post-intervention survey (30 minutes)	☒	☒	☒

Program logic for intervention

The intervention across all three arms was premised upon a standardised approach to online educational activities. Each arm was built around a learning principle for GPs to include 'is this necessary' in their clinical decision making, in regard to prescribing and test ordering. The expected outcome of this approach would be evidence of an increase in consideration of 'is this necessary' in clinical practice, followed by an hypothesised reduction in the associated subjects of the education (prescriptions, pathology and imaging). The flow-on effects in reduction of unnecessary health care would be dependent on a number of factors, including; individual clinical circumstances, the frequency of typical use of the resource and baseline use by the practitioner.



Program evaluation aim

This report will present the outcome of the UOW evaluation of Medcast's multifaceted educational intervention, using MHR, for GPs to encourage change in clinical behaviour and practice for pathology, diagnostic imaging ordering and deprescribing. The evaluation will appraise the outcomes of the educational intervention activities with GPs and providers to understand attitudes to use of MHR and the role of MHR in quality use of medicines and diagnostic ordering, including the usefulness, acceptability and sustainability of the training.

Outline of the report

The report presents the findings of the evaluation. The methods section provides a detailed description of the research design including, ethics approval, participant recruitment and analytical approaches. In the results section we report on our data analysis. This is divided into three sections: a thematic analysis of the qualitative data; pre- and post-intervention quantitative data analysis; and health economic analysis. In the discussion, we draw together findings of the evaluation and present recommendations for ongoing, future research.

Methods

Program evaluation methodology

The evaluation of the three arm educational intervention was conducted by the University of Wollongong and used a responsive evaluation approach. Responsive evaluation is derived from the naturalistic paradigm that places importance on an understanding of people and programs in context. (25) It sets out to observe the intents, standards, judgements and statements of rationale for a program and respond to emerging and preconceived issues. (26)

The evaluation structure uses Kolb's experiential learning theory (an adult learning theory) as a basis to understanding how learning is achieved in the intervention as well as measuring the effectiveness of the intervention. (27)

Ethics approval

Human ethics approval was obtained for this study from the University of Wollongong (HE 2018/047).

Program evaluation study design

The program evaluation involved a mixed-methods analysis of the pre/post surveys and post-intervention audit to assess the parameters identified by the ADHA as well as qualitative pre/post interviews to investigate behaviour change.

An embedded mixed-methods design was used to incorporate a qualitative component into an outcomes-based educational intervention trial. In this instance, qualitative data was used to develop understanding of how the intervention is experienced by participants and to help contextualise and explain the quantitative results. Our analysis aligns with Creswell and Plano Clark's (2006) model of mixing data using embedded mixed method design (

Figure *1*). (28)

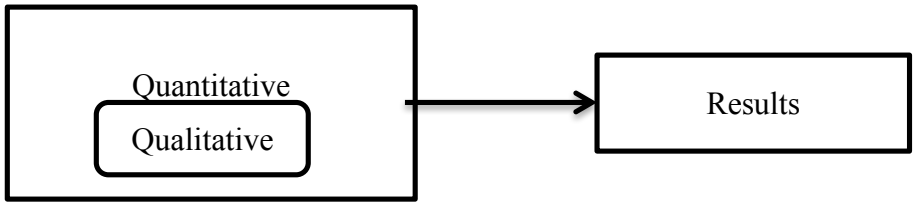


Figure 1 Creswell and Plano Clark's (2006) model of mixing data using embedded mixed method design.

We used Stakes's responsive evaluation (25) and Kolb's experiential learning theory (27) as a basis to understanding how learning is achieved. By integrating the embedded qualitative component within our quantitative intervention data we sought to better:

- Explore the effectiveness of the intervention on GP behaviour change
- Reveal and contextualise relationships between variables and outcomes
- Assess the acceptability and sustainability of the intervention

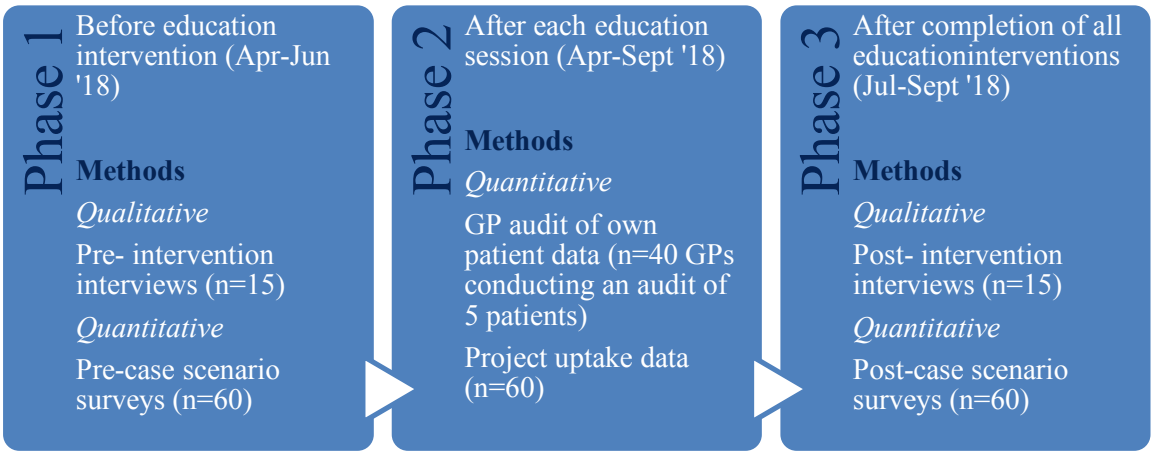


Figure 2 Mixed methods program evaluation and data collection

Sampling and recruitment for intervention and program evaluation

Recruitment sites

GPs and practice staff within the South West Sydney PHN (SWSPHN, opt-in MHR) and Nepean Blue Mountains PHN (NBMPHN, opt-out MHR) were invited to participate in the educational intervention.

Each arm of the intervention was to be targeted to the specific sites, with the NBMPHN recruiting GPs into two arms of the intervention - deprescribing and pathology - due to the higher likelihood, as an opt-out site, that patients would have a MHR to conduct the patient audit. However, following initial recruitment, recruitment numbers from the specific sites were not achieved.

In May 2018 recruitment was expanded to the Far North Queensland Primary Health Network (FNQPHN also an 'opt out' trial site) as well as email invitation from the Medcast list of GP members, until recruitment numbers were attained.

Deprescribing arm	Pathology arm	Imaging arm
20 GPs	20 GPs	20 GPs

Figure 3 Three arm intervention and target recruitment numbers.

Sample size

The study was designed to have sufficient power to detect a statistically significant difference with 60 participants using a multiple regression linear model with two predictors assuming a moderate effect size from the intervention.

Recruitment methods

GPs were recruited via three approaches into the education intervention and provided an online participant information sheet and consent form to complete upon online registration:

1. Direct correspondence – letter and/or email from SWSPHN, NBMPHN and FNQPHN over a month of advertising;
2. Direct correspondence via email to individual doctors on the Medcast database; and
3. A direct approach to certain practices by PHN Digital Health representatives in the area.

The participant information sheet and consent form detailed all data collection points for the intervention and program evaluation. They were also asked to indicate consent for a pre/post qualitative interview so that they could be contact by the UOW evaluation team.

Participation in the interventions were incentivised by professional development accreditation (40 point Active Learning Module and Quality Improvement activity) as well as a $500 payment (per GP) and a $200 practice payment as recompense for their time.

Data collection and analysis

Qualitative data collection

As part of the UOW evaluation, qualitative pre- and post-intervention interviews were undertaken to ascertain perceptions and attitudes of participant before and after the intervention. Key areas addressed in the interviews included changes in attitudes to use of MHR and the role of MHR in quality use of medicines and diagnostic ordering. The usefulness, acceptability and sustainability of the training were also addressed in the interviews.

Sample selection

Participants who consented to participate in a pre/post interview as part of their intervention registration were approached by a UOW researcher via phone. A list of consenting participants was provided by Medcast. The UOW evaluation team used purposive sampling approach (maximum diversity sampling) to derive the sample of 15 practitioner participants, from the intervention groups, before and after the intervention.

Qualitative data analysis

The transcripts were thematically analysed by the UOW evaluation team. Thematic analysis is a method for identifying, analysing and reporting patterns (themes) within data. (29) Two researchers compared initial codes and themes to ensure consistency while identifying patterns of meaning in the data until mutual consensus was achieved. This technique helps to capture important meanings which convey the story of the data and present a reasoned and logical argument in response to research questions. (29)

Quantitative data collection

Primary outcome measure

The study used the primary outcome of prescribing behaviour to derive statistical power, although radiology and pathology ordering behaviours were also assessed. Within the time frame available, two approaches were employed to assess changes in practitioner knowledge, skills and intended behaviours - the pre/post case scenario surveys and GP post-intervention audit.

Case scenario survey pre-and post-intervention

First, survey responses to case scenarios, pre- and post-intervention, were assessed for changes in knowledge and skills.

GP post-intervention audit

Second, these findings were correlated with the assessment of the projected impact, of knowledge and behaviour change, using real-life application of the learned skills to practitioner's own patients (n=5) in the post-trial case audit, incorporating the use of MHR. This entailed GPs looking at their own list of patients and reviewing their prescribing and pathology referral habits using MHR. GPs then completed an audit template that the evaluators were able to review in order to observe stated behaviour change.

By using repeated scenarios pre- and post- it was planned to observe how knowledge created through exposure to concrete experiences (the education intervention), followed by reflective learning, abstraction of the concept and applying it to new frames of understanding (application of knowledge to post-trial case analysis) during a second experience impacts on GP learning. (27)

Patient recruitment for audit

Patients involved in the intervention were recruited via two methods. The first entailed a practice nurse/manager to recall patients (n=5) for a 75-years-or-older health assessment (a routine 12 monthly comprehensive health check) that the GP will conduct in their audit of these patient's MHR. A second method was implemented in August 2018 due to difficulties with the recruiting patients into the patient audit. This method entailed GPs to opportunistically review patients.

Project uptake data

Project uptake data to assess GP engagement with the intervention was collected, provided by Medcast to include in the UOW evaluation.

Quantitative data analysis

It was planned that the data would be statistically analysed using multi-level modelling methods to test for between-group (intervention vs. control) differences in the change in variables over the course of the study period. This approach was changed to using a

combination of paired t-tests and whole of cohort independent samples pre-post t-tests and non-parametric equivalents due to sub-optimal response rates in the data and the lack of capture of control group data. Statistical significance was set at $p < 0.05$.

Health economic evaluation and data collection

The original aim of the economic evaluation was to consider the joint cost and effects of the multifaceted intervention as well as report on costs per session and individuals trained. Quantitative evidence of the practice change (i.e. pre-post survey, pre-post case scenarios and audit data) was to be used to triangulate the impact of training by Medcast. However, the evidence of practice change from the data collected during the intervention was limited and only the pre-post case scenarios – i.e. the prescription of Seretide™ in the prescribing arm and ordering of Full Blood Count (FBC) and Liver Function Tests (LFT) in the pathology arm - showed significant changes. No additional evidence was available from the pre/post survey and audit data to inform the economic analysis.

Therefore the analysis was restricted to those results that were found to be significant. Additionally, secondary data sources as well as evidence from the literature were employed to supplement the economic evaluation where possible.

Hence, the economic analysis estimated the cost impact within the intervention and, where appropriate, modelled downstream health system effects. In keeping with a conservative approach to modelling the cost impact, it was assumed that general patient co-payments were made for the PBS items without reaching the safety-net. The inflation calculator of the Reserve Bank of Australia has been used to adjust for inflation rates and unless stated otherwise, with all costs reported according to 2017/18 prices of fee schedules. (30)

Results

Qualitative results: a thematic analysis

Interview participant information

Fifteen pre-intervention and 13 post-intervention matched interviews were conducted with GPs in June and August 2018. The interviews lasted between 8 and 24 minutes in length (averaging 18 minutes) in the pre-intervention interviews and 13 and 32 minutes in the post-intervention interviews (averaging 23 minutes). Most participating were from opt-in MHR sites (80%) with three GPs (20%) from opt-out MHR sites.

Table 2 Interview participant information

MHR Site	Intervention arm	Classification	Pseudonym	Gender
Opt-in	Imaging	GP	GP A	Female
Opt-in	Imaging	GP	GP B	Female
Opt-in	Imaging	GP	GP C	Male
Opt-in	Imaging	GP	GP D	Female
Opt-in	Imaging	GP	GP E	Female
Opt-in	Prescribing	GP	GP F	Female
Opt-in	Prescribing	GP	GP G	Male
Opt-out	Prescribing	GP	GP H	Female
Opt-in	Prescribing	GP	GP I	Female
Opt-in	Prescribing	GP registrar	GP J	Female
Opt-in	Pathology	GP	GP K	Female
Opt-out	Pathology	GP	GP L	Male
Opt-in	Pathology	GP registrar	GP M	Female
Opt-in	Pathology	GP	GP N	Female
Opt-out	Pathology	GP	GP O	Male

Pre-intervention interviews

There were two overarching themes that emerged from the data. They were 'the Chimera of My Health Record (MHR)' and 'learning priorities'.

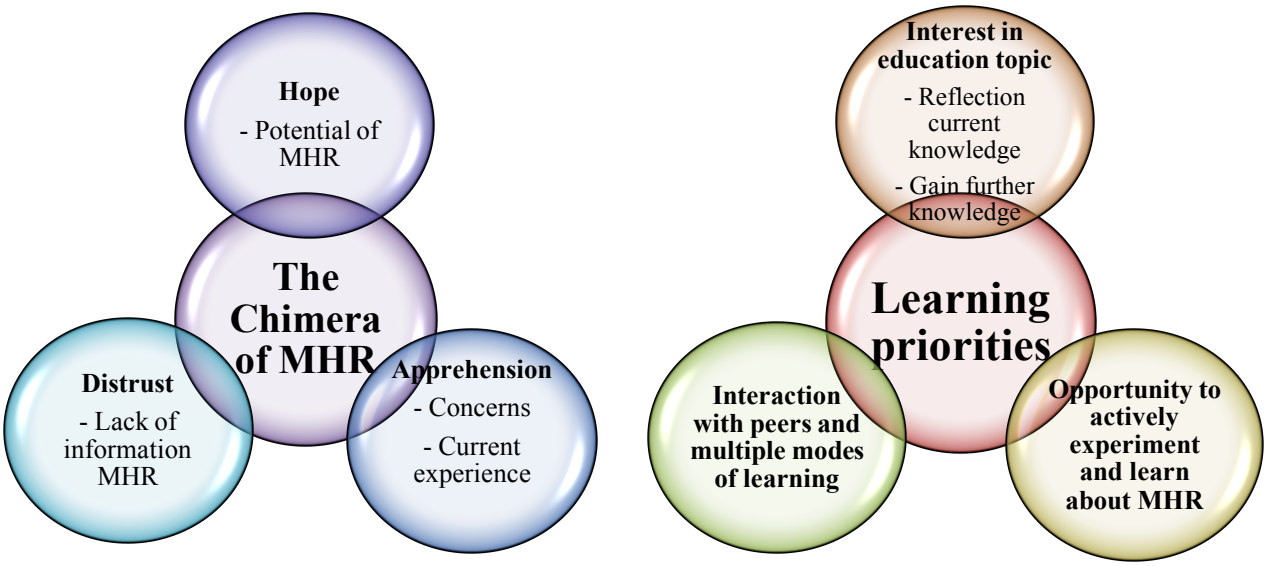


Figure 4 Overarching themes from pre-intervention interviews

The Chimera of the My Health Record

GPs preconception of MHR at the commencement of the Medcast education intervention was a mixture of **hope, distrust and apprehension,** which we have characterised as the 'chimera' of the national digital health record system.

Hope

There were ***potential benefits of MHR*** that were observed by the GP interviewees. These included the potential for ***better information sharing*** about patient's health among health providers, in particular other GPs and local hospitals, which would in turn ***reduce the duplication of tests***.

‘It's always frustrating to get information, to share the information. So, I think it's really good chance, or maybe a good data support for all the health professionals to share. One centralized [place for] the information… , I think that that will save a lot of on imaging and the pathology [being] repeated’- GP M, Female

‘It will be more like a complete record rather than... a fragmented record, so you can actually see the whole person and... it gives in a whole big picture of the patient's medical conditions and treatment for all investigations it would be very useful.’- GP J, Female

‘It stops us from doing too many blood tests, X-rays, or investigations. I think it's actually more useful for the patients in the management point of view.’- GP O, Male

It was also perceived as ***useful for new patients*** who have recently moved to the area who have ***complex health*** conditions, patients who are travelling and ***culturally and linguistically diverse*** (CALD) patients, as it would potentially ***save time*** chasing up medication lists, pathology results or past history from previous GP practices.

‘I hope for the My Health Record is that it supplements what we do, that we don't have to start from the ground-up every time we see a patient.’- GP E, Female

‘It is clearly potentially useful because the idea is that there's a central repository of information, you know, somewhere to go to see what people's health conditions are, what their medications are. If people are moving between practices, often their records are slow to come with them. People are very unreliable at remembering what all of their health conditions have been over the years. You can understand that something that happened five years ago, you often forget all about, you focus on the issues that are problematic for you now.- GP F, Female

‘Let's say somebody just comes in and they're a new patient and I do not know what medication they're on. I just jump into the online health record’- GP O, Male

‘Sometimes language can be a barrier. Like, we do have a lot of the culturally and linguistic group in Australia, so for them, I think it would be very useful.’- GP J, Female

‘I think it's going to be useful for sharing information, particularly, hopefully save us a lot of time looking for pathology and radiology for, either our current patients or new patients. Because it, you know, it can ... Once I know that they've had, let's say, a blood test done last year elsewhere, it's still another half an hour before I can access it.’- GP I, Female

It was perceived as a ***potentially useful tool to assist medication reconciliation***, (if the medications were up to date in the system) that would aid in ***reducing potential harmful drug interactions and duplication of medications*** a patient may already be taken but was unable to recall at the time of their medical consultation.

‘I think it's a useful tool for if somebody goes into hospital. I think it's a useful tool, um, if you've got somebody that's doctor hopping or you suspect that's doctor shopping.’- GP N, Female

‘I'm hoping the My Health Record will help that…oftentimes, they [patients] do come for a script...then they have no idea why they're taking certain things that they get the doses wrong or it's usually a tablet.- GP E, Female

‘I guess you can find out exactly what they are-prescribing and where things are being prescribed. So it probably wouldn't reduce any, so much duplication but just more safety and accuracy knowing exactly what's being prescribed.’- GP G, Male

Distrust

Lack of information about MHR

The perceived lack of information about the MHR before the roll out to GP practices impacted participants trust of the system. They expressed that did not feel sufficiently consulted or prepared to not only use a new system but also to answer questions or allay fears that patients may ask about privacy and confidentiality of MHR. In the context of the period in which this intervention was carried out, GPs were concerned about patients receiving information regarding the system from the media as opposed to official sources.

The perceived lack of information or training about MHR had left some GPs wondering whether they should use the MHR system and led to beliefs that it would not change their current practice, thus questioning its usefulness.

Lack of information about MHR and patient support

'We have no idea about what is the benefit. They [the patients] have no idea um, how they can benefit from this… There was not much education about it, about the privacy and about the benefits, how you use it, what the benefits for the GP, what would be the benefits for the patient, what would be the benefits for the hospital?'- GP B, Female

'I think the My Heath Record is something I don't know a lot about at this stage. I haven't received any training in, obviously it's something that's going to become a bigger part of general practice.'- GP G, Male

'There are lots of people who do not want to be on it, I know, and there are some people who want to be on it, so it all depends on the person concerned and how can we as doctors promote it in the GP setting.'- GP K, Female

'Those broader issues that we know there are, data security breaches in supposedly secure systems, but much more so the actual broader concept of privacy because I have several patients who will not want to have specific diagnoses able to be seen or inferred from their pathology or inferred from their prescribing. So I have many patients who will choose to opt-out for those reasons.'- GP F, Female

Questioning MHR usefulness

'Until it's actually more, um, taken up more widely. Um, I don't think that I'd be able to pass judgment on how successful or not successful it is.'- GP H, Female

There was concern that because there is a lack of information about MHR that there would be legal ramifications for GP practices should they commence using it, only later to find there were significant problems with the system.

> ‘There is still a little bit of concern amongst some of my colleagues about liability of information that's put up there, and then the liability of not having checked all these other computer sources of information before you've made a decision about a patient which- the lawyers in the future will say well why didn't you look?’- GP L, Male
>
> ‘I expect it's going to bring some trouble in the future, as well…a lot more issues [are] going to [happen] in the future as well, especially security. So probably that's why a lot of senior doctors and senior GPs are not very interested.’- GP M, Female

Apprehension

A majority of GPs interviewed did upload health summaries to MHR. A common reason cited for using MHR was that there was a Practice Incentive Payment (PIP) payment attached to uploading health summaries. They did not commonly use MHR beyond uploading the health summaries.

> ‘My Health Record, I guess not so much. Mostly, only, what we're required to do for PIP... I've only uploaded for my patients-in case it's useful for them in some way.’- GP I, Female
>
> ‘In a way, we're being forced to actually have to upload it, because that's part of the PIP payment...I can’t say that I’m actually utilizing MHR at the moment, all I’m doing is uploading them.’- GP H, Female
>
> ‘So we were one of the original trial areas um for the opt out option... the main thing that I utilize it for is uploading health summaries.’- GP L, Male
>
> ‘I've used it intermittently since it first came out…but I would have to say I use it very rarely.’- GP F, Female

Concerns

Concerns were raised as a reflection on their own, or peers, current experience with MHR, particularly those GPs who were in opt-out MHR areas. Areas of concern with MHR included ***time pressure*** to use MHR in a consultation, as well as the ***practicality, efficiency, consistency, accuracy and reliability of MHR***.

Time pressure to juggle patient expectations and administrative requirements in a 15 minute consultation were perceived barriers to using the MHR beyond uploading health summaries. In particular if a patient was a long-standing patient with complex health needs, GPs would prefer to spend time making sure they were caring for the patient rather than looking for or uploading information that they already know and use.

> 'If you're spending five minutes searching through My Health Record, you've still gotta question- is a third of my consult time better spent on My Health Record or better- spent with the patients.'- GP L, Male
>
> 'They expect it all to be done in (laughs) you know, less than 15 minutes. And that's just not realistic.'- GP D, Female

‘It's slow and clunky. It takes, you know I have 15 minutes to see people. It takes a big chunk of that to log in to bring up the pages you want to look at the thing that you want to look at. And so that also in the timeframes that we work with in general practice is I think a little bit of a barrier for uptake from the GP end’- GP F, Female

‘I already type an extra five minutes. Because, I explain it to the patient to say a little bit of clicking to start with-before you can even get to the first stuff loading up. I think it takes at least five minutes. And then again, you know, the next time you review it, you know, "Are you still taking this stuff? What else do you want uploaded again?’- GP I, Female

As a result of not having a lot of information about or practical experiences with MHR ***concerns*** were raised about whether the system would be ***practical*** and ***efficient*** enough to fit into a GP consultation time. Other concerns raised were whether MHR would be ***consistently used*** by other GPs or providers ***impacting on the potential accuracy and reliability of the information*** on a patient’s MHR.

Practicality of MHR

‘Pathology results separate to GP management plans, separate to clinical notes-Or discharge sort of notes. I don't know how clearly they are going to be labelled…They say most x-ray places aren't, can't be uploaded.’-GP D, Female

‘..pathology results, it's just a long list you've got18 pathology tests, it doesn't tell you what the test is or the results, so you've got to click on pathology test to find out- what the pathology test was, then you got to click on that to then get a result-so if you're trying to find out a specific result- it may mean you've got to have 30 or 40 clicks to actually find that’- GP L, Male

Efficiency of MHR

‘I'm hoping that it's a system that will last and so that we don't have to um I don't know in ten years time, re-upload everything on a new system.’- GP G, Male

‘The uptake of that [MHR] is sort of ad hoc, I don't think that we can solely rely on saying, "Go to the, MHR to find out information about patients." As yet…’- GP H, Female

Accuracy and reliability of MHR

‘I will upload what my current listed-medications are, but when they leave hospital-are they going to remove that and then will there be somewhere that says, "This medication was removed by so-and-so on this date?"’- GP I, Female

‘…whether those are being regularly updated and maintained is another issue. 'Cause it's hard for me to know if the people who have a record, how up to date those records have been…it's entirely dependent on how well patients and their healthcare providers engage with it, because if the information on there hasn't been updated for two years, then it's of limited use’- GP F, Female

Learning priorities

Interest in education topic

The GPs expressed interest in the different education topics (deprescribing, rational ordering of pathology, and rational ordering of imaging) as they saw it as relevant and important to their everyday practice. Some GPs saw it as an opportunity to ***review their knowledge*** on the topics whereas other GPs sought to ***gain further knowledge***.

‘I think it's always good to ... That's not gonna change me greatly. I think I'm reasonably okay with what's reasonable, but I think we can always improve.’- GP D, Female

‘Maybe we will come across information that negates the need for us to do tests- so that will be positive, the intervention or the program itself is a little bit more reflective on ordering of tests, so even though I believe reasonably across this area, there's always room for improvement’- GP L, Male

‘I'm hoping to learn how to de-prescribe and who, for, and what I can de-prescribe in a nutshell.’- GP I, Female

Opportunity to actively experiment and learn about MHR

Furthermore most GPs anticipated the opportunity to learn more about MHR with the hope that they may be encouraged to actively use MHR more in their clinical practice.

‘Currently, I'm just accessing shared health summaries and medication reviews and things like that if anything that I do not know...I would like to know more about it.’- GP O, Male

‘A better understanding of the My Health Records. How to use it. How to access it. That's basically what I'm after out of it.’- GP N, Female

‘I don't want to be outdated, I want to be ahead of all these changes and to be able to use it effectively so that I don't have to waste my time chasing after the reports and I think if I know what's happening effectively with a patient, then I can provide a better care, so I guess that's what I'd like to achieve’ – GP J, Female

‘My main hope was to be able to use My Health Record…I work as a locum. I've got lots of different practices. And I rarely have time to sit and play with it. And I just want you know.’- GP D, Female

‘While I feel I've got some knowledge of My Health Record, hoping to gain further knowledge and sort of user tips and ways to ah utilize My Health Record better’-GP L, Male

Although for some GPs MHR was not the priority for their learning.

‘My Health Record, I guess not so much. Mostly, only, um, what we're required to do for PIP…To be honest? I'm, no, I was more interested in the de-prescribing.’ – GP I, Female

‘I do have a very strong interest in de-prescribing for my elderly patients and I was hoping to extend my knowledge in that area. And also I really haven't been using My Health Records. Very few of my patients have them and I've always felt under skilled in being

able to use that system and I thought it would be good for me to improve my skills in working with that new system.'- GP F, Female

Interaction with peers and multiple mode of learning

The GPs looked forward to the opportunity to interact with expert speakers in the different education topics, ask 'burning questions' and to interact with their peers to learn about 'real patient' encounters. Using multiple modes to learn and reinforce information about the different education topics was important to the GP participants.

Interaction with peers

'..it allows [us] to have training session and interact with people who have a different way of practicing because they're in a different, more remote, or more inner-city area. So we can shed some experiences.'- GP A, Female

'The fact that general practice is actually more complex than the simple cases that are often presented in learning modules. Real people are quite complicated in their multiple health problems, in their social situations, in their stubbornness to take advice and to be able to acknowledge those limitations and ways to work around them is actually a really helpful way of extending the learning.'- GP F, Female

Multiple modes of learning

'Having different methods of learning really reinforces it, as having webinars and the audit and case discussion and on my modules, um, yeah I think often having multiple different forms where you are getting input and learning from, um, definitely helps to reinforce them. So, it sounds like a very comprehensive sort of program.'- GP G, Male

'I think the case-studies are a really good way to ... to enforce learning.'- GP C, Male

Although not all GP participants accepted the online webinar format, due to the lack of face to face contact with the speaker and other GP participants, having the opportunity to participate in the webinars in a ***controlled environment*** (namely at home) was valued.

‘I prefer face-to-face, but if I can't make it, this is the second best option for me.’- GP E, Female

‘I think it's critical in this day and age where, you know, we can access too, um, you know, webinars and online modules and the fact that you can actually use them at your own pace, for example, like I said, um, a lot of like doctors, they do have young kids today, especially female ones, like female GPs, often though it's really difficult to go to, you know, attend for example on the weekend or after work. So, the format of that is fantastic.’ –GP J, Female

Flexible engagement in the webinars by providing opportunities to download the webinars for further revision or because they had missed the webinar was greatly appreciated.

‘If there are webinars which are recorded and which are just sent and we can watch at our own clinical time and space, that would be fantastic.’- GP O, Male

Post-intervention interviews

There were two overarching themes that emerged from the data. They were ‘the Chimera of MHR’ and ‘learning outcomes’.

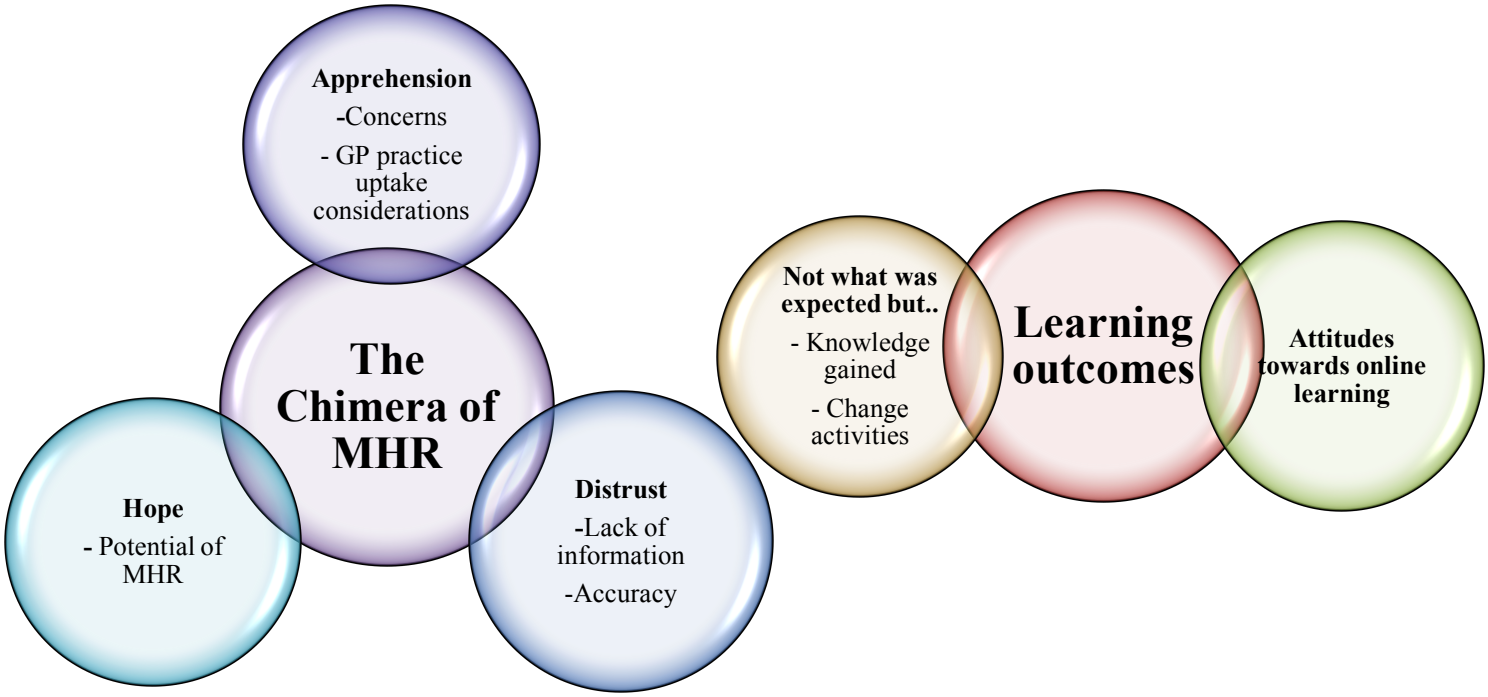


Figure 5 Overarching themes from post-intervention interviews

The Chimera of MHR

In the post-intervention interviews the attitudes of ***hope, distrust and apprehension*** regarding MHR had shifted somewhat; in response to a more concrete understanding of strengths, potentials and limitations of the system.

Hope

There was hope that the ***opt-out component*** of MHR may provide additional opportunities to create a centralised patient record. Sharing information more efficiently amongst providers and across state borders was still seen as a potentially positive thing to arise from the MHR if the government is able to abate their current distrust and apprehension to use it.

> 'I'm hoping that that means that once they do that, the front desk staff, no longer needs somebody to spend five minutes at the front desk asking questions and clicking on buttons so that we can see it.[talking about opt-out MHR]- GP D, Female
>
> 'So it's just a matter of time that we have a centralized system and this complicated medical field, we do need something like that. So I think it's 'for' my health, for a long time... we do need to have some kind of system where the doctors and the allied health professionals can access this. Because otherwise it's all fragmented.'- GP J, Female
>
> 'Then there's the chronic care ones who have a long history but then they may move for some reason. Even interstate. And very often you then, it's pretty rare for a GP to have the foresight to say, oh you're moving. Okay well I'll pick out all the important stuff from the last 20 years that I've been looking after you, and photocopy it and give it to you.'- GP D, Female

The unknown or new patient was seen to benefit the most from having a MHR and would reduce duplicate tests being run on them.

> 'Well the person I am, I'm pretty optimistic about a lot of things. For most things, for My Health Record can be very useful things. For example, in my patient demographic there are some patients who will come and see me and then see another GP for another issue, or ... look around.'- GP E, Female

‘As a doctor I know that I need to have a record. Sometimes when you see a doctor, or patient, and you don't have any previous records, how frustrating it can be for doctor. I can tell you how frustrating it can be.- GP C, Male

‘So I certainly have times where a new patient turns up, or you've got a specific question, then you can go to My Health Record and sometimes find some useful information.’- GP L, Male

‘So you would reduce the duplication but because there's still so much uncertainty about MHR, and people are opting out, it's become- and people have really no idea- the average person has no idea how to access their MHR.’- GP N, Female

As a result of the intervention a few participants felt more motivated to check that a patient had a MHR whereas prior they had only uploaded to MHR. The medication view was perceived as useful for unknown patients who could not remember the medications and dosages that they were taking.

‘Look, I will I think try and make sure that I do check if people have a My Health Record, and do have a look at the dispensing records.’- GP F, Female

‘Yes, so I check with the patient whether they have health record. That's like saying instead of asking. And obviously not every patient I ask, I ask if I remember. I mean mostly I am asking these days.’- GP C, Male

‘I have been using My Health Record like about ten times every day now. Every new patient that walks in, I definitely open My Health Record. It's been really good. Yeah, and is that as a result of doing these sessions.’ ‘(Sic)’- GP O, Male

‘I click on it more knowing that there's a My Health Record, I do click on it a little bit more for the medication view, especially if the patient is new. So I haven’t seen them before..so you click on it, there's a medication view section so you can have a look at all the medications they've been prescribed in the past.’- GP H, Female

Distrust

Some participants felt more negative about using MHR because they had encountered inaccuracies with patient information or they had not had a chance to practice using MHR because a lot of their patients did not have a MHR. This experience further distilled the initial distrust of MHR from the pre-intervention interviews.

> 'I know something with My Health Record, and I had got reservations about it. And not many of our patients who are on it. And I thought, what's the point to get all this stuff together with the government and work out the privacy problems and everything, what's the point of doing it now?'- GP K, Female
>
> 'It just so happened that there was a new patient who presented and she used to see a different practice… But unfortunately, it's not up to date. I mean it was put up in 2016 and the medication that she was on, she's no longer taking and the new medication that I wanted to check, it's not even listed… But now we in 2018 then if there has been no change in medications I suppose it wouldn't matter, but because strangely the patient said that this medication change has been for the last six years…one wonders when doctors are just setting up the My health record, is it actually them just ticking on saying oh I'll just upload the health summary that's on the computer without actually looking into the details of whether those details are actually accurate or not.'- Dr H, Female
>
> 'It didn't work on any of the three occasions when I tried to use it. Two of them didn't have one that we thought had them, and then one of them was absolutely bereft of information. There was nothing in there. I obviously, because I was using it, did a detailed history and medication summary and uploaded them, so that it would be actually useful for the next person. It wasn't helpful.'- GP F, Female
>
> 'When I go to visit, if I happen to think of it and I try and click on My Health Record in patient notes it almost never opens. Most of the practices I'm working in, the patients aren't signed up for it.'- GP D, Female

It was felt that information about patient privacy and confidentiality was still lacking and that there was uncertainty about what to advise patients. At the time of the follow-up interviews there was a strong focus on MHR privacy and security issues in the media. It was thought that

by having more information for patients and GPs that the GP would be better placed to have an honest conversation about MHR. Without this information they felt unable to allay patients fears.

> '…now we realize according to the media that indeed there is reducing of privacy. I keep explaining to them, "it's not a reason for privacy, except for doctors or hospitals, but it's not easy to convince someone after what they heard in the media… At 85, they don't care. But what I'm talking about is teen age, 40s to 50s and 60s to 70s.'- GP F, Female
>
> 'I can understand, there are some issues, especially to do with young people with domestic violence, and to do with gender and STDs... There are a number of very personal issues, primarily around young people rather than older people.'- GP D, Female
>
> 'It's.. patient dependent. It's not entirely up to you. You can only educate patients that there are these things that exist and it's good for you. You can tell them, but it's up to the patient what they want. So it's not entirely dependent on you.'- GP C, Male
>
> 'Well, people just randomly come and ask a question. There's not a specific population or a patient database, they just look at the television ads and come and ask me a question, "Do you think it's a good idea to opt-in or opt-out?"- GP O, Male

Apprehension

Concerns around MHR efficiencies including consistency of use by GPs and other providers as well as reliability of data and practical issues remained prominent in the follow-up interviews. Time pressure concerns, to review and upload results, particularly for complex patients, were more prominent in the follow-up interviews. This may have resulted from an opportunity to practice with MHR whereas before a majority of people only uploaded records.

> *Consistency*
>
> 'I can upload my summaries, but if the specialist around, if pathology around, and the X ray places don't follow through, I can't do more. So that's more it. It has confirmed to me it's a great thing but how do I make things move on from there. …'- GP A, Female

Reliability

‘I see health summaries that come from hospitals. But the actual health summary that comes from a hospital doesn't actually have the blood test listed on it when it comes in the MHR. When it's downloaded, it says, "Patient came in for XYZ," but there's a lot of information that is missing from those hospital summaries. And then you end up having to read the test results anyway.’- GP N, Female

Practicality

‘The user interface is not friendly or time efficient. So it's simply listing the fact that the patient has had 10 pathology results sitting there without knowing who ordered them or what the test was for. It's just labour intensive trying to go through that list just to find anything. The trouble is at the moment a lot of people talk about My Health Record as a filing cabinet that people are just throwing things in. the more we can sort that, the more useful it becomes. So if you've got a tab that would then just pull up the full blood counts or UEC…things like that would be, again, another step of improvement.’- GP L, Male

Time

‘It depends how many problems the patient has, and how much they want to discuss it with you. The actual clicking of the buttons is like 90 seconds. But you have to establish their consent and show them what it is that they're agreeing to and so I show them every single diagnosis and say do you want this one on, do you want this one on, do you want this one on? And see here’s your list of immunizations, do you want that one? And then I explain to them that all of their future pathology will be uploaded, is that okay? And then if you don't want that, then you need to tell me that in the future. So, it's a good ten minute consultation about it the first time. And then each subsequent time is okay. Now we need to update it, what do you want on it remember this is what we had on there before. So, you know each time it’s going to be another five minutes.’- GP I, Female

A few participants' encountered GP practice factors that they were concerned had affected the uptake of MHR in their practices. These included existing GP practice engagement with electronic records as well as uptake of MHR by different generations of GPs.

> 'So, I'm in a big group practice, I don't make many decisions on what happens... There are a few older doctors. We've only managed to make them use the computer to put their notes in. Well, they have in the last three, four years, but still that's ... Yeah, I don't think they're ready for that [referring to uploading to MHR].'- GP A, Female
>
> 'I've run the twilight years of my life now where working is concerned. I may be retiring in two years so, I don't know [in relation to using MHR].'- GP K, Female

Learning outcomes

Positive attitudes to online learning

The GP participants enjoyed the self-directed nature of online learning guided through the different modes of learning- webinars, case based learning, online modules and patient audit. The small group size was seen as a catalyst for informative case-based discussions. Being able to complete the intervention activities in their own homes also assisted in creating a controlled learning environment.

Enjoyed self-directed nature of online learning

'I thought the format was well thought out in the fact that it's involved a number of different activities which came across a number of different learning styles in terms of written, auditory, in terms of participation in the webinars…So I think it's got a place where you're trying to do a very targeted thing like this where you're using a number of formats to reinforce a very clear educational message.'- GP L, Male

'The webinars were great, online modules, I think it kind of reinforced what you've learned. And kind of gave you some examples, starting points. And then I think that reviewing the five patients, I think that's going to complete the exercise. So I think the format was really good.- GP J, Female

'A mixture of is good having different modalities the examples online, module was different to the webinar, and then having the results at hand to look at them later. The webinars, there's a lot of talking at the end, but I do appreciate that the slides are sent on it.- GP E

Small groups appreciated

'I was aware that this was a small group and we were caring about each other. It was nice that people said thank you when somebody presented a case. You informed each other and were grateful for you know the person involved. You know the evidence in terms of adult learning, there is very good evidence for small group learning.'- GP D, Female

Controlled learning environment

'I've got young kids so it's difficult, so to me, it's the timing was good because that's when they're asleep, it doesn't take my time with them. I think it's a great way, and I'm imagining doctors who need remote ... Well, to me, online training is really good.' - GP A Female

'It's after consulting hours and I don't have to travel anywhere. Travel takes time and expenses.'- GP I, Female

‘Online, so we can actually do it in the comfort of our homes, and not having to attend anywhere, and we did not have a time slot, which was specific.’- GP O, Male

‘I thought 45 minutes was perfect. If it was any shorter it wouldn't be long enough, and once you go over the hour mark, I think certainly in that format it's hard to remain engaged. So I thought 45 minutes was perfect.’- GP L, Male

Although there were some barriers encountered in the patient audit component of the intervention, that were amended later by Medcast, the GP participants thought the idea to practise using MHR was generally a good idea. Assistance with fact sheets was suggested as a solution to back up the practical component of the intervention.

‘As a result of this intervention, I had thought that it [the audit] might actually be beneficial, but in the patients that I had ... it's interesting the selection criteria, so it's sort of choosing more our older, more chronic patients who we would tend to know better. Because we chose people we knew better. Because most of these patients we've had for years. Therefore the information we got off My Health Record was less useful. Where My Health Record is a lot more useful in perhaps patients we don't know as well.’- GP L, Male

‘Whereas, the patient, the GP shared summaries for example, the ones that I did look at as part of the audit, I had a lot of trouble enrolling people, I have to say, because it was for 75 and over, most of ours did not have a MyHealthRecord.’- GP F, Female

‘So kind of some support fact sheets some support and information.’- GP N, Female

Technical issues

Some technical issues that participants encountered during the Medcast intervention included difficulties streaming the presentations due to *‘poor internet quality’*, some *‘inconsistency with volume’* between the multiple presenters as well as some user experience issues such as *‘not knowing’* if they had completed a module or *‘whether the system had registered that they had attended a webinar’*.

Opportunities to download the webinars helped increase access to the presentations, a benefit to those GPs who had work commitments or technical barriers such as poor internet connection. Although the presentations were interactive in nature they felt that the discussion covered off on any questions they had.

> ‘Well the ones that I downloaded were very good…I was happy, because I never had any questions when I downloaded and had a listen to them. …All of these webinars are actually saved and then we can download it and watch it whenever we want. A lot of other webinars that I've gone to, they say either you come to the live webinar or you miss out. They don't record it and then we don't have a copy of it to watch it whenever we need.’- GP O, Male

Learning about ‘is this needed’…

Knowledge gained

The GP participants valued the case-based interactive discussions in the different intervention groups. They felt that it allowed them to feel confident in their existing knowledge and aided reflection on how their own practice mirrored best practice.

> ‘I suppose the case studies that the presenters brought up then because there's a lot of commonality. It's interesting to know other people's perspectives of how they actually deal with certain groups of patients. I think that's useful.’- GP H, Female
>
> ‘So going through them made me sure that, well not sure, but increased my confidence about doing what I'm already doing.’- GP E, Female
>
> ‘I think it will make me a little more confident with either not ordering or ordering X-rays. More confident to show patients as well, and more confident to teach, that you know we don't always need to X-ray and such.’- GP D, Female
>
> ‘I mean there is reinforces the need to be actively thinking about rational pathology ordering. So that has helped keep that at front of mind.- GP L, Male
>
> ‘I guess I revised some of the tools that are available, so helping us make decisions about rational prescribing...The stop start tool. I did get to have some discussion around some

complex cases, and just looking at the complexities of working with real people, with their much more complicated health problems, than the problems in textbooks usually are.'- GP F, Female

Change activities

Some GP participants reflected on changes that they had made to their current practice. In the deprescribing intervention group some participants reflected on prescriptions that they had stopped as a result of the intervention.

'It definitely gives me, I guess not courage, but a little more initiative to look into the indications and the possibility of deprescribing, for the patients. I think the main thing has been the statins. I guess the statins, and the PPI. PPIs for sure. In fact, I had one patient, I didn't realize the patient had the um, so every patient who takes PPI, I have the conversation, how long have you been taking it for and what they're taking it for.'- GP J, Female

'I try on a regular basis to have a look and see if any of his can be ceased. Let me think about what I did for him. I think the main thing I did was talk people out of their proton pump inhibitors, because most of them would already not be on opioids or would have had the opioids minimized and under constant review. No one that's mine will be on regular Benzodiazepine. I worked very hard over the years to cease those for people.'- GP F, Female

'I suppose the webinars highlight the use of certain tests and the value or otherwise of some of the tests that we tend to order on a frequent basis. So I suppose it alerts me to perhaps be a little bit more judicious rather than tick the boxes and ordered the test and to think about whether there's any value in ordering them.'- GP H, Female

In the rational imaging and pathology intervention groups, some participants reported that the intervention had given them confidence to watch and wait rather than immediately refer patients for testing.

‘With back pain I really struggle to know, okay, is this something I need to image?...Defer the imaging and making it not the answer…sometimes the imaging opens up more of a can of worms and it seems to pathologize ... So, that's what I gained from it.’- GP E, female

‘I have learnt that be patient, not to jump on the fancy investigation…I mean you can wait and watch, you can afford to wait and watch unless there are no red flags in the patient history…You know, people can be very, “Oh, doctor ordered MRI scan, must be a very good doctor.” Not every doctor or MRI. But they don't realize how MRIs can be very expensive, and if you do without any proper reason, then it's just a waste of tax-payers money.’- GP C, Male

‘Yeah, I suppose I have. I think twice before I order some tests and say, "Is this really relevant or really viable?" So from that perspective, yes, I think I have made changes. I suppose if I'm looking at B12, folate, iron studies, tests for particular age groups, just doing a full blood count because it's part of a general screen. But instead of doing that on somebody that's healthy, I probably wouldn't- But again at this point in time- it's making me talk and explain to people more why I don't expect these tests.’- GP N, Female

Suggestions for improvement

Upon reflection on what the GP participants had learnt during the education interventions, participants reported that it had somewhat differed from expectations on what they were going to learn. GP participants were very eager to learn about practical tools and examples on how to use the MHR for best practice. However, some felt that the webinars had not necessarily addressed those expectations. Some participants also felt that there was no new information regarding the different intervention topics and that the webinars could have been pitched at a different level with broader discussions.

Expected practical tools and examples with MHR

‘I was more expecting practical tools on how to use it [MHR] more than explaining how useful it's going to be. I was quite convinced about the use of it before. So, I think what stops me from using it is not how useful it can be.’- GP A, Female

‘Well I guess I was magically hoping to be able to use My Health Record, having gone through this. That was my main hope for joining because I almost never use it.’- GP D, Female

‘Because I know what it's all about but I just wanted someone to go over it, examples, other than the test case where you click on My Health Record and this is what happens when you click this button and this is what will come up. Those little things, that wasn't there.’- GP J, Female

‘I expected it to be more involved with accessing MHR and the advantages of the MHR were really about identifying which pathology tests were valuable and which were not.’- GP N, Female

No new information

‘I suppose the information that was presented was information that I was basically aware of.’- GP L, Male

‘I thought, I already knew much of the material that was included in the de-prescribing talks, and I had hoped that there would be a more de-prescribing… I think I was expecting it to be pitched a little bit beyond where it was, for people who were already actively interested in de-prescribing. But that's okay, you know. I think it probably suited the majority of people quite well’. - GP F, Female

‘I think that I expected a lot more guidance on need on de-prescribe, how to de-prescribe and what it takes to de-prescribe. Maybe that's what I wanted to get out of it.’- GP I, Female

‘It's actually a bit of refreshing the knowledge that I already know, rather than learning something new.’- GP O, Male

Quantitative analysis results

Pre- and Post-training analysis

Independent samples *t* tests were used to compare pre-training case study surveys to post-training surveys. A total of $N = 71$ (38 females, 33 males) medical professionals were recruited over the duration of the study. Participants had a mean of 16.86 ($SD = 10.67$) years of experience as a medical professional. Of the total sample of medical professionals, $N = 63$ (89% of participants recruited) were General Practitioners and ($N = 8$, 11% of participants recruited) were GP Registrars. Medical professionals were recruited from the east coast of Australia. New South Wales and Victoria recruited the greatest number of medical professionals. A summary of where medical professionals were recruited from is presented in Table 3 below.

Table 3: State / Metropolitan Grouping

State/ Metropolitan	Frequency (*N*)	Percentage (%)
Sydney Metropolitan	21	30
Rest of NSW	24	34
Melbourne Metropolitan	13	18
Rest of Victoria	5	7
Rest of Queensland	4	6
Hobart Metropolitan	2	3
Rest of Tasmania	2	3

Not all participants completed both pre- and post-training surveys. A total of 60 participants completed pre-intervention surveys and quizzes and 44 post-intervention surveys and quizzes. A breakdown of participants that completed both surveys per case study, is presented in Table 4 below.

Table 4: Completed both pre- and post-training surveys

Deprescribing		
Yes	No	Total
10 (43%)	13 (57%)	23
Imaging		
Yes	No	Total
12 (55%)	10 (45%)	22
Pathology		
Yes	No	Total
15 (68%)	7 (32%)	22

Due to differences in pre- and post-training survey numbers, two approaches were used to analyse differences in the pre- and post-training survey data:

- *The analysis of differences in pre-training sample compared to post-training sample.* Independent Samples *t* tests and their non-parametric equivalent, the Mann Whitney U tests; and
- *The analysis of differences in participants who completed both pre- and post-training surveys.*

  Repeated measures analysis using paired Samples *t* tests and their non-parametric equivalent, the Wilcoxon Signed Ranks tests.

Deprescribing Pre- to Post-training Analysis

1. At pre-training medical professionals were asked if they had an approach to deprescribing. Of the 19 medical professionals who answered this question, two-thirds indicated 'No', while the remainder indicated 'Yes', as depicted in Table 5 below.

Table 5: Approach to deprescribing

Pre-training Only		
Yes *N* (%)	No *N* (%)	Total
6 (32%)	13 (68%)	19

Analysis of differences in pre-training sample compared to post-training sample

Independent samples *t*-tests were used to analyse the difference between medical professionals' prescribing pre-training to post-training. The results are presented in Table 6 below. Increased mean scores from pre-trial to post-trial (higher mean levels indicating greater levels of confidence and greater use, etc., in MHR) were observed across all five questions. Statistical analysis of questions 1 and 3 indicated a significant difference in the medical professionals' levels of confidence in using MHR, with medical professionals post-training more confident in using MHR compared to pre-training.

Analysis of Question 2 "*In the last 3 months, how many times you have you used MHR during patient consultations?*" suggested that medical professionals were using My Health Records more often at post-training compared to pre-training. Analysis of question 4, "*In the last 3 months, how often have you discussed deprescribing with a patient?*" and Question 5, "*In the last 3 months, how often have you stopped a medication that you deemed no longer necessary?*" suggests that medical professionals were discussing deprescribing and stopping medication that was deemed no longer necessary, at statistically greater levels at post-training compared to pre-training.

Table 6: Deprescribing, pre-training and post-training

Q1. I am confident using MHR with patients as part of my clinical practice. (1 = not confident – 5 = extremely confident) **Pre-training (*N* = 19), Post-training (*N* = 14)**			
Pre-training *M* (*SD*)	Post-training *M* (*SD*)	*P*	Effect size (*d*)
2.32 (1.25)	3.79 (1.25)	.002	-1.756
Q2. In the last 3 months, how many times you have you used MHR during patient consultations? (0, 1-10, 11-20, 21-30, 30+) **Pre-training (*N* = 19), Post-training (*N* = 14)**			
Pre-training *M* (*SD*)	Post-training *M* (*SD*)	*P*	Effect size (*d*)
1.74 (.99)	2.64 (1.28)	.029	-0.809
Q3. Please indicate your level of confidence in deprescribing medications in the elderly? (1 = not confident – 5 = extremely confident) **Pre-training (*N* = 19), Post-training (*N* = 14)**			
Pre-training *M* (*SD*)	Post-training *M* (*SD*)	*P*	Effect size (*d*)
2.68 (.82)	4.14 (.66)	< .001	-1.924
Q4. In the last 3 months, how often have you discussed deprescribing with a patient? (0 times, 1-5 times, 6-10 times, 11-15 times, 16+ times) **Pre-training (*N* = 19), Post-training (*N* = 14)**			
Pre-training *M* (*SD*)	Post-training *M* (*SD*)	*P*	Effect size (*d*)
2.53 (.90)	3.57 (1.02)	.004	-1.096
Q5. In the last 3 months, how often have you stopped a medication that you deemed no longer necessary? (0 times, 1-5 times, 6-10 times, 11-15 times, 16+ times) **Pre (*N* = 19), Post (*N* = 14)**			
Pre-training *M* (*SD*)	Post-training *M* (*SD*)	*P*	Effect size (*d*)
2.58 (.96)	3.29 (.99)	.048	-0.725

Mann-Whitney *U* tests were used to assess rank differences in medical professionals' deprescribing, pre- to post-training, of 13 medications. Medical professionals indicated whether they would make No change, Cease the medication, or Change the dose of the medication on allopurinol, atorvastatin, esomeprazole, frusemide, metformin, Panadol Osteo, perindopril, Seretide Accuhaler, salbutamol, prochlorperazine, temazepam, Panadeine Forte, and Voltaren at pre- and post-training surveys. From the 13 medications, a significant

reduction was found in prescribing of Seretide Accuhaler (p = .039), with a medium effect size, r = .43. This suggests medical professionals at post-training were more inclined to change the dose of this medication compared to pre-training. No significant differences were found in any other of the other 12 medications, pre-training to post-training.

Analysis of differences in participants who completed both pre- and post-training surveys.

Paired samples *t*-tests were used to analyse the paired data for participants (N=10) who completed deprescribing intervention and completed both pre- and post-training surveys (Table 7). Significant differences were found for questions 1, 3, 4, and 5. Question 2 approached significance.

Table 7: Paired data for deprescribing, pre and post-training

Q1. I am confident using MHR with patients as part of my clinical practice. Paired pre- and post-training *N* = 10			
Pre-training *M* (*SD*)	Post-training *M* (*SD*)	*P*	Effect size (*d*)
2.50 (1.35)	3.40 (1.26)	.001	-0.687
Q2. In the last 3 months, how many times you have you used MHR during patient consultations? Paired pre- and post-training *N* = 10			
Pre-training *M* (*SD*)	Post-training *M* (*SD*)	*P*	Effect size (*d*)
1.90 (1.20)	2.40 (1.17)	.052	-0.422
Q3. Please indicate your level of confidence in deprescribing medications in the elderly? Paired pre- and post-training *N* = 10			
Pre-training *M* (*SD*)	Post-training *M* (*SD*)	*P*	Effect size (*d*)
2.80 (1.03)	4.20 (.79)	.001	-1.537
Q4. In the last 3 months, how often have you discussed deprescribing with a patient? Paired pre- and post-training *N* = 10			
Pre-training *M* (*SD*)	Post-training *M* (*SD*)	*P*	Effect size (*d*)
2.70 (.95)	3.80 (1.03)	.003	-1.110
Q5. In the last 3 months, how often have you stopped a medication that you deemed no longer necessary? Paired pre- and post-training *N* = 10			
Pre-training *M* (*SD*)	Post-training *M* (*SD*)	*P*	Effect size (*d*)
2.70 (.95)	3.50 (1.08)	.037	-0.789

Wilcoxon Signed Ranks tests were used to analyse differences for participants in the deprescribing intervention who completed both pre- and post-training surveys. Non-significant differences were found in all but two. A significant difference was found in the deprescribing of metformin, pre- to post-training, $T = 4$, $z = -2.00$ (corrected for ties), N – Ties = 5, $p = .046$, two-tailed, with an effect size of -1.00. A significant difference was also found in the deprescribing of Panadeine Forte, pre- to post-training, $T = 4$, $z = -2.00$ (corrected for ties), N – Ties = 5, $p = .046$, two-tailed, with an effect size of -1.00.

Imaging Pre- to Post-training Analysis

Analysis of differences in pre-training sample compared to post-training sample.

Independent samples *t* tests were used to analyse the difference between medical professionals' imaging use pre-training to post-training. The results are presented in

Table ***8*** below. Significant increases in mean scores from pre-trial to post-trial were observed in questions 1 and 3, indicating a significantly greater level of confidence in using My Health Records-imaging at post-training compared to pre-training. Statistical differences were not observed in Questions 2, 4, and 5.

Table 8: Imaging, pre-training and post-training

Q1. I am confident using MHR with patients as part of my clinical practice. (1 = not confident – 5 = extremely confident) **Pre-training (*N* = 19), Post-training (*N* = 15)**			
Pre-training *M* (*SD*)	Post-training *M* (*SD*)	*P*	Effect size (*d*)
2.32 (.95)	3.53 (1.06)	.001	-1.220
Q2. In the last 3 months, how many times you have you used MHR during patient consultations? (0, 1-10, 11-20, 21-30, 30+) **Pre-training (*N* = 19), Post-training (*N* = 15)**			
Pre-training *M* (*SD*)	Post-training *M* (*SD*)	*P*	Effect size (*d*)
2.05 (.97)	1.73 (.70)	.293	0.370
Q3. Please indicate your level of confidence in ordering diagnostic imaging according to evidence-based guidelines. (1 = not confident – 5 = extremely confident) **Pre-training (*N* = 19), Post-training (*N* = 15)**			
Pre-training *M* (*SD*)	Post-training *M* (*SD*)	*P*	Effect size (*d*)
3.26 (.65)	4.27 (.59)	< .001	-1.600
Q4. In the last 3 months, how often have you referred to a guideline when deciding whether to order imaging for a patient with back pain? (0 times, 1-5 times, 6-10 times, 11-15 times, 16+ times) **Pre-training (*N* = 19), Post-training (*N* = 15)**			
Pre-training *M* (*SD*)	Post-training *M* (*SD*)	*P*	Effect size (*d*)
2.05 (1.22)	2.87 (1.13)	.055	-0.690
Q5In the last 3 months, how often have you discussed the rationale for not ordering or declining imaging with a patient? (0 times, 1-5 times, 6-10 times, 11-15 times, 16+ times) **Pre (*N* = 19), Post (*N* = 15)**			
Pre-training *M* (*SD*)	Post-training *M* (*SD*)	*P*	Effect size (*d*)
2.89 (1.10)	3.33 (1.05)	.247	-0.407

Mann-Whitney *U* tests were used to assess rank differences in medical professionals' imaging use, pre- to post-training on whether medical professionals would request (answering Yes or No) a lumbosacral spine x-ray, a lumbosacral spine CT scan, and a lumbosacral spine MRI scan, at pre-training and at post-training. No significant differences were observed.

Analysis of differences in participants who completed both pre- and post-training surveys.

Paired samples *t*-tests were used to analyse the paired data for participants (N=12) who completed imaging intervention and completed both pre- and post-training surveys (Table 9). Significant differences found for questions 1, 3, and 4. Question 5 approached significance. No significant difference was found for question 2.

Table 9: Paired data for imaging, pre-training and post-training

Q1. I am confident using MHR with patients as part of my clinical practice. Paired pre- and post-training *N* = 12			
Pre-training *M* (*SD*)	Post-training *M* (*SD*)	*P*	Effect size (*d*)
2.25 (.87)	3.50 (1.00)	.003	-1.337
Q2. In the last 3 months, how many times you have you used MHR during patient consultations? Paired pre- and post-training *N* = 12			
Pre-training *M* (*SD*)	Post-training *M* (*SD*)	*P*	Effect size (*d*)
2.17 (1.03)	1.58 (.67)	.152	.694
Q3. Please indicate your level of confidence in ordering diagnostic imaging according to evidence-based guidelines. Paired pre- and post-training *N* = 12			
Pre-training *M* (*SD*)	Post-training *M* (*SD*)	*P*	Effect size (*d*)
3.00 (.60)	4.33 (.65)	< .001	-2.128
Q4. In the last 3 months, how often have you referred to a guideline when deciding whether to order imaging for a patient with back pain? Paired pre- and post-training *N* = 12			
Pre-training *M* (*SD*)	Post-training *M* (*SD*)	*P*	Effect size (*d*)
1.92 (1.16)	2.92 (1.16)	.032	-.862
Q5. In the last 3 months, how often have you discussed the rationale for not ordering or declining imaging with a patient? Paired pre- and post-training *N* = 12			
Pre-training *M* (*SD*)	Post-training *M* (*SD*)	*P*	Effect size (*d*)
2.50 (.67)	3.50 (1.09)	.053	-1.136

Wilcoxon Signed Ranks tests were used to analyse pre- and post-training differences for participants who completed both pre and post-training surveys in the imaging intervention. No significant differences were found in imaging pre- and post-training.

Pathology Pre- and Post-training Analysis

Analysis of differences in pre-training sample compared to post-training sample

At pre-training only, medical professionals were asked if they were aware of any low-value pathology tests. Of the 37 medical professionals that completed this question, the vast majority indicated 'Yes', as presented in Table 10 below.

Table 10: Awareness of 'low value' pathology tests

Pre-training Only		
Yes *N* (%)	No *N* (%)	Total
31 (84%)	6 (16%)	37

Independent samples *t* tests were used to analyse the difference between medical professionals' use of pathology tests at pre-training compared to post-training. The results are presented in Table 11 below. Significantly increased mean scores from pre-trial to post-trial (higher mean levels indicating greater levels of confidence, usage, etc., in MHR) were observed in questions 1, 3 and 4. These results indicate a significantly greater level of confidence in using My Health Records-pathology and an increase in the number of changes to a patient's pathology schedule, or recalls and reminders, at post-training compared to pre-training. Statistically significant differences were not observed in questions 2 and 5.

Table 11: Pathology, pre- and post-training

Q1. I am confident using MHR with patients as part of my clinical practice. (1 = not confident – 5 = extremely confident) **Pre-training (*N* = 22), Post-training (*N* = 15)**			
Pre-training *M* (*SD*)	Post-training *M* (*SD*)	*P*	Effect size (*d*)
1.95 (1.33)	3.40 (1.40)	.003	-1.064
Q2. In the last 3 months, how many times you have you used MHR during patient consultations? (0, 1-10, 11-20, 21-30, 30+) **Pre-training (*N* = 22), Post-training (*N* = 15)**			
Pre-training *M* (*SD*)	Post-training *M* (*SD*)	*P*	Effect size (*d*)
1.73 (1.16)	2.40 (1.30)	.108	-0.552
Q3. Please indicate your level of confidence in ordering pathology investigations in an evidence-based manner. (1 = not confident – 5 = extremely confident) **Pre-training (*N* = 22), Post-training (*N* = 15)**			
Pre-training *M* (*SD*)	Post-training *M* (*SD*)	*P*	Effect size (*d*)
3.18 (.66)	3.87 (.92)	.012	-0.884
Q4. In the last 3 months, how often have you reviewed a patient's regular pathology to make sure it is evidence-based? (0 times, 1-5 times, 6-10 times, 11-15 times, 16+ times) **Pre-training (*N* = 22), Post-training (*N* = 15)**			
Pre-training *M* (*SD*)	Post-training *M* (*SD*)	*P*	Effect size (*d*)
2.23 (1.34)	3.40 (1.30)	.012	-0.885
Q5. In the last 3 months, how often have you made changes to a patient's pathology testing schedule, or recalls and reminders? (0 times, 1-5 times, 6-10 times, 11-15 times, 16+ times) **Pre (*N* = 22), Post (*N* = 15)**			
Pre-training *M* (*SD*)	Post-training *M* (*SD*)	*P*	Effect size (*d*)
3.00 (1.51)	2.73 (1.33)	.585	0.185

Mann-Whitney *U* tests were used to assess rank differences in medical professionals' pathology ordering, pre- to post-training. Medical professionals answered Yes or No to ordering Pathology on the following investigations: Full Blood Examination, Full Blood Count, Urea and electrolytes, Liver Function Tests, Fasting lipids, Fasting glucose, HbA1c, Prostate Specific Antigen, Thyroid Function Tests, Urine microalbumin, MSU M/C/S, and Testosterone, with reference to the case study presented. Of the 12 pre- and post-training pathology investigations, two recorded significant differences. A significant reduction in ordering was demonstrated for Full Blood Count (FBC) at post-training compared to pre-training (p = .049, medium effect size r = .41). A significant reduction was also found in the ordering of Liver Function Tests (p = .009, medium effect size r = .49).

Analysis of differences in participants who completed both pre- and post-training surveys.

Paired samples *t*-tests were used to analyse the paired data for participants (N=15) who completed pathology intervention and completed both pre- and post-training surveys (Table 12). Significant differences were found for questions 1, 2, 3, and 4. No significant difference was found for question 5.

Table 12: Paired data for pathology, pre- and post-training

Q1. I am confident using MHR with patients as part of my clinical practice. Paired pre- and post-training *N* = 15			
Pre-training *M* (*SD*)	Post-training *M* (*SD*)	*P*	Effect size (*d*)
2.00 (1.41)	3.40 (1.40)	.001	-.996
Q2. In the last 3 months, how many times you have you used MHR during patient consultations? Paired pre- and post-training *N* = 15			
Pre-training *M* (*SD*)	Post-training *M* (*SD*)	*P*	Effect size (*d*)
1.67 (1.05)	2.40 (1.30)	.006	-.621
Q3. Please indicate your level of confidence in ordering pathology investigations in an evidence-based manner. Paired pre- and post-training *N* = 15			
Pre-training *M* (*SD*)	Post-training *M* (*SD*)	*P*	Effect size (*d*)
3.07 (.70)	3.87 (.92)	.013	-.988
Q4. In the last 3 months, how often have you reviewed a patient's regular pathology to make sure it is evidence-based? Paired pre- and post-training *N* = 15			
Pre-training *M* (*SD*)	Post-training *M* (*SD*)	*P*	Effect size (*d*)
2.07 (1.39)	3.40 (1.30)	.001	-.990
Q5. In the last 3 months, how often have you made changes to a patient's pathology testing schedule, or recalls and reminders? Paired pre- and post-training *N* = 15			
Pre-training *M* (*SD*)	Post-training *M* (*SD*)	*P*	Effect size (*d*)
2.87 (1.55)	2.73 (1.33)	.728	.097

Wilcoxon Signed Ranks tests were used to analyse pre- and post-training differences in the ordering of pathology tests for participants who completed both pre- and post-training surveys. Significant differences were found for five pathology tests. A significant difference was found in requesting full blood examination, pre- to post-training, $T = 5$, $z = -2.24$ (corrected for ties), N – Ties = 10, $p = .025$, two-tailed, with an effect size of -1.00. A significant difference was found in requesting full blood count, pre- to post-training, $T = 5$, $z = -2.24$ (corrected for ties), N – Ties = 10, $p = .025$, two-tailed, with an effect size of -1.00.

A significant difference was found in requesting liver function tests, pre- to post-training, $T = 8$, $z = -2.83$ (corrected for ties), N – Ties = 7, $p = .005$, two-tailed, with an effect size of -1.00. A significant difference was found in requesting fasting lipids, pre- to post-training, $T = 4$, $z = -2.00$ (corrected for ties), N – Ties = 11, $p = .046$, two-tailed, with an effect size of -1.00. A significant difference was found in requesting thyroid function tests, pre- to post-training, $T = 4$, $z = -2.00$ (corrected for ties), N – Ties = 11, $p = .046$, two-tailed, with an effect size of -1.00.

Cohort differences

Paired samples *t*-tests were used to analyse the differences in the survey responses to Questions 1 and 2 of medical professionals (N=40) completing both pre-training and post-training surveys, across all three case study groups (Table 13). A statistically significant difference was found for Question 1, with post-training mean scores significantly higher than pre-training mean scores, suggesting that medical professionals at post-training were more confident in using My Health Records compared to pre-training. A significant difference was not found for Question 2, pre-training to post-training.

Table 13: paired data for total cohort, pre- and post-training

Q1. I am confident using MHR with patients as part of my clinical practice. Paired pre- and post-training *N* = 40			
Pre-training *M* (*SD*)	Post-training *M* (*SD*)	*P*	Effect size (*d*)
2.28 (1.22)	3.53 (1.22)	< .001	-1.025
Q2. In the last 3 months, how many times you have you used MHR during patient consultations? Paired pre- and post-training *N* = 40			
Pre-training *M* (*SD*)	Post-training *M* (*SD*)	*P*	Effect size (*d*)
2.03 (1.21)	2.23 (1.21)	.291	-.165

Post-training Audit Data: Deprescribing

The data on the audit conducted post-training for the deprescribing intervention was analysed (Table 14; discrepancies in numbers are due to missing data). Seven medical professionals completed the audit for all five patients and one medical professional completed the audit for three patients, for a total of 38 patients.

The mean age of the patients was 81.47 years (SD = 5.33). Female patients comprised 66% (N=25) of the sample, with men comprising the remaining 34% (N=13).
The audit questions have been included in the appendix of this report.

Table 14: De-prescribing data

Q4. Did you check the patient's MHR?		
Yes	No	Total
24 (63%)	14 (37%)	38
If you answered 'Yes' to Q4, did checking the MHR result in changes to patient management?		
Yes	No	Total
6 (25%)	18 (75%)	24
Was the MHR up-to-date with the patient's current medical information?		
Yes	No	Total
15 (50%)	15 (50%)	30
Did you upload any management changes to MHR?		
Yes	No	Total
10 (28%)	26 (72%)	36
Did you make, or plan to make, any changes to the patient's medications in the Health Assessment (including over the counter or complimentary)?		
Yes	No	Total
28 (74%)	10 (26%)	38

Crosstabulation was used to analyse the number of cases in the audit where the medical professional had changed the dosage or ceased Seretide Accuhaler® during a patient consultation. Of the 28 cases where the medical professional reported they would make, or plan to make, changes to the patient's medications during a Health Assessment, 7% (N=2) involved Seretide Accuhaler®, with other medications comprising the remaining 93% (N=26).

Audit Data: Pathology de-identified

The data on the audit conducted post-training for the pathology intervention was analysed (Table 15; discrepancies in numbers are due to missing data). Twelve medical professionals completed the audit for all five patients, for a total of 60 patients. The mean age of the patients was 81.21 years (SD = 5.62). Female patients comprised 56% (N=32) of the sample, with men comprising the remainder (N=25; discrepancies in numbers are due to missing data).

Table 15: Pathology data

Q4. Did you check the patient's MHR?		
Yes	No	Total
40 (73%)	15 (27%)	55
If you answered 'Yes' to Q4, did checking the MHR result in changes to patient management?		
Yes	No	Total
8 (20%)	32 (80%)	40
Was the MHR up-to-date with the patient's current medical information?		
Yes	No	Total
22 (55%)	18 (45%)	40
Did you upload any management changes to MHR?		
Yes	No	Total
13 (27%)	36 (73%)	49
Did you make, or plan to make, any changes to the patient's pathology testing schedule, or recalls and reminders?		
Yes	No	Total
20 (34%)	39 (66%)	59

Crosstabulation was used to analyse the number of cases in the audit where the medical professional made changes to the ordering of pathology tests for their patient. Of the 20 cases where the medical professional reported they would make changes to the ordering of pathology tests, only one case involved Liver Function Test (5%), and no case for Full Blood Count, with other pathology tests accounting for the rest (N=19).

Health economic analysis results

Prescribing arm

Comparison of the pre/post case scenario showed a significant change in the prescription of the medication Seretide™ (Fluticasone + Salmeterol 500mcg/50mcg 60 actuations, one puff twice daily) for the treatment of chronic asthma. During pre-training around 39 percent of respondents changed dosage and during the post-training this had increased to 82 percent. The number of cases where medication ceased altogether was around 10 percent at both time points. This implies that there was an approx. 43 percentage point increase in change of dosage. Based on additional notes of the participants during the case scenarios it can be assumed that in most cases the medication would have changed to Fluticasone + Salmeterol 250mcg/50mcg 60 actuations or Fluticasone + Salmeterol 250mcg/25mcg 120 actuations; one puff twice daily.

The cost for these three medications can be taken from the Pharmaceutical Benefits Scheme (PBS) fee schedule for 2017/18. (31)

Table ***16*** shows the cost for the different medications incl. the costs for patient and Government. Separate calculations are shown for pensioners and healthcare card holders who are entitled to discounted prices on PBS-subsidised medications. The cost of the Government Subsidy of the original medication was $21.89 ($54.99 for pensioners and healthcare card holders) and it would have lasted for one month.

Table 16: Seretide accuhaler, cost per product

Medicine	**Actual Cost of Medicine**	**Cost to patient**	**Cost to patient (discount)**	**Government Subsidy**	**Government Subsidy (discount)**
Fluticasone + Salmeterol 500mcg/50mcg 60 actuations	$61.39	$39.50	$6.40	$21.89	$54.99
Fluticasone + Salmeterol 250mcg/50mcg 60 actuations	$48.25	$39.50	$6.40	$8.75	$41.85

Fluticasone + Salmeterol 250mcg/25mcg 120 actuations	$61.39	$39.50	$6.40	$21.89	$54.99

Based on the costs per product the annual cost as well as the corresponding savings can be calculated. As can be seen in

Table *17*, a change of medication to Fluticasone + Salmeterol 250mcg/50mcg 60 actuations would reduce the annual cost in Government subsidy by $157.68 ($167.90 for pensioners and healthcare card holders). Correspondingly, a change to Fluticasone + Salmeterol 250mcg/25mcg 120 actuations would reduce Government subsidy by $131.34 ($340.20 for pensioners and healthcare card holders).

Table 17: Seretide accuhaler, annual cost

Medicine	**Actual Cost of Medicine**	**Cost to patient**	**Cost to patient (discount)**	**Government Subsidy**	**Government Subsidy (discount)**
Fluticasone + Salmeterol 500mcg/50mcg 60 actuations	$746.90	$474.00	$76.80	$262.68	$670.10
Fluticasone + Salmeterol 250mcg/50mcg 60 actuations	$579.00	$474.00	$76.80	$105.00	$502.20
Fluticasone + Salmeterol 250mcg/25mcg 120 actuations	$368.30	$237.00	$38.40	$131.34	$329.90

Downstream health system effects of the reduction in the dosage had to be estimated based on secondary data and the literature. The Australian Asthma Handbook lists a number of potential adverse effects for both oral corticosteroids as well as long-term, high-dose inhaled

corticosteroids (more than 500mcg per day). (32) These include local and systemic adverse effects.

Although most local adverse effects are generally not clinically significant, they still affect patient quality of life. Of the systemic adverse effects, the most relevant ones are diabetes, cataracts and lower bone mineral density.

Diabetes

According to a Canadian study, current use of inhaled corticosteroids was associated with an increase in the rate of diabetes. (33) The adjusted rate ratios ranged from 1.18 for low doses to 1.64 for high doses with underlying overall incidence rate of new diabetes onset being 14.2 per 1,000 per year. It can therefore be estimated that a reduction from high to moderate dose of inhaled corticosteroids (ICS) would reduce the onset of type 2 diabetes by approx. 4.8 per 1,000 per year.

Annual health care cost for type 2 diabetes was most recently estimated by Colagiuri et al. based on 2001/02 data. (34) They estimated that the annual health care cost of type 2 diabetes ranged from $4,025 (without complications) up to $9,645 (with complications). This means that, after adjusting for inflation, one case of reduced dosage of inhaled corticosteroids would – on average – lead to cost savings of $28.66 to $68.66 per year.

Cataracts

Cataract is a common problem affecting older Australians. According to the Australian Institute of Health and Welfare (AIHW) the prevalence was 31% among Australians aged 55 and older in 2004. (35) More recently in 2016/17, there were 235,502 cataract surgeries performed on Australians aged 55 and older. However, only 31% were performed in public hospitals with the majority taking place in private hospitals.

A systematic review and meta- analysis conducted by Weatherall et al. showed that the risk of cataracts increases by approx. 25% for each 1,000 mcg per daily dose of inhaled corticosteroids. (36) Consequently, a reduction in daily dose from 1,000 mcg to 500 mcg should reduce that elevated risk to 12.5%. Nationally, this equates to around 9,126 cataract surgeries in the public sector of persons aged 55 and older.

The Independent Hospital Pricing Authority (IHPA) is responsible for defining hospital services (including Australian Refined Diagnosis Related Groups (AR-DRG)) as well as price setting for public hospital services in Australia. (37) In 2017/18 the national average price (called National Efficient Price) was set at $4,910. Almost all cataract hospitalisations were grouped to the AR-DRG Lens Procedures (C16Z). The cost weight (National Weighted Activity Unit (NWAU)) was 0.5459. Consequently, the cost for a cataract surgery in 2017/18 was $2,680.

Altogether – on average – this amounts to approx. $73 savings to the public hospital sector for each case of reduced dosage of inhaled corticosteroids.

Lower bone mineral density

While it is recognised that very high-dose, long-term use of systemic corticosteroids has a detrimental effect on bone density, there is no clear evidence for high to moderate dosage inhaled corticosteroids. Therefore the financial impact of potential decreases in bone density will not be included into the economic evaluation. However, it should be noted that the financial burden of reduced bone density is high. Osteoporosis Australia provides a comprehensive overview over the burden of disease for osteoporosis and osteopenia, which are characterised by lower bone density and quality. From the total annual direct health care cost in 2012 it can be estimated that annual cost per affected person over the age of 50 years was $567.93 in 2017. (38)

Summary of the prescribing arm

Taken together, the cost savings achieved for each case of reduced dosage of Seretide™ ranges from $160.00 to $226.34 per year ($196.56 to $408.86 per year for pensioners and healthcare card holders) plus a one-time saving of $73.

Pathology arm

Comparison of the pre/post case scenario results in the pathology arm showed a significant reduction in the ordering of Full Blood Count (FBC) and Liver Function Test (LFT). During pre-training around 55 percent of respondents did not order a FBC and during post-training this had increased to 94 percent. This implies that there was an approx. 40 percentage point decrease in FBC ordering. Similarly, during pre-training around 36 percent of respondents

did not order a LFT and during post-training this had increased to 82 percent. This implies that there was an approx. 46 percentage point decrease in LFT ordering.

The cost of these tests can be taken from the Medicare Benefits Schedule (MBS) for 2017/18. (39) Table 18 shows the government cost for the different tests. Hence, each FBC order costed $35.50 and each LFT costed $17.70.

Table 18: Pathology tests, Medicare Benefits Schedule

Test	Group	MBS item number	Fee
Full blood count	Coagulation studies	65129, 65070	$35.50
---	Liver function tests	66512	$17.70

While there are downstream health system effects of reduced pathology ordering, e.g. through "investigation momentum", these have not been included in this analysis which is restricted to the direct cost of the pathology tests.

Despite the fact that there was significant reduction in FBC and LFT ordering during the case scenario, the limited evidence from within the intervention make it difficult to reliably estimate the wider implications of the observed practice change, especially with regards to the annual volume of pathology ordering. However, the Bettering the Evaluation and Care of Health (BEACH) program provides data on the rate of ordering of pathology tests in general practice. (40) FBC accounts for 14 percent and LFT accounts for 5.3 percent of all GP-ordered pathology tests (Table 19).

Table 19: Pathology tests, BEACH information

Test	Percent of pathology tests	Rate per 100 GP encounters	Rate per 100 problems
Full blood count	14.0	6.7	4.3
Liver function tests	5.3	2.5	1.6
All pathology	100.0	47.6	30.8

Taking into account the evidence of the BEACH program and assuming that the observed reduction of FBC and LFT ordering during the case scenario can be translated to equivalent

reductions in all FBC and LFT pathology ordering, then these changes would amount to a reduction of 8% of all pathology orders.

Summary of the pathology arm

In the pathology arm the reduction in FBC and LFT ordering has been estimated to achieve cost savings for each case of $35.50 and $17.70 respectively.

Discussion

Summary of findings

This evaluation assessed Medcast's multifaceted intervention to improve use of MHR and enhance quality of clinical practice in using my MHR in primary care. By the end of the education sessions, there was a change in knowledge, skills and behaviours in regard to the use of MHR and evidence-based deprescribing, imaging and pathology ordering. The evaluation has demonstrated that the intervention can improve confidence in, and use of, MHR. It also shows potential to achieve change in clinical reasoning and some reduction in unnecessary health care expenditure.

Responsive evaluation

Prior to the intervention, participants had indicated in interviews an expectation that that they would improve their understanding and skills in the use of MHR, including benefitting from hands on experience. They also showed an enthusiasm for being able to realise some of the potential for MHR, including reduction in duplicate tests and improved knowledge sharing among health care providers. Implicitly, they were also seeking to reduce anxiety and concerns regarding use of MHR, both for themselves and also their patients. Participants indicated some key clinical areas that were of interest to them, most notably deprescribing. The interviewees were looking forward to interactive education delivered across multiple modes of learning.

Following the training there was an evident shift in attitudes to MHR in response to more concrete appreciation of the opportunities, strengths and limitations of MHR gained through experience. The interviewed participants enjoyed the self-paced, multi-faceted and social nature of the learning. They very much appreciated the case-based learning style and interaction with peers around the cases and the ensuing reflection. The interviews demonstrated clear evidence of embedding 'is this needed' in participants' approaches to deprescribing, imaging and radiology.

The quiz and survey results were consistent with the interview data. Learning needs were confirmed with just a third of participants having an approach to deprescribing prior to the training. Statistically significant changes in survey items were noted between the

commencement and completion of the educations sessions. There was a significant increase in confidence in use of MHR in all three arms of the intervention, and in self-reported use of MHR in the deprescribing arm and the pathology arm (but only paired sample data significant) of the intervention. Beyond the use of MHR, there was increased confidence in deprescribing, guideline-based imaging and pathology test ordering following the education. There was an increase in self-reported discussion with patients regarding deprescribing and increased rates of stopping medications that were no longer necessary. There was also a possible increase in referring to a guideline when deciding to order imaging for a patient with back pain. There was a significant reduction in the hypothetical prescription of Seretide™ and possibly metformin and Panadeine Forte, and ordering of several pathology items in the case-scenarios following training. There was also an increase in self-reported review of a patient's regular pathology to make sure it is evidence-based.

When applied to actual patients in the post-education audit, 74% in the prescribing arm and 34% in the pathology arm, made, or intended to make a change to their patients' medications or pathology testing schedule respectively.

Thus, from the perspectives of meeting participants' expectations and needs and also achieving knowledge, attitude and skill change, the education intervention was broadly successful.

Reflecting Kolb's experiential theory of learning, when asked what could have been done better, participants related that they would have liked even more hands-on learning experience and also the opportunity to extend their knowledge in more complicated cases. The education intervention held the dual purposes of enhancing the operational use of MHR and also using MHR to achieve improved quality of care. Comments arose where participants had greater expectation of one or the other of these purposes in attending the education intervention.

Attitudes to MHR

Prior to commencement of the education sessions, the baseline interviews with participants demonstrated mixed attitudes towards MHR. These attitudes ranged from some degree of mistrust to hope in the potential for improved patient outcomes. At the end of the quite brief

period of time of the intervention there were persisting anxieties concerning MHR. In some instance, the concrete experience of using MHR deepened those anxieties. Despite these interview responses, the quantitative data demonstrated, on average, improved confidence in use of MHR following the training, in comparison with confidence prior to the training. It would seem that some areas of concern (e.g. media reporting, completeness of data, privacy and legal risk) are not influenced by improved hands-on confidence in the use the MHR itself.

Implications of health economic analysis

The interventions showed a potential to effect significant changes in GPs' prescribing and pathology test-ordering behaviours. These could lead to significant reduction in government expenditure on health care through the use of cheaper medicines, ordering of fewer pathology tests, and reduction in medication-related complications and side-effects. Analysis shows that the estimated cost saving of one patient being prescribed a lower dose inhaled corticosteroids as a result of the intervention varies between $160 to $408.86/year per person, plus a one-time saving of $73. Ordering fewer FBC and LFT tests could save between $35.50 and $17.70 per test respectively.

Limitations

This evaluation has a number of limitations. Given the scope and resources of the project there were a relatively small number of participants. Smaller than expected numbers of completed surveys, and a mismatch between completions of pre- and post-intervention surveys, exacerbated this difficulty. In addition, control group data were not collected. As a consequence the intended statistical analyses were not able to be performed. The overall impact of this was a limitation in the ability to demonstrate statistical differences in outcome measures. In order to mitigate these limitations to some extent, we provided two sets of analyses. In the first set, we tested for overall differences between participants before and after the intervention. This enabled a larger sample size but meant there were data missing from participants who may not have completed either the pre- or post-intervention surveys. In the second set, we analysed data only from those who has completed both pre- and post-intervention surveys. These analyses were limited by the very small sample sizes. Combined, the analyses demonstrated encouraging trends in reductions in unnecessary health care utilisation. Given the limitations in the data, we were not able to extrapolate the findings

regarding changes in medications or test ordering beyond this general statement. The small number of participants restricted the scope of health economic analysis. To illustrate potential cost savings, we used some

examples with differences pre- and post-intervention, i.e. inhaled corticosteroid prescribing and FBC and LFT ordering. Given the paucity of available data, the analyses relied on secondary data sources to model the downstream health system effects of the intervention and the impact on healthcare costs.

In addition, due to the scope and resources of the project, only self-reported or intended change in behaviours were able to be tested. The data collected did not permit comparison with a control group. Other considerations in applying these findings more broadly include the self-selected nature of the participants and short period of time for the intervention and follow-up.

Key findings and recommendations

- This multi-faceted educational intervention was broadly successful in meeting participants' expectations and needs while also achieving knowledge, attitude and skill change in the use of MHR and evidence-based deprescribing, pathology testing and imaging
- Overall, there was good evidence that there was uptake of an 'is this needed' step in participants' clinical reasoning and increased attention to reducing unnecessary health care expenditure
- In this small sample, there was evidence of a significant reduction in quiz responses to the use of Seretide™ inhaler, and possibly metformin and Panadeine Forte, and several pathology tests, with potential implications for savings in health care expenditure
- The conclusions of this evaluation are that the interventions are successful educationally and there is evidence that it could lead to tangible improvement in evidence-based use of medicines and pathology ordering
- Limitations in the robustness of the conclusions of the evaluation arise from the scope of the project, the compressed timeframe, less-than-complete data capture and lack of a control group
- It is recommended that for a robust understanding of the clinical and economic impacts of the education intervention, that a long-term large-scale study is undertaken, with an appropriate control group and using clinical data to measure outcomes

Appendix – Surveys and Case Studies

Deprescribing Pre / Post Training Survey & Case Study

1. I am confident using MyHR with patients as part of my clinical practice.
    a. 1 - not confident
    b. 2
    c. 3
    d. 4
    e. 5 - extremely confident

2. In the last 3 months, how many times you have you used MyHR during patient consultations?
    a. 0 times
    b. 1-10 times
    c. 11-20 times
    d. 21-30 times
    e. 31+ times

3. Please indicate your level of confidence in deprescribing medications in the elderly?
    a. 1 - not confident
    b. 2
    c. 3
    d. 4
    e. 5 - extremely confident

4. In the last 3 months, how often have you discussed deprescribing with a patient?
    a. 0 times
    b. 1-5 times
    c. 6-10 times
    d. 11-15 times
    e. 16+ times

5. In the last 3 months, how often have you stopped a medication that you deemed no longer necessary?
    a. 0 times
    b. 1-5 times
    c. 6-10 times
    d. 11-15 times
    e. 16+ times

6. Do you have a particular approach to deprescribing? Y/N If you have answered yes, please describe your approach. (free text)

Additional Questions add to the Post-training survey (deprescribing)

7. (If answered b-e in question 5 above) How many times have you stopped or reduced the dose for the following medications in the last 3 months:
    a. Opiates (0-10)
    b. Benzodiazepines (0-10)
    c. Inhaled corticosteroids (0-10)
    d. PPI (proton pump inhibitors) (0-10)

8. Please provide a brief description of the cases where you made changes to medications. I.e. patient, original medication type & dose and whether the medication was ceased or reduced, if reduced what is the new dose.
    a. Example 1 (free text)
    b. Example 2 (free text)
    c. Example 3 (free text)
    d. Example 4 (free text)

If changes were made to medications not listed above please provide a brief description. I.e. patient, original medication & dose and whether the medication was ceased or reduced, if reduced by how much. (free text)

Case Study

Reginald Webster, aged 75 years, presents to your General Practice as he has been recalled for Health Assessment for Older Persons ("75-Year-Old Health Check"). Reginald is currently well and is only request is a repeat of his prescriptions.

His current medications include:

- Allopurinol 100mg od for hyperuricaemia
- Atorvastatin 40mg orally mane for hyperlipidaemia
- Esomeprazole 40mg od for gastroesophageal reflux
- Frusemide 20mg o mane for hypertension
- Metformin 1000mg XR orally mane for Type 2 Diabetes Mellitus
- Panadol Osteo 2 tablets o tds for Osteoarthritis
- Perindopril 5mg od for Hypertension
- Seretide Accuhaler 500/50 one puff bd for chronic asthma
- Salbutamol 100 ug MA orally prn for asthma
- Stemetil 5mg prn for vertigo
- Temazepam 10mg orally nocte prn for insomnia

- Panadeine Forte 2 tablets qid orally prn for Osteoarthritis
- Voltaren 25mg bd orally prn for Osteoarthritis

What changes would you make, if any, to each of the following medications?

Medication	Current dose / frequency	Change? No/ Cease/ Change Dose	If change dose, what changes will you make (please note new dose)	What information are you considering when making these changes?
Allopurinol	100mg od			
Atorvastatin	40mg orally mane			
Esomeprazole	40mg od			
Frusemide	20mg o mane			
Metformin	1000mg XR orally mane			
Panadol Osteo	2 tablets o tds			
Perindopril	5mg od			
Seretide Accuhaler	500/50 one puff bd			
Salbutamol	100 ug MA orally prn			
Stemetil	5mg prn			
Temazepam	10mg orally nocte prn			
Panadeine Forte	2 qid orally prn			
Voltaren	25mg bd orally prn			

Imaging - Pre/Post -Training Survey & Case Study

1. I am confident using MyHR with patients as part of my clinical practice.
   a. 1 - not confident
   b. 2
   c. 3
   d. 4
   e. 5 - extremely confident

2. In the last 3 months, how many times you have you used MyHR during patient consultations?
   a. 0 times
   b. 1-10 times
   c. 11-20 times
   d. 21-30 times
   e. 31+ times

3. Please indicate your level of confidence in ordering diagnostic imaging according to evidence-based guidelines.
   a. 1 - not confident
   b. 2
   c. 3
   d. 4
   e. 5 - extremely confident

4. In the last 3 months, how often have you referred to a guideline when deciding whether to order imaging for a patient with back pain?
   a. 0 times
   b. 1-5 times
   c. 6-10 times
   d. 11-15 times
   e. 16+ times

5. In the last 3 months, how often have you discussed the rationale for not ordering or declining imaging with a patient?
   a. 0 times
   b. 1-5 times
   c. 6-10 times
   d. 11-15 times
   e. 16+ times

Imaging - Case Study

Mark Green, aged 26 years, presents to your general practice with ongoing lower back pain. He is a bricklayer by trade and first noticed the pain about five weeks ago as he was pushing a large wheelbarrow full of bricks. He took some Ibuprofen 400mg o tds for a few days and his boss allowed him to do light duties and the pain settled. He has been performing normal duties since but finds at the end of the day he has a dull ache across his lower back that sometimes prevents hiim from falling asleepin although he doesn't wake with the pain at night and there is no pain present in the morning. Mark tells you that the pain doesn't radiate

anywhere else and he has normal power and feeling in his legs. He does not complain of any bowel or bladder symptoms. He does get some stiffness in his back as the day goes on. Mark does not report any fevers or weight loss. He has been to the physio weekly for the last four weeks but does not report much improvement.

Mark has no other significant medical history and has had no previous back injuries or trauma to his back. He is a non-smoker and has 2-3 light beers after work each day.

On examination, Mark's vital signs are within normal limits, and his BMI is 23. On examination of his lumbar spine, flexion and extension are limited to 75% due to pain although lateral flexion and rotation are normal. There is some evidence of paravertebral muscle spasm bilaterally at the L4/5 level bot no bony tenderness over the vertebrae. Lower limb tone, power, reflexes and senation are equal bilaterally. Saddle sensation and tone are normal. The quadrant test is positive for local pain on both sides but a little more so on the right. Straight leg raising is limited to 80 degrees bilaterally due to tight hamstring muscles. The slump test appears negative.

Mark is keen for a resolution to his back pain as he is concerned it will affect his earning capacity.

Would you request?	Yes/No	If requesting this investigation, please provide your rationale. (free text)
Lumbosacral spine x-ray		
Lumbosacral spine CT scan		
Lumbosacral spine MRI scan		
Other (specify)		

- Please note down any other investigations you would consider ordering?

  (free text)
- If no imaging used, please provide your rationale (else, if you would use imaging please enter N/A below)

  (free text)

Pathology - Pre/Post-training Survey & Case Study

1. I am confident using MyHR with patients as part of my clinical practice.
   a. 1 - not confident
   b. 2
   c. 3
   d. 4
   e. 5 - extremely confident
2. In the last 3 months, how many times you have you used MyHR during patient consultations?
   a. 0 times
   b. 1-10 times
   c. 11-20 times
   d. 21-30 times
   e. 31+ times
3. In the last 3 months, how often have you reviewed a patient's regular pathology to make sure it is evidence-based?
   a. 0 times
   b. 1-5 times
   c. 6-10 times
   d. 11-15 times
   e. 16+ times
4. In the last 3 months, how often have you made changes to a patient's pathology testing schedule, or recalls and reminders?
   a. 0 times
   b. 1-5 times
   c. 6-10 times
   d. 11-15 times
   e. 16+ times
5. Are you aware of any commonly requested 'low value' pathology tests? (Y/N)
6. If you have answered yes, please describe the commonly requested 'low value' pathology tests that you are aware of. (free text)

Question in the Post-survey only (pathology)

7. Please give examples of reductions you have made to patients pathology ordering. I.e. Include brief description of patient and tests that were not ordered or removed from a schedule.
   a. Example 1 (free text)
   b. Example 2 (free text)
   c. Example 3 (free text)
   d. Example 4 (free text)

Pathology Case Study

Barry White, aged 76 years, presents to your general practice as he has been recalled for Health Assessment for Older Persons ("75-Year-Old Health Check"). Barry is currently well. Barry's medical history is as follows:

- Gout - one episode/year on average

- Osteoarthritis left knee, mild
- Left inguinal hernia repair - 3 years ago

Family history: nil significant

He is a lifelong non-smoker and has 2-4 units of alcohol each night over the weekend.

Barry is a retired high-school teacher.

On examination Barry's BMI is 24, and his BP is 130/80 mmHg. The rest of his physical examination is unremarkable.

You note that he had screening for cholesterol and diabetes last year during his health check and both were reported as in the normal range.

Select any pathology investigation, if any, you would request for Barry part of his health assessment today?

Check the investigations you request (Y/N)	If requesting this pathology, please provide your rationale. (free text)
Full blood examination	
Full blood count	
Urea and electrolytes	
Liver Function Tests	
Fasting lipids	
Fasting glucose	
Hba1C	
Prostate specific antigen	
Thyroid Function Tests	
Microalbumin	
MSU M/C/S	
Testosterone	
Please note down any other investigations you would consider ordering?	

Audit Questions

This audit is to be conducted with 5 patients that are booked for a 75-Year-Old Health Check.
The GPs should request consent to access the patient's MyHR to conduct the audit.
The GPs can verbally explain the audit to the patient using the following statement.

"*During the consultation today I would like to access your My Health Record (MyHR). Your MyHR gives me access to up to date information from other sources about your medical history that I may not otherwise have. This may include things like allergies, adverse drug reactions and medication history, prescribed medications and discharge summaries.*
I plan to check your MyHR during the consultation today to decide on the best approach for your ongoing treatment and management and enable the best possible health outcomes for you.
I will also be completing an audit to determine whether the MyHR has been useful and how the access to it has impacted on management. All of the information collected in the audit will be confidential and you will not be identified in any way. If you do not wish to consent to access to your MyHR your medical care will not be affected in any way.
Do you give me permission to access your MyHR?"

Did the patient give consent for access to their MyHR during the consultation?
(No/ Yes, consent gained and documented in the medical record)

Patient age:
Gender:

MyHR Questions

1. Did you check the patients MyHR? (Y/N)
2. If Yes, Did checking the MyHR result in changes to patient management? (Y/N)
3. If No, Please provide a rationale (short answer)

If yes to question 2:

4. Please provide a brief explanation as to how the MyHR altered management?
5. Was the MyHR up to date with the patient's current medical information?
6. Did you upload any management changes to the MyHR? Yes / No

Prescribing Questions

1. Did you make, or plan to make, any changes to the patient's medications during the Health Assessment (including over the counter or complementary)? (Y/N)
2. If no, why? (short answer)
3. If yes, please document the changes you made to the patients medications in the following table? Please list all other current medications in the rows below.

Medication	Current medication - name / dose / frequency (please list)	Changes made to medication? (drop down) No/ Ceased/ Increased Dose/ Reduced dose/ Prescribed Alternative	Rationale (if last 3 options selected)
Inhaled Corticosteroids			
Proton-pump inhibitors (PPIs)			
Opiates			
Benzodiazepines			

Pathology Questions

1. Did you make, or plan to make, any changes to the patient's pathology testing schedule, or recalls and reminders? (Y/N)
2. If no, why?(short answer)
3. If yes, please describe the patients testing schedule at the time of the audit and the changes that were made.

Investigation (list the test type)	Current frequency	What changes did you make? (drop down list) added as new tests to test more frequently to test less frequently	Rationale

References

1. Bubner T, Laurence C, Tirimacco R. Assessing pathology training needs: Results from a survey of general practice registrars. Australian Family Physician. 2012(9):721.
2. Gardiner FW, Zhai S. Appropriate pathology ordering? Troponin testing within an Australian Emergency Department. IRISH JOURNAL OF MEDICAL SCIENCE. 2017;186(1):213-8.
3. MacPherson RD, Reeve SA, Stewart TV, Cunningham AES, Craven ML, Fox G, et al. Effective strategy to guide pathology test ordering in surgical patients. ANZ Journal of Surgery. 2005;75(3):138-43.
4. Thomas RE, Vaska M, Naugler C, Chowdhury TT. Interventions to Educate Family Physicians to Change Test Ordering: Systematic Review of Randomized Controlled Trials. Academic Pathology. 2016;3:2374289516633476-.
5. Ajjawi R, Thistlethwaite JE, Aslani P, Cooling NB. What are the perceived learning needs of Australian general practice registrars for quality prescribing? BMC Medical Education. 2010;10:92-.
6. Kamarudin G, Penm J, Chaar B, Moles R. Educational interventions to improve prescribing competency: a systematic review. BMJ Open. 2013;3(8):e003291-e.
7. Morgan S, Coleman J. We live in testing times: Teaching rational test ordering in general practice. Australian Family Physician. 2014(5):273.
8. Morgan S, Kerr R, Tapley A, Magin SP, Morgan A. Test ordering by GP trainees Effects of an educational intervention on attitudes and intended practice. Canadian Family Physician. 2016;62(9):733-41.
9. O'Brien MA, Rogers S, Jamtvedt G, Oxman AD, Odgaard-Jensen J, Kristoffersen DT, et al. Educational outreach visits: effects on professional practice and health care outcomes. The Cochrane Database Of Systematic Reviews. 2007(4):CD000409.
10. Van Driel ML, Deckx L, Morgan S, Tapley A, Mulquiney K, Henderson K, et al. Changing the Antibiotic Prescribing of general practice registrars: The ChAP study protocol for a prospective controlled study of a multimodal educational intervention. BMC Family Practice. 2016;17(1).
11. Kumar RK, Webber K, Gilbert C, Pryor W. An online tool to help doctors learn about the rational use of diagnostic investigations. Focus on Health Professional Education: A Multi-disciplinary Journal. 2014(3):94.

12. Tzortziou Brown V, Underwood M, Mohamed N, Westwood O, Morrissey D. Professional interventions for general practitioners on the management of musculoskeletal conditions. The Cochrane Database Of Systematic Reviews. 2016(5):CD007495.
13. Zwar NA, Gordon JJ, Sanson-Fisher RW. Evaluation of an educational program in rational prescribing for GP trainees. Australian family physician. 1995;24(5):833-8.
14. Alldred DP, Kennedy M-C, Hughes C, Chen TF, Miller P. Interventions to optimise prescribing for older people in care homes. COCHRANE DATABASE OF SYSTEMATIC REVIEWS. 2016(2).
15. Gillaizeau F, Chan E, Trinquart L, Colombet I, Walton RT, Rege-Walther M, et al. Computerized advice on drug dosage to improve prescribing practice. 2013.
16. Walker J, Mathers N. The impact of a general practice group intervention on prescribing costs and patterns. British Journal of General Practice. 2002;52(476):181-6.
17. Ammenwerth E, Hörbst A, Lannig S, Muller G, Schnell-Inderst P. Adult patient access to electronic health records. Cochrane Database of Systematic Reviews. 2017;2017(6).
18. Smith SM. Interventions for improving outcomes in patients with multimorbidity in primary care and community settings. Cochrane Database of Systematic Reviews. 2017(9).
19. Arora S, Kalishman S, Thornton K, Dion D, Murata G, Deming P, et al. Expanding Access to Hepatitis C Virus Treatment-Extension for Community Healthcare Outcomes (ECHO) Project: Disruptive Innovation in Specialty Care. HEPATOLOGY. 2010;52(3):1124-33.
20. Boyle R, Solberg L, Fiore M. Use of electronic health records to support smoking cessation. The Cochrane Database Of Systematic Reviews. 2014(12):CD008743.
21. Barnett S, Hodgkins A, Dijkmans-Hadley B, Bonney A, Henderson J, Harrison C, et al. A valuable approach to the use of electronic medical data in primary care research: Panning for gold. Health Information Management Journal. 2017;46(2):51-7.
22. Majeed A, Evans N, Head P. What can PACT tell us about prescribing in general practice? BMJ. 1997;315(7121):1515-9.
23. Gnjidic D, Le Couteur DG, Kouladjian L, Hilmer SN. Deprescribing trials: methods to reduce polypharmacy and the impact on prescribing and clinical outcomes. Clinical in Geriatric Medicine. 2012;28:237-53.

24. Jenkins HJ, Hancock MJ, French SD, Maher CG, Engel RM, Magnussen JS. Effectiveness of interventions designed to reduce the use of imaging for low-back pain: a systematic review. CMAJ: Canadian Medical Association Journal = Journal De L'association Medicale Canadienne. 2015;187(6):401-8.

25. Stake RE. Program Evaluation, Particularly responsive evaluation. . In: Stufflebeam DL, Madaus G, Kellaghan T, editors. Evaluation Models: Viewpoints on Educational and Human Services Evaluation. 2nd edition ed. Boston: Kluwer Academic Publishers; 2000.

26. Curran V, Christopher J, Lemire F, Collins A, Barrett B. Application of a responsive evaluation approach in medical education. Medical Education. 2003;37(3):256-66.

27. Kolb DA. Experiential learning : experience as the source of learning and development / David A. Kolb: Englewood Cliffs, N.J. : Prentice-Hall, c1984.; 1984.

28. Creswell JW, Plano Clark VL. Designing and conducting mixed methods research / John W. Creswell, Vicki L. Plano Clark: Thousand Oaks, Calif. : SAGE Publications, [i.e. 2006], c2007.; 2006.

29. Braun V, Clarke V. Using thematic analysis in psychology. Qualitative Research in Psychology. 2006;3(2):77-101.

30. Reserve Bank of Australia. Reserve Bank of Australia Inflation Calculator 2018 [Available from: https://www.rba.gov.au/calculator/annualDecimal.html.

31. Australian Government Department of Health. Pharmaceutical Benefits Scheme 2018 [Available from: www.pbs.gov.au.

32. National Asthma Council Australia. Australian Asthma Handbook version 1.3. Melbourne: National Asthma Council Australia; 2017.

33. Suissa S, Kezouh A, Ernst P. Inhaled corticosteroids and the risks of diabetes onset and progression. The American journal of medicine. 2010;123(11):1001-6.

34. Colagiuri S, Colagiuri R, Conway B, Davey P, Grainger D. DiabCo$t Australia: Assessing the burden of Type 2 diabetes in Australia. Canberra: Diabetes Australia; 2003.

35. AIHW. Vision problems among older Australians. Bulletin no. 27. Canberra: AIHW; 2005.

36. Weatherall M, Jennifer C, James K, Perrin K, Shirtcliffe P, Beasley R. Dose–response relationship of inhaled corticosteroids and cataracts: A systematic review and meta‐analysis. Respirology. 2009;14(7):983-90.

37. Independent Hospital Pricing Authority. National Efficient Price Determination 2017-8. Sydney; 2017.

38. Watts J, Abimanyi-Ochom J, Sanders K. Osteoporosis costing all Australians. A new burden of disease analysis - 2012-2022. Sydney: Osteoporosis Australia; 2013.

39. Australian Government Department of Health. Medicare Benefits Schedule 2018 [Available from: www. mbsonline.gov.au

40. Britt H, Miller G, Henderson J, Bayram C, Harrison C, Valenti L, et al. General practice activity in Australia 2015-16. . Sydney; 2016.